EVIDENCE

Oral and Documentary

RECORDED BY THE

BACK BAY ENQUIRY COMMITTEE.

1926.

PART II.

EVIDENCE RECORDED IN ENGLAND.

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11-17, Hare Street, E.2.

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The Committee Assembled at 11 a.m. on Friday, 17th September, 1926, at 6, Richmond Terrace, Whitehall, S.W.1., all the Members being present, except the Chairman.

Sir M. Visvesvaraya: The Bombay Back Bay Enquiry Committee appointed by the Government of India commenced its work on the 2nd August in Bombay. The examination of the Bombay witnesses occupied the Committee till the 24th August. The Chairman of this Committee, Sir Grimwood Mears, is expected to arrive here and join the Committee on September 26th. The regular public sessions for taking evidence will begin on or about September 29th, but for one special reason or another we have to examine a few witnesses before that date. Sir Henry Lawrence will assist the Committee by giving evidence to-day, as it is understood he will be leaving for India very shortly.

39th Witness, Sir Henry Staveley Lawrence, K.C.S.I.

Sir M. Visvesvaraya: In what year did you become a member of the Executive Council of Bombay?

A.—In April, 1921

Q.—On what date did you retire from that office?

A.—In March, 1926.

Q.—You also officiated as Governor of Bombay?

A.—Yes, the last three months after March, 1926.

Q.—You have retired very recently and you are doubtless familiar with the principal facts connected with the control or administration of the Back Bay Scheme?

A.—Yes.

Q.—Can you tell us generally what was the object of commencing this reclamation scheme? Was it to extend the area of the city or was it to have a productive public scheme, or was there any other reason?

A.—The scheme was commenced and sanctioned two years before I joined the Government.

Q.—You joined when?

A.—In 1921.

Q.—When was the scheme sanctioned?

A.—In 1919.

Sir M. Visvesvaraya: I think in 1920.

Mr. Billimoria: The official sanction was in 1920.

Sir M. Visvesvaraya: The sanction by the Government was in October or November, 1920.

A.—But work had been begun before then.

Q.—That is true.

A.—Discussions between the Government of Bombay and the Government of India and the Secretary of State went on from April, 1919, but Sir George Buchanan's report was received in October, 1919, I think. The Secretary of State's approval for raising the loan and of the other financial arrangements was given early in 1920, and the Directorate of Development was actually established from November, 1920. I think that is as near as possible the course of the dates.

Q.—The scheme was evidently sanctioned about the middle of 1920.

A.—What date the sanction of the Secretary of State was given formally I do not know, but it received his approval and was carried on with his approval from some date—about the middle of 1919. Then you said you wanted to know the purpose of it.

Q.—Yes. What was the object of the reclamation scheme?

A.—I was not acquainted with the discussion which went on at that time because I was not in India, but from my subsequent reading of the papers I gathered that there were two primary objects. The first was to improve the conditions of life for the poorer classes in the congested areas of Bombay, and the second was to reduce the heavy cost of all commercial transactions and make Bombay a more efficient and workable port by reducing the cost of land. The enormous height to which the cost of land has risen, owing to the war, and owing to the profits which poured into Bombay during the war became a very heavy burden on all the trade of Bombay, and it was to assist the future prosperity of Bombay that it was considered necessary to reclaim from the sea a large area of land in the immediate vicinity of the business quarter of Bombay.

Q.—You are aware that when the project was first sanctioned the cost was to be 367 lakhs?

A.—Yes.

Q.—That was sanctioned in 1920. The revised project was sanctioned increasing the estimates to 702 lakhs in October, 1922?

A.—Yes.

Q.—That is roughly two years after the first project was sanctioned?

A.—Yes.

Q.—Since that date the necessity for further expenditure has become evident, and according to the engineers the cost of completing the work is now likely to amount to 10 crores or a thousand lakhs.

A.—Is that so?

Sir Frederick Hopkinson: 1,100 lakhs.

Sir M. Visvesvaraya: I think it is a thousand lakhs. While the estimates of cost have doubled or trebled you are aware that the value of land in Bombay has gone down?—Yes.

Q.—You expected large profits on account of the high prices which ruled in 1920 and 1921?

A.—Some profits, yes—whether you take the figure as high is a matter of opinion.

Q.—For these and for other reasons the scheme is now expected to result in a loss to the Government?

A.—That depends on the latest estimates, which I have not seen. I do not know on what figures you say that the engineers now estimate the cost at 1,000 lakhs.

Q.—Sir Frederick Hopkinson says it will be 1,100 lakhs.

A.—I do not know on what basis that calculation has been made.

Sir Frederick Hopkinson.—On the basis of cost?

A.—I do not know who prepared it.

Q.—The Government engineers.

A.—Quite so. You do not ask my opinion on it?

Sir M. Visvesvaraya.—I only want to remind you of those figures and the present position of the works.

A.—Yes.

Q.—If Block 8 is completed and the work stopped it is expected that the net loss will be roughly four crores.

A.—If the work stops at Block 8?

Q.—After completing and selling Block 8 the loss will be Rs. 4 crores. That is the latest figure we have got from the engineers and the financial officers concerned.

A.—Yes.

Sir Frederick Hopkinson.—You might tell the gentlemen of the Press, who are not perhaps familiar with these figures, that when you speak of a crore the amount meant is £750,000, and a lakh is 100,000 rupees, which at the present exchange is about £7,500.

Sir M. Visvesvaraya.—Was the 367 lakhs estimate, submitted in 1919 or 1920, regarded as an approximate estimate at the time it was submitted, or was it treated as a regular official estimate?

A.—It was a figure put forward by Sir George Buchanan in his first report. I have no opinion as to how he arrived at that figure.

Q.—But how did the Government regard the estimate? Did they regard it as a provisional one or as a final estimate?

A.—I was not at headquarters, nor was I in India at the time. I am afraid I cannot answer that question.

Q.—But you have dealt with the later estimates—the 702 lakhs estimate?

A.—Yes.

Q.—You have heard of that, and I thought perhaps you might have gone into that question?

A.—Yes, but I cannot tell you what was in the mind of the members of the Government at the time when they saw these figures.

Q.—It is stated that the 702 lakh scheme was a final one, and that the 367 lakh scheme was only an approximate figure, the details of which had to be worked out after the preliminary sanction was given. Is that so or not in your opinion?

A.—I should think that is correct.

In one of the statements of the Government the estimate was put at 400 lakhs. It gave the impression that that was the correct amount of the estimate. There was no mention of any approximate figure on that occasion.

Sir Frederick Hopkinson.—A margin of 10 per cent. was allowed.

Sir M. Visvesvaraya.—That meant 367 lakhs plus 10 per cent. would make roughly four crores, but no mention was made that the estimate would be more than four crores?

A.—Quite so.

Q.—The 702 lakhs estimate was sanctioned in your time in October, 1922, I think?

A.—Yes.

Q.—But there has been no sanction accorded to the excess expenditure incurred since then. The estimate was sanctioned in October or November, 1920, and it was revised in October, 1922, but there has been no revision since, although there have been excesses of expenditure. Can you explain the reason why?

A.—Since 1922 or for some time, I think, we were waiting for the work of the dredger, and these estimates depend for their accuracy almost entirely on the output of the dredger. That dredger did not begin work until December, 1923. The first year's results were known in the autumn of 1924.

Sir Frederick Hopkinson.—Not till the autumn? The directorate's report of 31st March, 1924, gave them, did not they? Did not the Development Directorate's report of 31st March, 1924, give those results?

A.—No, it could not possibly do so. The work was going on until the middle of May, 1924, and the figuring out of the results was only done after May, 1924, and the reports would reach Government some time about August, 1924. When those figures proved to be unsatisfactory they were referred to Sir George Buchanan, who, I think, was in London at the time. His point of view was that the first year's working of a new machine of this rather novel type—novel size at any rate, if not type—could not be taken as a guide to its working in subsequent years, and he asked that the matter should be held up for decision for another year. The results of that second year only became known in August, 1925. Then those results have been the subject of discussion and inquiry by many engineers, and I had left India before the final figures at the last Committee of Engineers were reported to the Committee, and I do not know what those figures may be.

Sir M. Visvesvaraya.—Why was not a public statement made to that effect instead of keeping this question open for three years. I hope you do not mind my putting it to you in that way?

A.—At what stage do you suggest that a public statement should have been made?

Q.—After a couple of years or so, when you formed the view that things were unsettled and unsatisfactory, and that the project was not going to make good.

A.—That is to say after the second year's working?

Q.—Yes—not only the point about the dredger, but the exact position of the schemes might have been explained to the public—it is so stated by many critics.

A.—Quite so, it is so stated, but when was the first Advisory Committee appointed? I have forgotten the dates. It was at the end of 1924, was not it?

Mr. Billimoria: The second interim report was published on the 25th August, 1924.

Sir M. Visvesvaraya.—The witness is referring to the appointment of the first Advisory Committee.

A.—I do not quite follow the date Mr. Billimoria has given.

Mr. Billimoria: It is the 25th August, 1924, which was the second interim report on which the Government then decided.

A.—Report by whom?

Q.—By the Advisory Committee.

A.—That Advisory Committee contained members of the Legislative Council, did not it?

Sir M. Visvesvaraya: Some of them.

A.—Is not that a publication? If the Legislative Council select their members and they are put on a Committee to which all the papers are referred, is not that a publication? Nothing was kept secret by these members of the Legislative Council. There is no reason why it should have been.

Q.—It is stated that full information was not given to that Advisory Committee, and we want to know what the truth is from your point of view. It is stated that full information was not laid before that Committee. Several witnesses have deposed to us that full information was not laid before the Advisory Committee and the information asked for was not furnished on the ground they were not concerned.

A.—I should hesitate to accept those statements. I was not at the Advisory Committee, and I do not know anything of what went on there.

Q.—We only want to know why no steps were taken to take the public into the Government's confidence in this matter and keep the public informed of the progress of the work and its financial results.

A.—Well, so far as the Government are concerned, I think the answer is that when this Committee was appointed and the Government understood that the Committee had access to all information, they thought that full publicity had been achieved. No complaint ever reached the Government from this Committee to say that any information had been withheld. I never heard of any complaints at that time.

Q.—There are complaints.

A.—Now?

Q.—In the evidence given before us reference has been made to complaints made then.

A.—But not to the Government?

Q.—Yes, to the Government and in the Legislative Council.

A.—I cannot remember any such complaint ever coming to my attention.

Q.—Anyhow the excess expenditure was evidently incurred without regular sanction for two or three years?

A.—No. When expenditure has been undertaken it has received regular sanction. The estimate is that after so many years the work may cost so much.

Q.—For so much quantity of work the cost will be so much—that is the idea of the estimate. If an excess is apprehended the estimate should be revised.

A.—Yes, but no expenditure has been undertaken to my knowledge for which sanction has not been duly received from the Government with the approval of the Legislative Council.

Q.—It was stated that expenditure to the extent of over Rs. 190 lakhs was incurred without regular sanction as required by the Public Works Department Code. Can you state why this was so?

A.—That is a statement, I know. I have heard that, but that refers, I think, to the expenditure which started from 1919 on the construction of the dredger, does it not?

Q.—No, the total expenditure.

A.—But it includes that.

Q.—It must be included in that.

A.—Is the suggestion that that expenditure was unauthorised and incorrect? Is that the suggestion?

Q.—Whatever expenditure was incurred should have been publicly recorded in a Government resolution. I believe that was what the critics meant with regard to this point.

A.—It is a very technical point, is it not?

Q.—Well, it is said that expenditure on several works has been passed by Government without waiting for sanction to estimates according to the requirements of the Public Works Department Code, and the aggregate of these items amounted to over 1,90,00,000 of rupees. The accuracy of that statement was questioned, but a witness insisted that it was true.

A.—You are quoting from the auditor's report.

Q.—The witness was quoting from the auditor's report.

A.—What year?

Q.—1921-22.

A.—But the expenditure was in 1919 and 1920.

Q.—You are not concerned with it?

A.—It is a minor point that I am not concerned with it, but the Legislative Council was not in existence then. The Reformed Legislative Council was not in existence then. The Regulations under which that report was written were not drawn up and were not in existence.

Q.—Was that pointed out to the people who objected to the expenditure at the time?

A.—Yes, it was. It was discussed in the debates of the Public Accounts Committee, and it was pointed out that the auditor in question had made a slight error, because he was applying rules which were subsequently framed to expenditure which had been undertaken before these rules came into existence.

Q.—Were there any rules which prevented the recognition of the excess expenditure until the issue of a regular Government order in the form of a Resolution?

A.—My belief is that that expenditure was regularised in accordance with the rules that existed at the time.

Q.—At a later stage?

A.—At a later stage. I was not with the Government at the time, but my impression is that the procedure was quite regular in so far as the Governor and the Government of that day had power to give these sanctions without reference to the Legislative

Council, a power which was subsequently taken away under the new system. Is that quite clear now?

Q.—From your point of view, I think it is. It is stated that before sanctioning it in October, 1922, the project was not submitted to the Government of India—this 702 lakhs project was not submitted to the Government of India; neither was it brought to the notice of the Reformed Legislative Council. Can you explain what truth there is in this suggestion, or what your own view is about it?

A.—Perhaps I had better go into the machinery that was established. The Government of India had their own officer in Bombay who was working for the Government of India as Deputy Comptroller, and was also Financial Adviser to the Development Department. Therefore, any item of this kind would be reported direct by that Financial Adviser to the Government of India.

Q.—The project of 702 lakhs was sanctioned by the Local Government?

A.—Yes.

Q.—The original project of 400 lakhs was sanctioned by the Government of India and the Secretary of State?

A.—Yes.

Q.—Should not the same authority which sanctioned the original scheme have accorded its sanction to the revised estimate which was so much larger?

A.—No.

Q.—Why not?

A.—For this reason, that in the interval the whole system of Government had been changed. The Reformed Government had come into existence from the 1st April, 1921. The detailed powers of control previously exercised by the Secretary of State and the Government of India had been delegated to the Local Government, and therefore it was not within their power to interfere in this matter.

Q.—Was the Local Legislative Council consulted? The powers of the Secretary of State were withdrawn in favour of the Legislative Council to some extent?

A.—Yes.

Q.—Did you consult the Local Legislative Council in according sanction to the 702 lakhs scheme?

A.—The sanction to the estimates was, as I take it from you, given in October, 1922. That could have no effect unless and until the Legislative Council gave their sanction to the Budget. That 702 lakhs figure was put into the next Budget. The Budget was being prepared through October, 1922. That figure was printed and published immediately afterwards and was sanctioned by the Legislative Council in February, 1923.

Sir Frederick Hopkinson.—You said just now that the Government of India had no control over these estimates, or the provision of the money, but actually they found the money, did not they?

A.—I am afraid I expressed myself badly if I said that. I did not say they had no control over it. I said the same detailed control that was previously required under the old Government system, by which the Government of India had to sanction these estimates, was withdrawn.

Q.—Surely, if an estimate is doubled, it would be sanctioned by the Government of India which found the money?

A.—No. The Government of India only found the money at our expense and at our cost.

Q.—I know that.

A.—It was merely by private arrangement between the Governments.

Q.—But the Government of India had to give sanction to the scheme originally? Therefore, they would surely keep control if the scheme were to be multiplied by 10?

A.—They could interfere, and they were given an opportunity of interfering, because all these facts are published and were within their knowledge.

Q.—I have had a long discussion with Mr. Cowasjee about this subject, and, in the end, he came to the conclusion that you have come to, that the Government of India could interfere.

A.—Certainly they can interfere. They have final authority under the Act.

Q.—Naturally.

A.—It is a matter for their discretion when to interfere.

Sir M. Visvesvaraya.—When you had obtained sanction for a 702 lakhs project you had to go to the Legislative Council to get the Bill passed for the funds?

A.—For the raising of the loan, yes.

Q.—Did the same sanction hold good when your estimate was doubled in 1922? When your estimate was doubled in 1922, could you assume the old sanction as holding good in that instance also?

A.—No, we made no such assumption. We placed the new figures before the Legislative Council in the Budget of 1923.

Q.—Is the ordinary Budget statement quite sufficient for the purpose? Was not it necessary to carry it in another Bill?

A.—No. No further Bill was required. The money had to be provided by vote of the Council in the Budget debate.

Q.—That was enough, was it?

A.—That was enough.

Q.—Was not a full debate necessary on the whole question when the project was practically doubled?

A.—It could be raised at any moment by any member of the Legislative Council. He had a right, and some of them exercised the right of objecting to any particular portion, or to any item entered in the Budget. I think if you refer to the Budget debate in 1923 you will probably find that there were votes taken as to whether such and such an item in this figure of 702 lakhs should be sanctioned or should not be sanctioned.

Q.—Is that the right and correct procedure? The whole subject has to be reviewed, has not it, when the estimate is exceeded to a figure of that magnitude?

A.—It is open to review. Any member can object to the whole figure of 702 lakhs, or he could object to any item in it.

Q.—And, as you said, the Government of India could interfere?

A.—Yes.

Q.—What steps were taken by the Government of India to keep themselves informed of the progress of the work under the changed conditions and circumstances of the work?

A.—That, I am afraid, I cannot remember at this lapse of time, but they had frequent reports from the financial adviser who, as I say, was their own officer.

Q.—He confined his attention to the financial aspect of the scheme and not to the technical details or engineering aspects?

A.—I thought you were questioning me about finance.

Q.—When the Government of India sanctioned it, they also looked into the general engineering aspects of the scheme?

A.—Into the engineering part.

Q.—And also the general aspects of the scheme when they gave their sanction—I mean, they did not only confine their attention to the financial aspects?

A.—When they gave their sanction, I fancy they must have had some advice from someone—some engineering adviser, I think, they must have had, but I do not know.

Q.—I want to know what steps were taken by the Local Government to keep the Government of India informed? You first asked them to give their sanction to an expenditure of 367 lakhs, and you got that sanction. Then when the estimate was increased you should have informed them that the estimate had been doubled and that further sanction was necessary. Did you do this? Did you inform them of the change in the circumstances?

A.—I cannot remember any definite report.

Sir Frederick Hopkinson.—I presume you would send them a copy of the Development Directorate's Report?

A.—Certainly, they would get all that.

Q.—Is that the only means of communication?

A.—And the Budget debates.

Q.—Which would be at a later date?

A.—As between October, 1922, and February and March, 1923.

Q.—Generally speaking, the only information which the Government of India had as to the progress of the works was in the Development Directorate's Report at the end of the working year?

A.—Yes.

Sir M. Visvesvaraya.—The Development Directorate were submitting their annual reports. There have been no other reports, save what was contained in the speeches by the members of the Executive Council?

A.—There has been a constant stream of reports.

Q.—Were they issued to the public? Was there any definite statement of the progress of the work issued on the authority of the Government to the public at any time in these three years?

A.—Between 1922 and 1925?

Q.—Yes.

A.—There are these reports of the Advisory Committees, but they are not on the authority of the Government, exactly.

Q.—They came afterwards. They came in 1925. Until the reports of the Advisory Committee were published, what steps did the Government adopt to take the public into their confidence? Considering that the circumstances had very greatly altered, was not it necessary to take the Government of India and also the public into your confidence in these matters, since things had not been developed on the lines that the Government of India and the public had expected? That is the point I want to know about from you.

A.—I would ask you to consider very carefully the progress of time, and to consider from time to time what reports it was possible to make. In October, 1922, this estimate was passed. You accept that. In 1923 the work was going on very favourably. You accept that. The dredger had not begun. The whole trouble arose from the working of the dredger. I wish to make that very clear and emphatic.

Q.—There are various reasons. One of the reasons, as you remarked at the beginning, was the fall in the value of land. That was a very material consideration.

A.—That has not begun to operate yet.

Q.—Has it not?

A.—We are not selling any land.

Q.—You are not selling any land it is true, but the fall in the value of the land has affected the outlook.

A.—Yes, the fall in the value of the land has changed the outlook.

Q.—And considerably, too.

A.—But we have not lost one penny through the fall in the value of the land in cash, so far.

Q.—It is a prospective loss?

A.—It is a prospective loss, yes, if the value of the land does not go up again. But I want to go back to the question of the time. During 1923 the work that was going on on the wall and the work in the quarries was all work being done very satisfactorily and efficiently—well below the estimates, according to my information.

Q.—A great deal of that information is true.

A.—Therefore, there is nothing to report to the public adverse to the scheme in 1923.

Q.—You must have read the Development Director's Report. That officer made a statement before us that he economised information in order to please the Government.

A.—My knowledge of what passed in your enquiries in Bombay is very scanty, but I was unable to ascertain to what point of time the Director was referring when he made that statement, and I think the point of time is the most vital point here.

Q.—There are many vital omissions in his reports, and when questioned about them he said he did not know what the policy of the Government was and so could not commit the Government.

A.—I am not concerned with what he did or wrote or subsequently said.

Q.—I want to know whether he represented the Government view or whether the Government took steps themselves to take the public into their confidence in this matter?

A.—I think on that point I had better explain the Budget debate because it is at the time of the Budget debate that the public had the most thorough means at their disposal of finding out what was going on. The Budget debate of 1923 gave an opportunity for any member to raise these questions.

Q.—But it is alleged that members of the Government also misled the public in regard to the prospects of the work. They gave optimistic figures about the productive character of the work and about its progress. What is your view about that?

A.—Could you tell me what figure you are referring to when you speak about optimism?

Sir Frederick Hopkinson.—One member of the Government hoped for a profit of 50 crores and another said 30 crores.

A.—You say they said so in the Legislative Council.

Sir Frederick Hopkinson.—Some member said 30 or 50 crores.

Mr. Billimoria.—The statement was put that at a very modest estimate there would be a profit of 30 to 50 crores. That is a very astounding statement in view of present circumstances.

A.—Was it accepted as a serious statement?

Mr. Billimoria.—I think the public believed it.

A.—Did they?

Q.—Yes, as coming from members of the Council.

A.—Yes, but would you give me the date and the name of the gentleman?

Mr. Billimoria.—Sir Chimanlal Setalvad made that statement in February, 1921.

Sir Frederick Hopkinson.—He had been financial representative of the Government.

Mr. Billimoria.—No, he was a general member of Council.

A.—I believe you are going to have Sir Chimanlal to answer for that particular point. My own impression is that most people who heard him thought that he was mixing up lakhs with crores.

Sir Frederick Hopkinson.—No, I do not think so.

Mr. Billimoria.—It could not be that, because further on he says he is positive about it—it is not a mistake of figures.

Sir Frederick Hopkinson.—It is a general statement on what was to produce the profit.

A.—That is quite true, but when you are going to write down a number of crores you do write a number of ciphers and you may go wrong.

Q.—But it is in words.

A.—It is not for me to go into it. He had three crores in front of him and he read it as 30 crores. I think he slipped up on a cipher.

Sir M. Visvesvaraya: This is the statement: "The land produced by the Back Bay Reclamation Scheme will certainly be for people who will pay for it. But Rao Bahadur Chitale will remember that 30 or 40 crores of rupees, the profit which will be realised out of the land that will be reclaimed, will be available for ameliorating the condition of the poorer classes." This was a statement made in February, 1921. Then in another place he says: "But even supposing we can get land for Rs. 20, making all liberal allowances for mistakes and miscalculations which we do not anticipate, still bearing in mind the present market value of the land, we would make a very, very big profit on that scheme." There are also other members who made similar statements. If you were not at Bombay you would not know about them.

A.—You must get it from Sir Chimanlal Setalvad. I heard him make that statement, and I got somebody to pull his coat-tails and say three crores and not 30, but he would not alter it—he was too engrossed in his speech.

Q.—It is said that the project was sanctioned under the Reformed powers by ignoring the Reformed Council.

A.—I do not know what that means.

Q.—It is said that the Reformed Legislative Council was ignored.

A.—At what stage?

Q.—In sanctioning the 702 lakhs project. You claim that because the Budget was passed the scheme was also authorised?

A.—Yes.

Q.—You did not require sanction to the fund separately for prosecuting a work of this magnitude?

A.—Separate sanction is taken in the Budget.

Q.—That is sufficient, you think?

A.—Yes.

Q.—So if an estimate is doubled or trebled you are not required to go to the Legislative Council for funds, except to the extent of asking for funds in the Annual Budget for the year's expenditure?

A.—That is the only way in which you can make the sanction effective. If you prepare an estimate, say, in September and October, at the time when the Budget for next year is being prepared, you put that estimate into your Budget and put it before the Council, and until you put it before the Council and obtain their sanction that estimate is merely a piece of paper; it cannot be effective.

Q.—That is the procedure adopted, as I understand, for ordinary departmental estimates, but for a big scheme of this magnitude is not a special procedure necessary? Could you tell us why the work was taken out of the Public Works Department? You are not responsible for that, I know, but we wish to know what the attitude of the

Government was in those days. The work was taken out of the Public Works Department and placed under a department specially created for the purpose. Was that necessary, in your opinion? You have considerable experience of the departments of the Government in Bombay?

A.—Yes.

Q.—In your opinion, and speaking from your experience, was that a correct procedure to adopt?

A.—It was something on the lines of what was being done in England at that time. Special men were being imported, who had been found to have proved their value during the war, and given enormous responsibilities. If the Government of that day thought that they had found men outside who would do the work better than the officials at their disposal at that moment, it was within their discretion to adopt this unusual procedure. I am not in a position to judge whether or no that discretion was wisely exercised at that moment.

Q.—So, you do not express any opinion as to the correctness or the appropriateness of that procedure?

A.—No. As a humdrum official, my sympathies are all with the ordinary Department. In the Service of Engineers in India we have an extremely able and powerful body of men.

Q.—Why were not the services of these men requisitioned for this work?

A.—I cannot tell you. I assume that the authorities of that day thought that they had found something far superior to what was available in the ordinary Service of Engineers. My own experience of the Service of Engineers is that they have proved capable in India to undertake the very highest responsibilities, but beyond that I cannot go in judging the discretion of the Government in 1919.

Q.—In that Department there was a permanent staff which looked after the usual routine and technical matters?

A.—Yes.

Q.—Did not the Government take a risky step by dispensing with the service of such a staff—let alone the Departmental officers?

A.—They set up a special machinery.

Q.—A Commission or Department without any traditions?

A.—To fill those posts they imported, to a certain extent, their own officers from other Departments, and they recruited a certain number of officers from outside.

Sir Frederick Hopkinson.—Would you describe it, putting it shortly, as a big jump in the dark?

A.—No. I would not describe it in those words which you have used. It was a break away from precedent in India, but it was action of a character that was being taken continuously through the war in England and elsewhere, and we were at the moment under the influence of those special war conditions.

Sir M. Visvesvaraya.—The circumstances and atmosphere were peculiar then, in your view?

A.—Yes.

Q.—Could not the work have been equally sufficiently done, with the aid of experts, perhaps, by the Public Works Department?

A.—My sympathy is all with the Public Works Department. I think they are a very capable body of men.

Q.—So you are inclined to the view that it was a mistake to have created a separate Department for this one work?

A.—I cannot go further than I have said. I am not prepared to say it was a mistake. I say that it was an act of discretion of the Government at a time when I was not associated with it.

Q.—Were all the members of the Executive Council kept informed of the progress of this scheme?

A.—At what date?

Q.—In your time—when you were there?

A.—All the members of the Executive Council—no. We are divided up into departments. We cannot carry on our several responsibilities if we are constantly ascertaining what our neighbour is doing. We have to have departmental responsibility very clearly defined.

Q.—But, in the case of a scheme like this, do not you take counsel together?

A.—On any large problems that arise the Governor is entitled to the advice of all the members of his Council.

Q.—Is it not binding on him to take the advice of all the members of the Council?

A.—No.

Q.—Even on such a big scheme as this?

A.—The powers are laid down in certain published rules, which I am afraid I must refer you to.

Q.—I want a statement of fact—whether the Governor is or is not bound to take the advice of all the members of his Council in sanctioning a scheme of this magnitude. Is he not so bound under the rules?

A.—There again you come up against the Budget and the Budget procedure. The Budget is placed before all the members of the Executive Council when the Budget is discussed.

Q.—The Budget, in a general way, comes under administration. That is the time when all the differences are brought forward?

A.—I am not speaking of the Budget before the Legislative Council. I am speaking of the discussion of the Budget in the Executive Council.

Q.—It is brought before them at that time?

A.—Yes.

Q.—Otherwise it does not concern all the members to sanction it?

A.—No particular problem is likely to concern other members than the administrative head of the Department.

Q.—That is all. Were the Ministers kept informed of the progress of the work, or they did not count at all?

A.—They took part in the Budget discussion at the Executive Council.

Q.—Do the Ministers take part in the Executive Council in discussing the Budget?

A.—The whole of the Budget is discussed by the Cabinet, including the members and Ministers equally.

Q.—That does not entitle them to enquire into the individual schemes on that occasion, except, perhaps, their financial aspect?

A.—Well, there is a very free and full discussion on any point which any member wishes to raise.

Q.—You did not answer one question I put at the beginning very clearly, namely, whether the regular project estimates for the scheme were commenced after preliminary sanction was given to the 400 lakhs estimate. Did you take that sanction as a sort of general authority to commence the work on, or did you rely on the estimates as giving complete cost of the whole scheme? In the correspondence it was stated that the regular project estimates were commenced after the work had been in progress for 18 months. Are you aware whether this was the case?

A.—May I ask whose statement is that?

Q.—You may read it in the second report of Sir George Buchanan, in which he agreed to a detailed estimate in February, 1922. His original report was in 1919. So that the detailed estimates were not prepared until about 18 months to two years had elapsed. The revised estimates were prepared in May, 1922, and sanctioned by the Government in October of that year?

A.—They must have been begun before May, 1922.

Mr. Billimoria.—Yes, the revised estimates must have been before that, because the original report was in 1919.

A.—I am sorry if I have not answered that question clearly, but, as I understand the sequence of events, the estimate of 4 crores, or 400 lakhs, was in October, 1920.

Sir M. Visvesvaraya.—That is right.

A.—The Development Department was created and came into being in November, 1920.

Q.—About the same time?

A.—Immediately after Sir Lawless Hepper and his officers were constituted the Department.

Q.—It was formally constituted on November 18th, 1920?

A.—Sir Lawless Hepper and his officers were appointed then.

Q.—Yes?

A.—Then the first business they were concerned with was the preparation of these detailed estimates.

Q.—When you sent up the estimate for 4 crores, did you say that the detailed estimates would be prepared later? Or did you give the Government of India the impression that they were the final estimates and that they were complete and correct? I want to know what your view is from your knowledge of the circumstances of this project?

A.—Again I must say I was not in India in 1920 when the project was made or dealt with of 4 crores.

Q.—You have been through the correspondence about it. You have been meeting the views of the critics of the scheme so often that I thought you might know all about it?

A.—This point is not within my recollection.

Q.—I want to know why the statement was first made that the 4 crores estimate was to be sanctioned, and then later on why it was stated that the detailed estimates had to be commenced after the 400 lakhs estimate was sanctioned?

A.—You have the explanation of that in that the 4 crores estimate was prepared by Sir George Buchanan. When Sir Lawless Hepper came on the scene he found that the estimate was not in sufficient detail. He thereupon prepared revised estimates, with the help of his officers, and those officers, I assume, must have taken 18 months to prepare those estimates in full detail, and those estimates are finally sanctioned in October, 1922.

Sir Frederick Hopkinson.—Do you suggest that an estimate of that kind should take 18 months to do?

A.—I am afraid I am not able to tell you whether that was the time taken, but there were a very large number of hands through which these details went.

Q.—An estimate made in January one year is very often invalidated by June of the following year by alteration in prices.

A.—Yes. I am not aware of the progress of events in regard to those estimates in those years.

Sir M. Visvesvaraya.—There are two or three important allegations on which I should be glad if you would favour us with your views. One is that the work was started on insufficient investigation and preparations. What is your opinion upon that point? Was the work started on insufficient investigation or not?

A.—Well, may I ask if the Committee have had before them the statement that I made to the Legislative Council on the subject of the Budget debate in 1923 or 1924?

Sir Frederick Hopkinson.—I should very much like to see that. I have been looking for it, and cannot find the one you are speaking of now. The first we have got is 1926.

A.—Have not you got the Budget debates of the earlier years?

Sir Frederick Hopkinson.—We have only 1925 and 1926.

A.—I see. I did give my view of the inception of this project in the speech that I made to them. I wrote the speech. I was actually ill in hospital, and it was delivered by Mr. Cadell in February, 1924.

Q.—We will try and get that from the India Office.

A.—I believe I have got it here. It is February, 1924. That is the one I refer to.

(*Document handed in by the witness.*)

Sir M. Visvesvaraya.—Could you put that statement in a few words for us?

A.—Well, I put it as briefly as I could then.

Q.—I want to know whether the work was started on insufficient investigation and preparation or not? I want you to give us your view generally on that.

A.—Well, I will have to go into rather a lengthy history, I am afraid. The idea of relieving the congestion at Bombay started 30 years ago in 1897, when the plague first came to India. The Improvement Trust was started then.

Q.—I mean the preparation for this scheme, or this project. What steps were taken to carry out a complete investigation before recommending this particular scheme? That is what I want to know. We are not concerned with the earlier stages.

A.—But I think you must be concerned with it.

Q.—Everybody knows about the origin of the Improvement Trust.

A.—They do not. I am perfectly certain that the gentlemen who are sitting here (the witness pointed to the Press table), who are the most important people in the Empire, do not know.

Q.—Very well, perhaps you will state it, and they will appreciate it, and we shall also understand it.

A.—Well, as I say, Bombay was visited by the plague in 1897, and the City Improvement Trust was started in that year by Lord Sandhurst. That was to relieve congestion in the slums and to turn the population gradually away to the north of the island. That work has been proceeding very slowly for 30 years. After Lord Sandhurst, 25 years ago, every Governor who has touched the question has had his mind directed towards enlarging the island at the southernmost point, rather than pushing on with the original scheme of diverting the population to the north. Governor after Governor has discussed this question. Lord Lamington pressed it on the attention of Lord Sydenham, and Lord Sydenham left it to Lord Willingdon, and Lord Willingdon left it to Lord Lloyd.

Through all those successive Governorships the matter had been examined by numerous engineers. It came to a very clear point in 1908, when Lord Sydenham sent up a scheme to the Government of India.

Q.—I remember that.

A.—Yes.

Mr. Billimoria.—When you talk of numerous engineers, could you give us any names, because so far as any records go, no other engineers were consulted beyond Mr. Kidd and Sir George Buchanan. Who were the engineers who were consulted?

Sir Frederick Hopkinson.—There was nothing about engineering in connection with the scheme until 1912. At least, we have not got anything in the records.

A.—1912 was Lord Willingdon's time. Lord Sydenham, as you gentlemen are aware, was himself on engineer, and he went into the question in great detail in 1907 and 1908.

Sir Frederick Hopkinson.—Lord Lamington had it in 1907 apparently?

A.—You are quite right—Lord Lamington in 1907 and Lord Sydenham came in 1908. Is not that right?

Sir M. Visvesvaraya.—About the end of 1907?

A.—Yes. I have here a letter from Lord Sydenham which might interest you: 'I took up the Back Bay project as soon as I had time, because Lord Lamington urged it upon me. With the assistance of Cameron, who was chief engineer in the Public Works Department at that time, and Mr. Kidd, the whole scheme was worked out in detail, and I examined it most carefully as an engineer.''

Sir Frederick Hopkinson.—That would be 1912.

A.—1908, I think—between 1908 and 1912.

Q.—It was in 1912 that Mr. Kidd did it. Mr. Kidd made borings in 1912.

A.—Lord Sydenham became Governor in 1908, and he says he took it up as soon as he possibly could, and that would be in 1908. Then he goes on: "I trusted Mr. Kidd's careful examination of the available stuff in the harbour, which, of course, I could not check." You have no doubt seen Mr. Kidd's report and the chart of the harbour.

Sir Frederick Hopkinson.—Mr. Kidd's report is the basis of all the work which has been done. It has never been checked to this day.

Sir M. Visvesvaraya.—I was referring to the point as to the investigation being insufficient. To this day the engineers are relying on the results of Mr. Kidd's surveys. No further surveys have been made since 1912.

A.—Well, that is an engineering point which Sir Frederick Hopkinson will advise you upon. My opinion is worthless, but is it suggested that the bottom of the harbour has changed in its character in those years?

Q.—No, it is suggested that the investigation was not sufficient, and that the surveys were not complete.

A.—Well, I personally examined Mr. Kidd's chart, but not being an engineer I am unable to say.

Sir Frederick Hopkinson.—I think what the chairman means is this: that Sir George Buchanan, when he went out, took Mr. Kidd's report holus-bolus, and never examined it or checked it in any way at all, and that report of Mr. Kidd is the basis of the entire scheme as it exists to-day.

A.—I should think that is very probably correct. You asked me whether I considered that sufficient or insufficient. My opinion upon that point is valueless.

Sir M. Visvesvaraya.—Do you not think that it was such insufficient investigation that led to the project being under-estimated at the time?

A.—I do not know that my opinion on that point is worth anything.

Q.—Are you aware that if the Government had gone into the project very carefully they would have found that the reclamation might have been completed by dry filling cheaper than it is likely to cost now? We have had several witnesses before us who have testified to the fact that for about 5 crores you might have completed the scheme without resort to any scientific appliances like the dredgers. If this question had been fully investigated at first a good deal of trouble might have been saved. Is it not so?

A.—I think I must assume that it was investigated, and that the reports were that filling by means of suction dredgers must be cheaper and quicker than filling by dry filling by trains.

Q.—It would be cheaper at 367 lakhs, but it was not cheaper when you sanctioned an estimate for 702 lakhs?

A.—Well, I cannot tell you.

Q.—You are aware that the Government had been committed to the purchase of the dredger before sanctioning even the first scheme of 400 lakhs. Are you aware of that or do you want to refresh your memory on that point?

A.—That may be technically correct, but I do not suppose that is correct in the broad sense. The Secretary of State's final consent to the scheme may not have been received, but the Secretary of State's approval was behind the scheme before the dredger was ordered.

Sir M. Visvesvaraya.—That may be so. We do not know exactly what passed about that. I only want a statement of fact recognised, namely, that the dredger was ordered before the scheme was sanctioned.

Mr. Billimoria.—Officially sanctioned?

A.—Before the technical sanction was received?

Sir M. Visvesvaraya.—Yes.

A.—I believe that is so.

Q.—If the Government had not committed themselves to the purchase of the dredger they would have found that a dry filling scheme for five crores would have been much more satisfactory than a 702 lakhs scheme to which they committed themselves later?

A.—I very much doubt it. I very much doubt whether a five crores scheme with dry filling is at all possible.

Q.—We have got before us evidence of engineers given in Bombay?

A.—Very well.

Mr. Billimoria.—That would be an engineering question.

Sir M. Visvesvaraya.—It is a very important question. You have about 29 million cubic yards of earth work to do and at about Rs. 1.5 per cubic yard the cost of filling would be Rs. 435 lakhs. With the sea wall added the cost might come to something like five crores. You may accept this because the Commission has been supplied with evidence by previous witnesses.

A.—Very well.

Q.—So that the commitment of the Government to purchase dredgers before the scheme was sanctioned has led to subsequent heavy losses?

A.—On the working of the dredger up to date—not if the dredger had worked as it was estimated by the makers that it would work.

Q.—As estimated in the original 400 lakh scheme you mean?

A.—Yes.

Q.—Did you consider when you sanctioned the 702 lakhs scheme that dry filling would be more costly? Did you go into that question at all?

A.—You are talking of at that time?

Q.—If you take it one rupee eight annas per cubic yard?

A.—Yes.

Q.—You may be surprised to learn that Sir Frederick Hopkinson holds that it is likely to cost one rupee not one rupee eight annas per cubic yard if the matter is properly gone into.

A.—I am very glad to hear it, but on the figures that were before the Government the dredger filling would have been one rupee three annas a cubic yard. Is not that so?

Mr. Billimoria.—Five annas a cubic yard?

A.—One rupee three annas is what it was raised to.

Q.—The original estimate was five annas.

A.—Do you say one rupee eight annas a cubic yard would be preferable to the dredger if it worked at five annas a cubic yard?

Sir M. Visvesvaraya.—The cost of the dredger is a crore and a half, and therefore the whole cost has gone up. If you had not committed yourself to do the work by dredging you might have completed the scheme for four or five crores. As it is, the final scheme might cost 10 or 11 crores if it is to be completed.

A.—With dry filling?

Q.—Yes, so the work which might have been completed in the ordinary way for five crores we will be doing with scientific appliances at a cost of perhaps 11 crores. That is the position. That is what the public seems to be up against.

A.—Those figures have been reported since I left India, and I have not seen them. I find it a little difficult to follow them. Perhaps you can give me any particular point on which you want information from me.

Sir Frederick Hopkinson.—Perhaps I can help you on this point. Sir George Buchanan's estimate in 1918 said that he was going to do the whole of the pump filling for eight annas a cubic yard. The provision of the machinery alone divided by

the quantity of work to be done cost approximately 12 annas a cubic yard before he commenced dredging.

Sir M. Visvesvaraya.—Five annas was the estimated working cost.

Sir Frederick Hopkinson.—No, five annas is the original cost in 1912. Eight annas was his cost in 1919, including everything. The provision of the machinery alone cost 12 annas before he had dug a single yard. That is the position.

Sir M. Visvesvaraya.—A new Department having been created, we find from the reports in the Department that the question of appointments was left practically to the consulting engineer. The purchase of materials was also left to him and to the engineer on the works who was his subordinate, and who practically was his nominee?

A.—Yes.

Sir M. Visvesvaraya.—Was it right to trust responsibility to a person who had no stake, and on whom the Government had no hold?

Sir Frederick Hopkinson.—All the purchases were made through the director of contracts in London.

Sir M. Visvesvaraya.—No; there is no report by any other person except by the consulting engineer and his assistants. That would not have been the case had the work been carried out by the Public Works Department. Perhaps you are not prepared to express an opinion on that. All I say is: was it right to entrust such great responsibility to persons in the temporary employ of the Government, or who were doing business with the Government in a temporary capacity?

A.—If you employ contractors you give them very great powers.

Q.—But in this case the responsibility was not limited by the rates which govern a contract. But in the present case the responsibility was all on the Government and the work was done at the will of the consulting engineer and his officers. You said all the trouble had arisen mainly from the failure of the dredgers?

A.—Yes, that is the main point on which the whole thing pivots.

Q.—What steps did the Government take when they discovered that the dredgers were not giving the required output?

A.—Well, it was discussed between the director of development, Sir Lawless Hepper, and Sir George Buchanan, the engineer controlling the work from London.

Q.—What did it lead to? What practical action did the Government take in order either to improve the work of the dredgers or to adopt any new policy in carrying out the works when the difficulty came to light?

A.—There have been only two years' working.

Q.—But two years is a long time Interest is accumulating at the rate of about 30 to 40 lakhs per annum.

A.—When I say two years' working seasons, I mean from November to May. That is the whole of the working season. The results of the first working season were reported in August, 1924. They were discussed with Sir George Buchanan, who advised the Government that a machine of this complex character could not be expected to work well in the first year.

Sir Frederick Hopkinson.—Did he actually say that?

A.—Well, not to me.

Q.—Did he say that to the Government?

A.—That is the information that reached me—and that the crew were not experienced and had to be trained to it. There were some difficulties with the crew. Some of them had to be replaced, I understand, because their work was unsatisfactory in every way. Fresh men had to be trained in the following year.

Q.—You have no definite knowlege of that?

A.—No.

Sir M. Visvesvaraya.—I do not think you ought to say that.

Mr. Billimoria.—Was that at any stage mentioned in any of these official reports by Sir George Buchanan?

A.—Which statements?

Q.—The statements you have made either about the crew or otherwise. Did he make any statement in any of these official reports? We do not find anywhere that he did, but, on the contrary, he says: "The crew worked very satisfactorily."

A.—Well, I do not know what he may have written. These reports were not shown to me, but my own information is that the crew were not working satisfactorily.

Sir Frederick Hopkinson.—As a matter of fact, the reason the dredgers could not work the first year was because they had not got the crew there. They had not got a

sufficient crew there. They had only got enough men to work the dredger a single shift for the whole of the first year?

A.—Well, I take that from you, Sir Frederick; but I went on board the dredger several times, and my impression was that some of the men were giving trouble. I give that to the Committee for what it may be worth.

Q.—That is not an uncommon thing since the War?

A.—Quite. It is very common; but we have rather drifted away from the question which you put.

Sir M. Visvesvaraya.—I want to know when they found the work of the dredger unsatisfactory, what steps were taken by Government to improve its efficiency?

A.—Well, as I was saying, at the end of the first season in August, 1924, the Government were advised by Sir George Buchanan that the first year's results could not be accepted as a guide to the final results. Therefore, we waited for the second year's results, and those second year's results were worse still. Now we have got the third year's results, and those results are not within my knowledge officially.

Q.—They are more favourable.

A.—They were reported after I left India; but I understand that at the end of the period, from April, the last six weeks, they were very much more favourable.

Mr. Billimoria.—They were more favourable, but not very much more favourable.

A.—Not for those six weeks?

Q.—The dredgers were expected to give about 5,000,000 cubic yards per annum. The maximum they have given so far is 1,800,000 cubic yards.

A.—That is this last year?

Q.—Yes.

A.—I want to be a little more clear on that point. Is it not the case that from April last, in the last six weeks, the work was very much better than in any other part of the whole period?

Q.—Comparatively, it is so.

A.—What is the figure per hour for the last six weeks?

Sir M. Visvesvaraya.—The figure for the last season averaged about 950 cubic yards per hour.

A.—As against 600 in the first year and 460 in the second year?

Q.—Yes.

A.—So that it is more than twice as good as the second year?

Q.—Yes; and it might be better.

A.—I want to drive home this point. It is twice as good in the close of this last season as the average of the year before.

Sir Frederick Hopkinson.—You must take these figures of six weeks with a grain or two of salt.

A.—Oh, very well; but you have, no doubt, noticed that the bonus system was introduced from the 1st April, and that coincides with this improvement. Whether it is an accurate and genuine improvement, I do not know.

Sir M. Visvesvaraya.—Do you happen to know why no guarantee for the efficiency of the dredger was obtained in placing the contract with the builders? That is a very important point, is not it?

A.—No; I do not know that. It is 1919.

Q.—When the dredger failed to give satisfaction, did not you take steps to ask the manufacturers to put it right?

A.—I think you have had that evidence from Mr. Cowasjee. It was done by Mr. Cowasjee in his department.

Q.—He has not given any definite answer on this point.

A.—I have only got rather remote knowledge that there was correspondence with them.

Q.—It is now recognised that the scheme is a failure, is it not?

A.—I do not know. That is for you to say.

Sir Frederick Hopkinson.—That is anticipating our report.

A.—And what is a failure? What do you mean by a failure?

Sir M. Visvesvaraya.—The Committee in Bombay, which went into the scheme last month, have stated that the completion of the scheme is not now a practical financial proposition. I do not know what your view is.

A.—Let us have the figures.

Sir Frederick Hopkinson.—We do not accept them.

Sir M. Visvesvaraya.—I am just asking what your own view is as to the position of the scheme, under the circumstances we have discussed, up till now. Do you consider the scheme a success, or is it still on its trial, or is it a failure?

A.—I say it is still on its trial. I have not seen the last reports, but the word "failure" is, I think, premature. It is all a question of what it is worth while for the Government to pay for this enormous increase to the business quarters of Bombay.

Q.—But the value of the land has gone down very considerably.

A.—At the moment, yes; so has the value of the cotton mill shares. One depends on the other. But the cotton mill shares are going to move up again, are not they?

Q.—Have you any suggestions to make with regard to the future of the scheme in the present circumstances?

A.—Do you mean as to completing it or not?

Q.—We have to make our own recommendation, and we want to know what you, as an administrator, think should be done?

A.—1 and 8 are practically completed.

Q.—1 and 8 are practically completed.

A.—What about 7?

Q.—That is under discussion. Opinion is partly in favour and partly against it.

A.—I should say that it would be wise to go on with 7 as rapidly as possible this next season with the dredger.

Q.—You think so?

A.—Yes; complete the sealing of the wall, and pump in with the Sir George Lloyd dredger throughout this next season. It is shallow land, as you know. You know the depth varies very much from 3½ cubic yards to the square yard in No. 8. In No. 8 it is about 3½.

Q.—That is the average depth?

A.—That is cubic yards to the square yard.

Q.—It may be so.

A.—In No. 5 it is 7 cubic yards to the square yard.

Q.—Not so much; it is about 5 or 6.

A.—No; it is over 6, in my recollection. In Nos. 4 and 5 it is between 6 and 7. You have got that in the interim report. In No. 7 it is very little over 4. Obviously, it will be much cheaper to do No. 7 per square yard than 4 or 5 or 6.

Q.—Nos. 3, 4, 5, or 6 are hopeless for the present?

A.—I would not say they are hopeless; but, at any rate, they are more expensive than No. 7.

Sir Frederick Hopkinson (to the Chairman).—I do not think you ought to give expression to an opinion of that sort,

Sir M. Visvesvaraya.—Why not?

Sir Frederick Hopkinson.—It is rather anticipating our report.

Sir M. Visvesvaraya.—I want to let the Witness give his view. We may or may not accept the evidence on the point. What other blocks do you wish to see completed?

A.—You have to go on with No. 1 this next winter, and now we are going step by step. It is very important that you should carry on with No. 7 immediately.

Q.—It is stated that No. 7 is not a thoroughly sound financial proposition?

A.—I do not believe it, when there is less than half as much filling in No. 7 than in the blocks higher up.

Q.—And the others?

A.—That will take you through next winter, and if the dredger works fairly satisfactorily next winter, say, at the rate of 950, which it is said to have been working at at the close of last season, then you can think later on what to do with regard to the dredging of the other portions. In any case, I regard it as of the most immense value to Bombay that as much as possible of this reclamation should continue. I would like your Committee to consider the geography of the island. It resembles New York in its geographical position, and you, Sir, who know New York, know how immense the traffic problem in New York at the present day is. You know that Bombay City is going to get into the same condition as New York and will not have the same possibility of lateral alleviation as New York has. You know the value of land in Bombay City during a period of time rose to the same value as land at the Bank of England here. Do you know that, because that is so, if you work out these figures?

Q.—It is very high indeed. The highest rents in Bombay are sometimes higher than they are in London.

A.—That is throttling the trade in Bombay. It is throttling the life of Bombay. It is the hold that a small group of landowners in Bombay City has on the trade of

Bombay that is the greatest danger to the life and prosperity of Bombay in the future. Here is an opportunity for doubling the whole of the business quarter of Bombay and shifting it a bit more out here to the west and avoiding the traffic problem of New York, diminishing the cost of all mercantile and commercial life in Bombay and making the future prosperity of Bombay. To value that in terms of 20 or 30 or 50 rupees a square yard is, I think, unwise.

Q.—Would you not leave the work as it is and take it up after four or five years, when again prosperity returns to Bombay? In the meantime interest will be accumulating, and Bombay is in distress now financially?

A.—That, I think, is a question which will have to be decided in the light of further experience. I am very doubtful whether the experience that we have got up to date is sufficiently sound and certain to form a final judgment upon it.

Q.—I have only one remark to make now. If you wish to give any information or explanations calculated to remove misapprehensions in the course of examination by my colleagues, we will welcome them.

Sir Frederick Hopkinson: I understand that the only means of communication as to the progress of the works from the Government to the public generally has been the Annual Reports of the Development Directors?

A.—No; there are the Sessions of the Legislative Council. During these Sessions any member of the Legislative Council can raise a debate on any point of public interest. There have been debates on questions affecting the Bombay Development Department. In those debates the member of Council affected has to give his reply and enlighten the public.

Q.—But nothing in the nature of a general detailed report would be given on those occasions?

A.—Papers may be presented.

Q.—But have they been presented, do you know?

A.—I think they have, but I could not be certain.

Q.—My impression is that the only reports have been those of the Annual Reports of the Development Directorate to the end of the financial year?

A.—That is possibly the only official communication to the public, if you exclude as valueless the discussions in the Legislative Council.

Q.—I have no knowledge of them, so I cannot exclude them as valueless.

A.—There are very frank expressions of opinion by some members who have appeared before you.

Q.—Those very frank expressions of opinion would not be anything in the nature of a Report from their Government?

A.—They would draw forth a Report from the Government. They have to be replied to and explained.

Q.—I want to suggest that the Reports of the Development Directors on the Back Bay Reclamation Scheme have been extremely meagre. Do you agree with that? You know them, of course?

A.—I have seen them.

Q.—Would you describe them as full?

A.—I am afraid I do not remember them. They appeared at a time when the Finance Department was rather pressed, and, beyond a cursory reading of them, I did not form a very definite judgment of them, I think.

Q.—I will just go through two or three of them. For the year ending March 31, 1921, in July it was stated that the cost of land values for building would in June, 1929, be 28 rupees a square yard. For the year ending March 31, 1922, it was stated that the detailed estimates were practically completed and they show no real difference from those of last year, namely, 28 rupees a square yard, but probably the actual figure would be less.

A.—The figure of what?

Q.—Of 28 rupees a square yard?

A.—That was stated when?

Q.—March 31, 1922. Then in February, 1922, it is stated that 50,000 chawls—that is, single-room tenements—have been reduced from 50,000 to 17,000. Can you tell us why that was done?

A.—That does not come into Back Bay?

Q.—No, but I am going to bring it in in relation to Back Bay. Before I do that, can you tell us why that was done?

A.—Yes; the prosperity of the cotton mills had fallen off very greatly. There was far less employment in Bombay. Masses of people who had migrated into Bombay are

believed to have left in very large numbers, and the population for which those chawls, or tenements, were being built was found to be very much smaller than was anticipated when the scheme was started.

Q.—In other words, the scheme was started when Bombay was flooded with population?

A.—Yes.

Q.—I believe in one case they said the provision of these extra chawls was in order to put in half the population of Bombay?

A.—If that was stated it was somewhat of a wild statement.

Q.—I do not think so. This is in the Development Committee's Report of 1922: "The population provides for 600,000 new immigrants and it is stated half the present population."

A.—What provides for 600,000—I do not follow it?

Q.—New chawls. I suppose it means the population to be provided for by the new chawls is 600,000.

A.—It is a very badly written sentence.

Q.—I will have the exact sentence looked up. It is for the year 1922. It goes on and says: "In addition, a large population will be accommodated in other schemes." This is the exact wording of it: "On a conservative basis the figures may be taken as under." And then it gives three schemes: "Back Bay, 50,000; Housing Scheme, 50,000; Tenements, 250,000; Suburban Schemes already notified, 300,000, making a total of 600,000 or about half the present population of Bombay." That is the official document.

A.—May I see it?

Q.—Certainly. (*Document handed to the Witness.*)

A.—I do not understand about the Housing Scheme. The figure I found difficult to understand from you was that the Housing Scheme, 50,000 tenements, should provide for 600,000?

Q.—Yes, it is only a portion of it—it is 250,000.

A.—Yes, there are five persons taken to a tenement and I could not understand 12 persons being taken.

Q.—You see what they are providing for. I am going to suggest to you that possibly the public were alarmed by a sudden drop from 50,000 to 17,000 tenements, showing that the estimate of requirements was hopelessly wrong, and that it was made at a time of scare without consideration to the probability of the peak falling?

A.—Yes. You say that was a probable cause of public alarm?

Q.—Yes, and that probably alarmed the public also in connection with the Back Bay Reclamation Scheme—that a thing had been started that was started without due consideration, in the same way that they started these 50,000 tenements.

A.—Well, there may have been some connection in the public mind between the two, but the two are quite distinct.

Q.—I agree.

A.—The Housing Scheme is in a totally different quarter of Bombay.

Q.—That is what I wanted to get at. You said just now that the purpose of this Back Bay Reclamation Scheme was the improvement of the conditions of the poorer classes?

A.—Yes.

Q.—I wanted to see how you connected that up?

A.—Well, we must deal with the general economic condition of Bombay City. Bombay City depends very largely on its cotton mills. The profits of those cotton mills before the war were about two and a-half million pounds a year. During the war, and for a year or two afterwards, they went up to over ten million sterling, or fourfold. That money very largely poured into the pockets of the middle classes of Bombay. Those classes became richer and richer than they had ever dreamed of being in their lives. They began to migrate out from the congested areas of Bombay into all the possible surrounding tracts. A very considerable number have migrated out of Bombay into the hinterland. Others came up on the hills, Malabar Hill and Cumbala Hill, and then went into other parts—in the northern part of Bombay.

Q.—That is the middle classes?

A.—That is the middle classes. An enormous amount of building went on. They vacated their houses, which became available for the classes immediately below them. There was a regular move up of the standard of life, and the poorest classes, in the end, benefited by there being rendered available for them accommodation which would not have been available otherwise.

Q.—What I did not understand was why the Back Bay Reclamation Scheme would improve the condition of the poorer classes?

A.—Because it will provide accommodation for the residence of large numbers of people near their business, which will again make a wider space in the congested areas.

Q.—It is remote, not direct?

A.—Not absolutely direct.

Q.—It is remote. Having regard to the cost of the Back Bay Reclamation Scheme, do you believe the middle classes would ever be able to afford to live there?

A.—I do not know. If you knew the conditions under which they are living now in the centre of Bombay——

Q.—They may be bad, but the cost of the Back Bay site will be so heavy that I doubt if the middle classes will ever be able to live there?

A.—Yes, but people will spend on rent in India, in these conditions, a larger proportion of their total livelihood than they will do in England.

Q.—But they cannot spend more than they have?

A.—That is true.

Q.—To go to another matter, I thought I understood you to express the opinion that the dredger was the crux of the whole scheme?

A.—I think so.

Q.—The dredger arrived in Bombay in March, 1922, and it commenced working in December, 1923, having been idle for a period of about 20 months. It then started work having only enough crew to work at a single shift until the end of that season, which was about May, 1924. The reports of this work done, you said, were communicated to the Government in the following autumn—about August. Can you tell me why the Government did not get reports of the work done earlier than that?

A.—This is August, 1924, is it not?

Q.—Yes, August, 1924?

A.—I am sorry I was not in India then.

Q.—Were you not in India in the following year?

A.—Yes, 1925.

Q.—The same question applies to the following year. Why did they not get the reports before the autumn?

A.—The autumn is perhaps the wrong word.

Q.—You said autumn first, and then August was mentioned. August is after the end of the working season?

A.—Yes.

Q.—It is some three months after the end of the working season?

A.—Yes. I understand various calculations have been made by the engineers which would take them a considerable time into June. Those calculations drift up through the various departments, through the Director of Developments to the member in charge, and I think they would reach him about the middle of July, or thereabouts—I speak subject to correction, but that is my impression—and the other members of the Government would hear about it after that.

Q.—In August?

A.—Generally at the end of July they are having the Legislative Council Session, and the ordinary business has to lie dormant. When that is over we get back to normal administration.

Q.—I understood you to say that you were not able to mention the matter to Sir George Buchanan till after August, 1924, for the reason that you had not got the information?

A.—I do not wish to pin myself to that date at all.

Q.—The Autumn?

A.—Well, I do not know. I was home, sick, all that time.

Q.—Then take the next year. My question applies to both years?

A.—1925, you mean?

Q.—Yes. I think it was communicated to Sir George Buchanan as soon as Mr. Cowasjee——

Q.—The first year it was communicated to him, and he said : " It is nothing to go by. We have only been working a whole season. You cannot judge a dredger of this kind on a whole season's working."

A.—That is what I understand.

Q.—Then next year you could not communicate with Sir George Buchanan until after August?

A.—Yes, I think so. That correspondence does not pass through me. I only have an indirect knowledge of it.

Q.—As a member you would know pretty well what was going on?

A.—Generally speaking, yes.

Q.—May that be taken as the measure of the control exercised by the Government of Bombay—to wait results from December until August with a valuable plant costing one-and-a-quarter million sterling? The dredger began in December?

A.—Yes.

Q.—You did not get any results until the following August? Therefore, you could not do anything on those results until three months after the season had ended. I ask whether that may be taken as the measure of control exercised by the Bombay Government?

A.—Well, this is not a very easy question to understand.

Q.—It is a very difficult one to answer, I am afraid.

A.—Well, the Bombay Government consists of various portions.

Q.—I am speaking of the Government as a whole?

A.—From December, 1923, I believe, Sir George Buchanan was for some time on the spot, and he and Sir Lawless Hepper, the chief engineer, would be watching the work of the dredger, so that, in so far as they represented the Government of Bombay, they were not waiting until August, 1924, to ascertain how the dredger was working.

Q.—They may have been watching it, but you do not get any results till August. You can go out and watch a thing till you are black in the face and it will not tell you anything. What I want to know is, why did you not get results before August? Why did you not get results the next week?

A.—That is a question you must ask the engineers. I have no doubt you have asked them. We had to depend on our engineers, who told us they could not give us any infomation until the end of the season.

Q.—Were you satisfied with that explanation?

A.—We had to rely on our engineers in matters we did not understand.

Q.—Surely you can understand the question of measuring up the work done? It does not need any great knowledge to understand that. Surely the Government can say, "You have dug a hole, now measure it up. What does it consist of, and how much has been dredged out of it?"?

A.—As far as I know, that is left to the administrative head of the Department.

Q.—This dredging plant is the crux of the entire scheme, a scheme which is going to cost 702 lakhs. Yet the Government of Bombay is so little interested in knowing how the heart of the machine is working that they wait till August to know what it did in the previous December? Is not that so?

A.—May I suggest that perhaps you think it is the Government of the City of Bombay. It is the Government of the Presidency of Bombay, with many pre-occupations.

Q.—I am thinking of the Government of the Presidency of Bombay?

A.—Very well.

Q.—Who are responsible to the general public for the whole scheme?

A.—Yes.

Q.—What I am suggesting is that you did not take any steps to find out how the work was going on when you could have done so quite easily. Is not that so?

A.—No; I say definitely it is not so.

Q.—I will put it to you in another way. The dredger has been working over a certain area, and for a certain period of time. Have not you got engineers who will take soundings of the amount of work done every day during that period, and could not you tell at the end of each week exactly how much has been done?

A.—That is the work of the responsible head of the Department.

Q.—Your servant?

A.—Yes.

Q.—I am asking you, why was not that done? Why was not the Government informed in January that the dredger was failing in its work in the previous December?

A.—That is a question to be asked of the Director of the Department.

Q.—No, it is not. I am asking you, as the representative of the Government, because you are responsible for the Director of Development. He is your servant?

A.—Quite so.

Q.—Here is the Government going on with its head in the clouds for eight months and not knowing whether the dredger was going to be a success or not, when they ought to have been able to tell after the first week or two. I was afraid you would find it a difficult question to answer.

A.—Well, that is your opinion—that we should have known from week to week?

Q.—It is not my opinion, surely? It is your opinion now, is not it? Surely it is your opinion now?

A.—We were told we must wait till the end of the season.

Q.—Why did you wait? Why did you accept such a statement? Why did you not say, " Go and measure it " ? Well, I am afraid you cannot help me any further on that?

A.—I say, that is the way in which the work and responsibilities are delegated.

Q.—I say to you, No; the Government of Bombay should have insisted upon knowing how this enormous work was progressing, instead of waiting until the end of the whole season, first the 1924 season and then the 1925 season?

A.—Very good.

Q.—It is too late in August to correct a mistake of the previous December, except for the future?

A.—Well, I take it that is your opinion.

Q.—When did the Government think first that the estimates were going to be so largely exceeded?

A.—Well, I suppose, when this estimate of 702 lakhs was brought forward.

Q.—Was the Government at all alarmed about that?

A.—No, I should think that the 702-lakh estimate was considered as well within the financial possibility of the scheme.

Q.—A scheme that would be a financial success at 367 lakhs would not necessarily be a financial success at 702 lkhs, would it?

A.—A scheme of 367 lakhs, which was likely to produce a profit of several crores of rupees could, even as a scheme of 702 lakhs, still be financed and prove remunerative.

Sir M. Visvesvaraya.—Did you prepare any statement of the financial results when you sanctioned the scheme, and, if so, what was the return that you expected?

A.—Well, it is four years ago now.

Sir Frederick Hopkinson.—It is a very important thing. Did you prepare anything in the nature of a balance sheet, showing what the Government was going to gain by doing this scheme?

A.—The figures were examined by the financial officers.

Q.—Can you give us the results? Have you anything in writing or in a paper?

A.—I have nothing in writing here, no.

Q.—Is there anything anywhere?

A.—There should be something in Bombay.

Q.—Have you seen anything?

A.—I cannot tell you now, but there must be something.

Sir M. Visvesvaraya.—We have not seen anything.

Sir Frederick Hopkinson.—As Financial Agent of the Government you would have seen it had it been in existence?

A.—My impressisn is that there were calculations made, and the conclusion was that the figure of 702 was still possible.

Q.—I do not think it carries us very far to say you have an impression that something was done. What I asked you was, was a balance sheet made showing the profits likely to accrue from the carrying out of this scheme? Was it made for the 367 lakhs estimate?

A.—If you have made these inquiries of the financial people, with the papers before them in Bombay, I am afraid I cannot add anything to what they must have told you.

Q.—You were responsible for the finance, were not you?

A.—Yes.

Q.—Cannot you tell us, was there such a thing as a balance sheet made?

A.—I have certain officers——

Q.—Was there such a balance sheet made? Did you see anything of the kind?

A.—Not what you would call a commercial balance sheet.

Q.—Nothing in the nature of a balance sheet?

A.—These things are reported according to the method of administration of the Government in India and are recorded in the Secretariat of the Government.

Sir Frederick Hopkinson.—But you do not say that that has been done, so we do not know that they have been recorded. I asked you definitely, was such a thing ever done? Surely, if it were done you would be the person who should know of it?

Sir M. Visvesvaraya.—Was a big scheme of this magnitude sanctioned withbut calculating the cost, that is, without preparing a financial statement?

Sir Frederick Hopkinson.—We are on something more than cost. It is the question of getting out a balance sheet and seeing whether it was a profitable scheme.

Mr. Billimoria.—We were told by some witness that certain forecasts had been prepared from time to time. They were not forthcoming before this Committee, but it was said they had some forecasts made from which they could estimate how the scheme was going to proceed—either profitably or otherwise. Did you see any of such forecasts? Were they ever submitted to you as the honourable Finance Member for the Presidency?

A.—Yes, forecasts certainly, but whether they correspond with what Sir Frederick is asking for as a balance sheet is another matter.

Mr. Billimoria.—Forecasts would give results of some kind.

Sir Frederick Hopkinson.—Here is a paragraph from the Second Interim Report of the Advisory Committee: "I have asked the Department whether any forecast was ever prepared of the period of disposal of the land or of the rate of sale per square yard, but it appears that the Government of Bombay never considered these questions at all." You have read this I presume?

A.—Yes.

Q.—Do you object to that?

A.—I do not think that is correct.

Q.—Perhaps you can tell us where we can find this information?

A.—I am not sure whether you examined the Financial Secretary in Bombay.

Sir M. Visvesvaraya.—We did not. You are at liberty to take a day or two and send us a statement on the point.

Sir Frederick Hopkinson.—But the witness has not said that he has ever seen such a statement?

A.—There were forecasts prepared to the best of my memory but what exactly are in those forecasts I find it difficult now to recollect. But there were officers in Bombay who could have produced before you whatever records there were.

Sir M. Visvesvaraya.—None were placed before the public for their information?

A.—No forecasts?—that I do not know.

Sir Frederick Hopkinson.—According to this report I have just read there is nothing of the kind in existence. It is Paragraph 61.

A.—I think this is a mistake "I have asked the Department whether any forecast was ever prepared of the period of disposal of the land or of the rate of sale per square yard." Certainly there were forecasts prepared for disposal of the land per square yard.

Q.—He says he was asking for them and he has not got them and you have not told us anything definite; you have only said you have the impression such things were done. I should have thought it was of the greatest importance that you should have had a balance sheet showing the advantage of going on with this scheme. Then when you got on to the estimate doubling the first one, you would see exactly what the exact chances were for the success of it. Your chances of profit, of course, would be reduced enormously. Then when you got another estimate running to another 400 lakhs or so, taking it up to 1,100 lakhs, you would be able to see what your losses were going to be.

A.—Yes. I do not think we can accept the statement in Mr. Subedar's report as showing that these forecasts were not prepared.

Q.—All you can tell us is you have not got them. You do not know beyond that?

A.—I have not got them here.

Q.—You do not know of them?

A.—I think I saw a forecast which did show a period of disposal of the land and rate of sale per square yard.

Q.—Surely that is a very important thing?

A.—Yes.

Q.—The Government would not surely go into a thing of this kind without having some idea of what the pecuniary result was going to be?

A.—Certainly

Q.—You are not able to give us anything of the kind, or refer us to anything of the kind?

A.—That is not quite a right statement of the position.

Q.—I do not want to get anything that is not right.

A.—I say you could obtain that information from the officers in Bombay who have those records in their possession. My recollection is that such records did exist.

Sir Frederick Hopkinson.—But it is only an impression.

Mr. Billimoria.—May I remind you in this forecast you have estimated the realisation of the land at 100 rupees per square yard?

A.—Then you have seen this forecast?

Q.—No, we are told about it, and we are told the land you are going to sell for 100 rupees per square yard, and therefore the scheme is a sound proposition. Is that your impression or is it otherwise? The land should be produced for 28 rupees a square yard and sold at 100 rupees a square yard, leaving a very substantial margin of profit on a modest estimate, 30 to 50 crores. That is the sort of view which has been expressed?

A.—Certainly not 30 or 50 crores.

Q.—That is exploded?

A.—It was never in the mind of the Government.

Q.—Supposing it was 30 or 50 lakhs, there must be some basis on which these figures were calculated?

A.—Yes. I am under the impression there was a forecast prepared at different times by different officers of the Government.

Sir Frederick Hopkinson.—We must leave it there as we cannot get it any further. We cannot get it beyond that you have that impression?

A.—You can ascertain that if you inquire from Bombay.

Q.—There has been a great deal of complaint in Bombay that the Government has not taken the public into its confidence over the construction of the Back Bay reclamation. Can you tell me, beyond these debates in the Council and the Annual Reports of the Development Directorate, if any other steps were taken to take the public into your confidence?

A.—What sort of steps do you suggest? There was an Advisory Committee appointed.

Q.—That was subsequent?

A.—That is from August, 1924.

Q.—Anything before that?

A.—No. The dredger began working in December, 1923, and up to then the operations of the Department, so far as regards the quarry and the wall and all that, all went very well.

Q.—They are all minutely described, but I am speaking of a precise thing which could be measured, which is the dredging?

A.—Quite so, but you accepted that up to December, 1923, the work was proceeding satisfactorily so far as the quarry and the wall were concerned.

Q.—I do not accept anything of the kind because dredging had not been started then, although the dredger had been there since March, 1922. Therefore I could not say in 1923 that it was proceeding satisfactorily. I should consider it most unsatisfactory?

A.—That the dredger did not work earlier?

Q.—Yes.

A.—I see. That is another point.

Q.—Certainly.

A.—So far as the engineering work on the wall, the preparation of the quarry and the stones, and so on, was concerned—so far as all that was concerned—the work was proceeding within the estimates and satisfactorily.

Q.—That I do not know. I shall know something more about that by the time we have finished, but I consider the construction of the reclamation wall was done in a most unsatisfactory method. My point is this. What you told the public in the March, 1923, report says that the work was proceeding smoothly practically according to programme, but it does not say except the dredging. It says: "The work of the Directorate proceeded smoothly practically according to programme"?

A.—Yes.

Q.—But the dredging had not been started then?

A.—No.

Q.—The programme was to be finished in five years, and the whole of the dredging was to be finished in five years. The dredger was there in March, 1922?

A.—Yes.

Q.—In those circumstances I suggest that is not a fair or accurate statement?

A.—Well, was it possible to start the dredger working before the wall was completed?

Q.—I say it ought to have been possible?

A.—Oh!

Q.—You knew you were going to get the dredger there in the spring of 1922. You knew the dredger was ordered in March, 1920, therefore you ought to have been ready to receive the dredger so that it might start work immediately it arrived. Surely

you would agree with that as a working proposition with a dredging plant costing 1¼ million pounds, on which the interest would come to £70,000 or £80,000 a year?

A.—Yes.

Q.—In the same report in March, 1923, the report goes on to say : " The policy is to push reclamation and housing with all speed." The dredgers all this time were lying idle, and for the whole of that year until December, 1923, they were idle?

A.—Yes.

Sir Frederick Hopkinson.—Then the next year, March 31, 1924, they simply gave a statement that the actual dredging was started and 500,000 cubic yards deposited, which came to 5,720 cubic yards a day against the estimated quantity for the dredger of 2,000 cubic yards an hour which, at a 15 hours' working day, would be something between 20,000 and 30,000 yards a day, so that the dredger was only doing less than a quarter of what it was expected to do. Then it goes on to say that " much better quality material than anticipated was being met with." But the complaint we have had at Bombay is that the material has been very much worse than was anticipated, yet here is the Official Report in March, 1924, saying it was much better than had been anticipated.

Mr. Billimoria.—In connection with this Report, may we get out from you whether the Government gave any formal sanction as to the publication of this Report, or whether it was simply on the responsibility of Sir Lawless Hepper that the Report was published? Was it with the approval of the Government, or was it his own document?

A.—No, it was never submitted to the Government before publication.

Q.—That would make your position as Finance member clear. For any statement made therein you are not responsible?

A.—No, I had nothing to do with those statements.

Sir Frederick Hopkinson.—The report further goes on to say that this material was so good that Sir George Buchanan decided that further Funds were not necessary, and so he was going to save 17 lakhs of rupees. There is not a word there about the dredger only doing a fifth or a quarter of its estimated quantity. It is absolutely silent on that. Then we come to the next year. In March 31, 1925, Report, the only reference to it of a general nature, I think, is that the " work made steady progress." Surely all the people in Bombay could see that it was not making steady progress, but that is all this Official Report says. With regard to the other dredger, which did 15,000 cubic yards dredging for the whole season's work when it ought to have done about 1,500 cubic yards an hour, all they say in this Report is that " progress was disappointing." It did practically two days' work in the whole season, and all they have got to say is that the progress is disappointing. Then, in the last one of 1926, after giving some details one observes there is no mention of the output at all, but it is practically passed over in silence. That being so, probably you will agree with me that the public in Bombay were justified in feeling anxious about the state of affairs?

A.—Those reports are certainly not very illuminating.

Q.—Could they be less so? I do not suppose you think so?

A.—Well, perhaps not.

Q.—It is in connection with that I want to ask you this question. What did the Government do to take the public into their confidence besides issuing these Annual Reports? Did they do anything?

A.—They gave the Advisory Committee full access to the information. They set up the Advisory Committee, which was appointed in August, 1924, as soon as the first results were known to be unsatisfactory—as soon as the first year's results of the dredging were known, no time was lost then in giving all the members of the Legislative Council access to all information. It was hoped that would be sufficient communication to the public.

Q.—But actually the Government did nothing? It waited until August before it even did what had been done?

A.—That is the valid criticism that you make.

Q.—I was very much interested in the remarks you made to the Chairman in the last part of your evidence, and I was going to ask you a question on the same subject. As ex-Acting-Governor of Bombay, and ex-Financial Adviser, I wanted to ask you your general opinion as to the advisability of completing the whole scheme. Various suggestions have been made in Bombay. One was that we should leave an ornametal lake in the middle of it, and another that we should leave it as it is, and other suggestions were that it ought to be finished in its entirety. You suggest that the present slump in values in Bombay should be looked at from a more distant point than the year 1926?

A.—Yes.

Q.—And that we should take account of the general prosperity and future necessities. You should look at the future necessities of Bombay from a far more distant point than the year 1926?

A.—Certainly.

Q.—Do you think that the scheme will ultimately be required for the expansion of Bombay?

A.—Yes.

Q.—You do?

A.—Yes.

Q.—Do you think it would be a good thing if the Government were to complete the scheme although it involved some heavy financial burden?

A.—Yes, I think, in the long run, it will certainly be remunerative. Four or five millions sterling is nothing to the city of Bombay—absolutely nothing.

Q.—It is a very fine city. I had never seen it before, but I was vastly impressed by it. Anyone could see that it would be an enormous asset to the city of Bombay if this scheme were completed, but I do think you have been very extravagant in your projected lay-out. I think the present cost of the scheme will induce you to think a little more soberly in the lay-out of the scheme if you ultimately come to do it. I notice you have got there a 120-foot road. We have no such thing in the whole of this country. Land in Bombay is surely too valuable to give it up to a 120-foot road?

A.—We have got a 120-foot road in the heart and centre of Bombay, and that is thoroughly congested with vehicular traffic.

Q.—I was there in the slack season, so I did not see it?

A.—The population of Bombay is somewhat in the neighbourhood of a million and it is congregated in a very small area. In the ordinary streets of Bombay it is difficult to get a carriage through when the people are out in the evening. The width of roads required is larger, I suggest, than you are likely to want here.

Q.—There is the road right along the front. They have got Queen's Road?

A.—That is a 50-foot road, and it is crowded very much indeed.

Q.—Now they can go round Worli. They have some very wide roads out there?

A.—Yes; that is rather in advance of necessity, I quite agree.

Q.—If you have nothing more to say on that general subject I should like to have your view as to the desirability of completing the scheme?

A.—I should like to speak about that at some length, and if I may do so I should like to speak after lunch on the subject.

Sir Frederick Hopkinson.—Very well.

(*Adjourned for a short time.*)

Sir Frederick Hopkinson.—When we stopped for lunch you were going to give us your views generally as to the desirability or otherwise of proceeding with the Back Bay Reclamation Scheme, having regard to the possible or probable future requirements of the city of Bombay, not taking the view of to-morrow or the day after to-morrow, but of the distant future. If you would give us your opinion on that we shall be glad.

A.—Well, the Committee are well acquainted with the general formation of the city, and the way in which the whole island runs down to an extremely narrow point.

Q.—Yes?

A.—The communications coming down through the centre of the island with its narrow point are very bad indeed. In fact, there is no through communication at all from the north of the island down to the extreme point. They have been working for 30 years on getting a through communication, and the road is not completed yet. When that is completed it will not be anything like sufficient for the traffic which is coming. The result of that must be, in my opinion, that the business classes will have to live nearer the extreme point where their office quarters exist.

Q.—In fact, it is the only point, is not it, within a reasonable distance of Bombay that is open to the business people, Malabar Hill being pretty well occupied?

A.—Yes, and there being no possibility of any lateral expansion. The sea shuts it off on the one side. The harbour with very difficult communication in the monsoon season shuts it off on the other. Then there is another consideration which may have been put before you, and that deals with the military offices at the far end.

Q.—That is all settled?

A.—Block No. 8 is settled. It is practically reclaimed. The military offices which are scattered all over the town will be grouped together in one quarter in Block No. 8.

Q.—In or near Block No. 8?

A.—In or near Block No. 8. That is a very important consideration which one need not specify in any detail, but in order to secure that great advantage it is well worth the while of the State as a whole to pay a sum of money. In times of trouble (we must always understand that there will be some times of trouble in Bombay City) those classes which are now raising some agitation against the scheme will be the first to take

refuge on this area which has now been reclaimed. That is taking a long view—not the year 1926.

Q.—I think you might say a little more about the desirability of doing it from the business man's point of view and having so much more land there for lateral expansion both of the city and residences, because you get a seafront with the new reclamation of four miles in length, which is a very valuable asset to the city of Bombay, in my opinion?

A.—Yes.

Q.—Do you agree with that?

A.—Absolutely, it is most valuable.

Q.—There is no other place in the vicinity of Bombay that conceivably will be so valuable as the site of the Back Bay reclamation. Do you agree with that?

A.—That is absolutely correct. You have the south-west monsoon breeze blowing straight over that area. That is the most favourable situation in all Bombay for health.

Q.—From the health point of view?

A.—From the health point of view.

Q.—Also, speaking from the lateral expansion of the business quarter of Bombay, is not it equally important?

A.—I think it is, but land in the business quarter a few years ago was selling at a thousand rupees a yard. An offer was made and refused at 1,200 rupees a square yard for nearly 100 square yards.

Q.—That is £80 to £90 a square yard?

A.—Yes.

Sir M. Visvesvaraya.—What was the extent of the area involved in that offer?

A.—That particular offer referred to only one particular site.

Sir Frederick Hopkinson.—You will not get anyone to offer that for 1,145 acres straight off.

A.—No, it was only one particular site. It is merely an illustration. I do not suggest for a moment that is an average price.

Sir M. Visvesvaraya.—That has been actually paid for land on which the Tata buildings are now constructed. They paid 1,150 rupees a square yard.

A.—Yes, and I think that is an area of 500 square yards.

Sir M. Visvesvaraya.—It is more than that.

Sir Frederick Hopkinson.—Would not this reclamation in your view add enormously to the general value of Bombay as a city?

A.—Yes, enormously. I consider it essential to the continuance of commercial life in Bombay.

Q.—That is a very serious statement to make, but I presume you make it after due consideration?

A.—I consider that the cost of trading in Bombay is far too high, not merely because of the charges of the Port Trust and the difficulty of transport inside of Bombay, but there is the cost of residences and office accommodation in Bombay. That is all based on the price of land.

Q.—One witness told me that the price of a flat in Bombay is higher than the price of a similar flat in the West End of London?

A.—I think that is a correct statement. Then we have to consider that the people in London who pay these high prices base these prices on the trade of the Empire—hundreds of thousands or millions of pounds. The people of Bombay have to pay these very same high prices on a very much smaller margin of trade. They cannot afford to do so unless they have land produced at a very much cheaper cost.

Q.—Then, again, part of this reclamation site would make an excellent site for open spaces?

A.—Yes.

Q.—For recreation grounds and for public gardens and so on?

A.—Some of it is allotted for that in the lay-out. Whether we can afford to go on on such a lavish scale for those purposes just now we do not know.

Q.—I believe some people do think your provision is somewhat lavish in that respect. I think the Committee will agree with me in saying we are inclined to think you are giving up land in Block 2 for that purpose which is the most valuable part of the new reclamation scheme, but if you pushed the recreation grounds further to the south where the land is not so valuable it would be desirable?

A.—I think that is a point certainly to be settled now on your advice. I quite agree with you. I think we have to reconsider it and not be quite so liberal in the selection of land to be set apart for open spaces.

Q.—Is there any other point you would like to make in connection with the value of this land at Bombay?

A.—Do you mean in regard to how to pay for it?

Q.—No, I am on value. Is there any additional inducement which you can hold out to the Government for prosecuting this scheme to its final completion?

A.—I should like to remind the Committee of the large fluctuations in prosperity that Bombay has gone through in the last 50 years.

Q.—That is the point I had in my mind. At the present time they are in the trough?

A.—In the trough.

Q.—As we are in this country?

A.—Quite so.

Q.—We do not anticipate always to remain in the trough.

A.—Bombay went through a similar period 60 years ago after the American War. Then subsequent to that period it has had various waves of ups and downs culminating in an enormous wave of prosperity during the war. Some 25 years ago now, the fortune of one of the biggest families in Bombay was very largely increased by their far-sighted land speculation. Mr. Jamsetji Tata bought land in Hornby Road at 25 rupees a square yard and he was laughed at for being a fool at the time. That land subsequently has gone to 500 or 600 rupees a square yard in 25 years.

Q.—That is a 24 times increase?

A.—A 24 times increase in 25 years. Mr. Billimoria can confirm that, I think.

Mr. Billimoria.—It is quite a correct statement.

A.—The wealth of Bombay is very difficult to compute.

Sir Frederick Hopkinson.—I suggested that some wealthy men in Bombay should combine and present this to Bombay, but I escaped from Bombay with my life.

Mr Billimoria.—We have not many multi-millionaires in Bombay. We wish we had.

A.—If you want to have some figures—you can check them, of course, and I can only speak from memory—the assessable value for Income Tax purposes of Bombay City is between 30 and 40 crores of rupees. That is the assessable value of the incomes of people above the minimum rate.

Sir Frederick Hopkinson.—If this scheme is finished and built upon that will go up?

A.—Immensely, but what I want to suggest is this. Of that 30 crores a very large portion will be available for investment in land and buildings. The first thing that an Indian wants is a good house and, if possible, a good piece of land. I think the desire for that is even more widespread in India than it is in England. As soon as the cotton mills begin to pay once more, a great portion of their wealth will be invested straight away in land reclaimed from the sea here. I do not think there is anything excessive in the estimates that were made of the rate at which this land would be taken up. Those estimates are in various printed papers at your disposal.

Q.—At the present moment Bombay public opinion is extremely pessimistic, as you might expect it to be in a time of great depression in trade. It was to the same extent optimistic in 1919 and 1920—unduly optimistic, I gather. It may be that it is now unduly pessimistic.

A.—Some of the most loud-voiced exponents of that pessimism are very largely interested in preventing this land coming into competition with their own holdings.

Sir M. Visvesvaraya.—With their own properties?

A.—Yes.

Sir Frederick Hopkinson : Therefore, it is for the Government to hold a wise balance between those two views?

A.—I do not know whether a sentence in that Report which you showed to me just now by Mr. Manu Subedar attracted your attention, in which he suggests that it will be a most disastrous thing for Bombay if this land is brought into competition with properties now held in Bombay.

Q.—It is a different kind of land. This, I should imagine, from my small knowledge of it, to be infinitely more desirable than any other land that I have seen in Bombay city?

A.—Yes, but still it will be snapped up, and to that extent people will not take inferior land now available. To that extent these property holders will suffer.

Q.—Therefore, that will make them all the more anxious to depreciate the Back Bay reclamation land?

A.—Precisely.

Sir M. Visvesvaraya.—You seriously think rents will come down?

A.—They must. That is one of the objects of the whole scheme. But it is for the benefit of the people at large. There is no virtue in high rents except for a few successful monopolists.

Sir Frederick Hopkinson: And the recipients of the rent.

Sir M. Visvesvaraya.—The only point we have to weigh is what price shall we get for this land, and to what extent should it be extended now?

Sir Frederick Hopkinson: I think it would be a very bold man who would venture to put any sort of price on it now, or in the near future.

Sir M. Visvesvaraya.—The point is, after what time would it come in?

Sir Frederick Hopkinson: If the Government get this land they will have to exercise great discretion in the disposition of it?

A.—Certainly. Perhaps I might just say one word more. You have laid some emphasis on the insufficiency or the alleged insufficiency of the information given by the Government.

Q.—When I speak of the Government I speak of the governing body and the people they govern. That is to say, my remarks should be applied to the people who ought to have given you this information. I use the word Government because, after all, it is the Government which is responsible?

A.—Yes. I have seen some complaints that sufficient opportunity was not offered to the members of the Legislative Council. I would like to explain that point. Under the law a certain limited period is allowed for the debating of the Budget—12 days in all. The Governor can appoint so many days at his discretion up to a maximum of 12 days. He has in every case given a maximum of 12 days for the discussion of the Budget. Then it rests with the members of the Legislative Council to use their discretion so as to concentrate their time on those matters which are of the greatest importance. In 1921 we had our first Budget Session in the first Council under the Reform Scheme. They were all raw, and they were very keen, so every petty question that came up in order was debated at inordinate length. So that ultimately the closure had to be applied and the Development Department had five minutes out of 12 days. That was not within the discretion of the Government. They could not stop the eloquence of those speakers. They said over and over again, "Let us leave that and get along. We have a big matter waiting for you." Nobody paid any attention to that, but they went on discussing, and five minutes was the total amount left for this. The second year we laid considerable emphasis on this over and over again, and asked them to get on to the Development Scheme. In my opening speech I told them this was waiting for discussion and I hoped they would give time for it. After a lot of persuasion we eventually managed to get two hours in the second year. Then in subsequent years we altered the order of the debate. The last year I had authority to settle the order in which the subjects should be taken up. I took up the Development Scheme first this year. The year before this I had it put half way through. In the first three years we hoped they would exercise their discretion, but there was a certain stereotyped order of subjects in which development came low down and we could not get them to come to it.

Q.—Eloquence is a fatal gift, is not it?

A.—So that my suggestion is that it was not the action of the Government that prevented a full discussion of the development problem. It was at the discretion of all the gentlemen concerned in the Legislative Council. We asked them over and over again also to come round and see things for themselves. We offered to conduct them round the scheme. We had arrangements made, and a train to come for anybody, and we found, out of 112 members, very rarely we would get eight or 10 to come and look at things.

Q.—Eight per cent?

A.—Yes. I submit, for this Committee to consider it, that we did our level best to make these things thoroughly well known and understood, and it is not our fault that there was not wider publicity to everything that we knew from the very first. We certainly concealed nothing so far as the Government is concerned.

Q.—I remember showing a party round some works, and I gave them champagne and sandwiches. I remember one man holding up a glass of champagne in one hand, and a sandwich in the other, and he said, "Mr. Hopkinson, this is a most interesting sight?"

A.—Well, we were not allowed to give champagne and sandwiches. The Government audit is much too severe.

Mr. Billimoria: With regard to the remarks which have just fallen from your lips, I trust that you have gone through the evidence that was recorded in Bombay. I do not know whether you have gone through the whole of it or not, but it is on record

that some of the members of the Council complained very bitterly that the Government deliberately withheld information and did not give them any opportunity to discuss at the Budget time questions arising out of development: that in former years not more than five minutes were allotted; in the second year about 15 minutes; and in the last year only two hours were allotted, when the Government knew very well that they were in a hopeless muddle and that they had to go before the public and tell the public candidly that the scheme was going to be a failure, and that even then they allotted only two hours. This is the impression that has been in the mind of the public of Bombay. I shall be glad if you would kindly explain whether that is the real situation, and whether it was that the members of the Council wasted more time on unimportant matters and left over this important matter from consideration?

A.—There is no question of the Government allotting five minutes in two years, or anything else. It was not within the power of the Government to make any allotment at all. The one allotment that was laid down was 12 days for every item of the Budget.

Q.—Could you not have extended it by another day, on a subject so important, and vitally concerning the interests of the city of Bombay?

A.—It was impossible according to the law. The Statute law gives a maximum of 12 days.

Sir Frederick Hopkinson.—Does this come under the ordinary Budget? Is not it a loan fund?

A.—It is a loan fund.

Q.—Does it come under the ordinary Budget?

A.—It does.

Mr. Billimoria.—Did the members themselves appreciate it was their own fault, and not the fault of the Government, so that if they now complain, that complaint is not justified? Is that what you want to suggest?

A.—I certainly suggest it is totally unjustified. I think they know perfectly well that it was the action, not of each individual, but of the general body of councillors.

Q.—Taking it that there were other important questions to be discussed, and the discussion lasted for the whole of 12 days and there was no time left when this item was reached on the Budget, how were the members to have their grievances ventilated, or to bring to the notice of the Government that there are certain difficulties which they want prominently to be brought to its notice? What is the opportunity for members of the Council to do that?

A.—If the subject has been shut out from the Budget, then it is open to the members interested to bring a resolution up in the session of the Council to discuss any particular specific recommendation that they desire to make to the Government.

Q.—Under the rules they cannot do it, because once a subject has been discussed, no resolution is permitted?

A.—That does not apply to the Budget discussion.

Q.—So that the members who have complained about it are labouring under some misapprehension that the Government deliberately withheld information, or did not give them an opportunity to discuss a vital issue?

A.—That is certainly an entirely unjustified charge. Whether they are labouring under that misapprehension or not, I cannot say. I would ask the Committee, if they can find the opportunity, to have a look at the Budget debates.

Sir M. Visvesvaraya.—We have the records?

A.—You have only seen the last year's, but there are five or six years' debates open to your consideration.

Q.—We have all the records?

A.—You will see there has been frequent reference to matters of the Development Department and replies given by the Government.

Mr. Billimoria.—With which the members were not satisfied?

A.—With which individual members were not satisfied, but with which the majority of members were satisfied, by the vote they gave approving the grant.

Q.—I am talking of those gentlemen who have come before us and have given evidence complaining very bitterly that the action of the Government was to be condemned in that direction, and we want something on the record to clear up that from you?

A.—Their real complaint is against their colleagues, the other members of the Legislative Council, who refused to support them in their grievance against the Government. Mr. Laljee Naranji made several proposals in the Legislative Council to omit certain grants. He could not get the other members of the Legislative Council to support him in his attack against the Government and the Department.

Q.—In the course of your evidence just now, in answer to my friend, you referred to some 60 years ago. That means history repeats himself. Sixty years ago the people of Bombay had burnt their fingers after the war. There was a trade depression, and people had been ruined to a very large extent. Is that the reference you are making to the 60 years ago history?

A.—The reference is to the recovery from that period.

Q.—You are aware that about the time that this scheme was launched, there were one or two syndicates very anxious to do this reclamation work?

A.—Yes.

Q.—You are aware of that fact?

A.—Yes.

Q.—If that syndicate had been entrusted with this work, do not you think they would have been in the Bankruptcy Court by this time, having regard to the results we have seen? The manner in which the work has been conducted shows that it has not been possible to carry out this reclamation scheme within the estimate of 367 lakhs?

A.—No; I do not think they would have been in the Bankruptcy Court. These particular syndicates have far greater financial powers and resources than three or four crores. These same syndicates have financed other works in India running into 20 to 30 crores.

Q.—True, but I mean if a scheme or project which, on paper, appears very profitable at 367 lakhs, may not be so productive or remunerative when the figure reaches 11 crores, and if the resources of the syndicate were limited to that capital amount, they would now be in the Bankruptcy Court, I suggest?

A.—It is very difficult to get to the bottom of the purse of these gentlemen to whom you refer.

Sir Frederick Hopkinson.—You have tried your best as Chancellor of the Exchequer?

A.—No. I have seen what they can do in other concerns which have been hard hit. They have overcome great difficulties with the most wonderful resourcefulness.

Mr. Billimoria.—You were playing with public funds in a matter like this. Do not you think that the Government ought to have been very careful before launching such a scheme to see that the estimates were properly checked?

A.—Quite true.

Q.—And that they were satisfied that this was going to be a productive piece of work?

A.—Quite true.

Q.—Did you at the time when the scheme was arranged consider that reclamation had a reasonable prospect of being a productive scheme?

A.—I have explained more than once that I was not in India or associated with the Government at headquarters at that time.

Q.—In reply to Sir Frederick you have stated you desired the whole of the reclamation to be completed. You know that the area is 1,145 acres for the whole scheme?

A.—Yes.

Q.—It makes available 22 lakhs of square yards as land for building sites?

A.—22 out of 55 lakhs—very good.

Q.—Do you think there is an immediate demand for such a huge area as that having regard to the depressed state of the conditions of trade in Bombay and the financial disabilities of the people of Bombay?

A.—22 lakhs will not be taken up in the next few years.

Q.—A few years may mean 50 years?

A.—I hesitate to prophesy what will happen in Bombay in 50 years, but I have very great hopes that the recuperative power of the city is enormous.

Q.—But there is no immediate possibility of the whole of this area being taken up, having regard to the present circumstances. You are very intimate with the conditions of life in the city of Bombay, and you will say there is hardly any possibility of 22 lakhs of square yards being taken up in the next few years?

A.—No. I hesitate to give a time limit, but it will be all taken up if it is made available in time.

Q.—Can you give any indication of that time?

A.—No.

Q.—It is very difficult to prophesy?

A.—I cannot give you the time but I would like your Committee to notice one fact. There has been a complaint from these interested sections of the population amongst other pessimistic prophecies that no land is being taken up now and no buildings are being constructed. That is definitely stated in the report of Mr. Manu Subedar, to which you have made reference. If you turn to the actual statistics available in the report of the Improvements Trust of the amount of building space that is built on year

by year in the last five or ten years you will find that last year when these people were complaining that no building was going on the amount of building was in fact twice as much as before the war. That is the last report of the City Improvement Trust. There is the total given year by year of the amount of building space built over, and it has been going up even in the last few years in spite of all this depression.

Q.—You may not be aware that several people who have taken up land from the Improvement Trust had to give it up again and the Improvement Trust had to cancel some of the contracts, which I can prove from the records of the Improvement Trust itself?

A.—I know that, but only in a very few cases.

Q.—It is over a large proportion of land. There is an official report for the last year which gives rather an alarming figure?

A.—Very well, but you can examine the report and compare it with the other statements to which I referred you.

Q.—When these estimates of 367 lakhs were practically doubled and came to a figure of 702 lakhs, did it not cause anxiety to the Government of Bombay?

A.—The figures were examined and we still thought that the scheme would prove remunerative.

Q.—At a figure of 702 lakhs?

A.—Yes.

Q.—How was the figure of 367 lakhs accepted? Was it merely the recommendation of Sir George Buchanan and his estimate, or was it tested and examined by any independent engineer or by any Government Department?

A.—That is before I came there. I do not know.

Q.—Do you know that the Port Trust were not consulted, although the Port Trust had very great experience of dredging in the harbour? Do you know that nobody ever attempted to consult those authorities for the purpose of getting any advice from them? Can the Government give any reason why the Port Trust was not consulted?

A.—I have seen that statement made, but I doubt whether it is accurate.

Q.—Mr. Neilson, Chairman of the Port Trust, told us that the Port Trust were not consulted.

A.—Yes. I doubt whether it is accurate. I think the head of the Port Trust was almost certainly consulted. Whether the Port Trust as a body was consulted, which is what Mr. Neilson would have meant, I do not know, and Mr. Neilson was not in Bombay at the time.

Q.—Was Mr. Hatch the head or was he there?

A.—I do not know. I was not there myself.

Sir M. Visvesvaraya.—I am afraid that information may not be correct. They were not consulted when inquiries were made in Bombay.

Mr. Billimoria.—What has gone in on the record is that the Port Trust were never consulted?

A.—That is, no official letter may have been written to the Port Trust to ask them their opinion, but that the Governor of Bombay failed to consult the head of the Port Trust is, I think, very doubtful. I have already read to you Lord Sydenham's statement. I do not know whether I did read that part of it.

Q.—You did not refer to anything regarding the Port Trust?

A.—That is quite right. It is the subsequent sentence which did not apply to what I was saying at the time, but his letter goes on to say: "I got a Citizens' Committee to estimate the value of the reclaimed area, and I do not think there was any public body that was not consulted." That would be in 1912.

Sir M. Visvesvaraya.—That is ancient history?

A.—But it would refer to this.

Q.—We are on the 367 lakhs now.

A.—That is not Mr. Billimoria's point. Mr. Billimoria's point is as to the bottom of the harbour.

Mr. Billimoria.—I am on to the point as to the Port Trust being consulted.

Sir M. Visvesvaraya.—I thought he said in 1919.

Mr. Billimoria.—It is in 1919 that I am speaking of. In 1919, when this scheme was launched, I want to know whether the Port Trust were at all consulted.

A.—May I ask whether you are referring to the bottom of the harbour or to something else?

Q.—To anything connected with dredging, because they have a very vast experience of dredging. I want to know whether the Port Trust Authority were in any way, directly or indirectly, consulted, privately or officially.

A.—Well, I cannot give you any denite information because I was not there, but I wish to ask you to investigate this point—whether when enquiries were made in 1912 regarding the bottom of the harbour by Mr. Kidd the Port Trust were not consulted at that time on that subject as to whether the stuff was available there for reclamation.

Q.—If the Port Trust were consulted, can you assign any reason why when this scheme was launched the Port Trust came and interfered and would not allow the Development Department to dredge from the harbour? They said that it would prejudice their property to a very considerable extent and they would not allow any dredging being done in the harbour, and so did the Naval Authorities. Can you assign any reason if they were consulted why they should not have raised that objection then and why did they raise the objection later on? A very large area has been taken off which has in some measure interfered with the actual reclamation under consideration.

A.—Well, I have not seen the terms in which the Port Trust made their objection. My understanding was that it was the Naval Authorities that made the objection and not the Port Trust.

Q.—It is both. We have that on the record.

A.—The Port Trust supporting the Naval Authorities.

Q.—Each one saying that it would be dangerous for the harbour if any dredging was allowed from a certain area.

A.—That may be the opinion of the officers in 1926. When was the opinion given? Was it given in 1924?

Q.—Just about the time the dredging operations started—about 1923.

A.—These officers change and you get a new set of officers who hold different opinions to the first set. That is the explanation which I suggest for your examination.

Q.—In the course of your statement this morning you said that the Financial Adviser to the Government in India was available in Bombay, and it was his duty to have drawn the attention of the Government to the fact that the estimates had increased from 367 to 702 lakhs. Do you suggest that if he did not draw the attention of the Government of India to it that he failed in the discharge of his duty?

A.—I do not suppose for a moment that he failed to draw attention to it.

Q.—Were the Government of India aware of this fact?

A.—I do not know that they were, but I assume that they were.

Q.—You are doubtless aware of the fact that the Government of India were very reluctant to embark on such an ambitious scheme of reclamation involving 1,145 acres of land, and they were brought round when Sir George Buchanan completed the estimate and report and took it over to some department of Government; but in all the previous correspondence between the Government of Bombay and the Government of India it has been brought out that the Government of India was very chary of sanctioning any such ambitious project?

A.—Yes.

Q.—Do you know the circumstances under which the Government of India eventually were made to agree to sanction such a project? I suppose the natural conclusion is that they were persuaded on the figure of 367 lakhs, but if they had known the figure was going to be 702 lakhs they would have set their faces against it?

A.—It is difficult for me to express an opinion as to what the Government of India would do with certain figures before them, but I do not suppose that the 367 lakh figure was the determining factor.

Q.—What else could it be, because if you will kindly refer to the correspondence between the Secretary of State and the Government, all along it has been suggested how these borrowings had to be made, and so on; so unless there was a determined figure that question would not arise. It was to come out of loan operations, and the figure for the loan had to be determined; so that unless you know the capital cost, the question of the loan would not arise. The Government of India must have known the figure, and it was only on that basis that it approved and sanctioned the scheme. There could be no other factor for consideration.

A.—I should differ on that point. There was the other very important factor. There was the distress of the people of Bombay. There was a danger to the trade of Bombay as well. Those two important factors are so overwhelming that the figure of 367 or 702 lakhs sinks into insignificance in comparison.

Q.—So that you think there was an immediate danger, or an imminent danger as far as Bombay was concerned, that required the scheme?

A.—That is my opinion now from my subsequent knowledge of it. I also am of opinion that that was the view of the Secretary of State before the figure of 367 lakhs was ever arrived at.

Q.—Where was the necessity of secrecy? Why was the scheme launched with such great secrecy, and why was there this hush-up policy throughout? That has been

a very serious complaint from practically every witness who has been before this Committee—that the scheme was launched in complete secrecy. Was there any reason for it to your knowledge, if you know anything about it?

A.—I was not in India nor associated with the Government at that time.

Q. As a member of the Government, did you find that Sir Lawless Hepper was placing all the facts before the Government regarding his department?

A.—Those quotations read out by Sir Frederick Hopkinson cannot be said to be all the facts.

Q.—Was he placing all the facts before the Government?

A.—I say those quotations which Sir Frederick Hopkinson read out do not constitute all the facts.

Q.—That does not give an answer to my question, whether Sir Lawless Hepper placed all the materials and all the facts before the Government. I want to know were their eyes opened, or were the Government kept in the dark?

A.—I am afraid on that question you would get enlightenment from the head of department, Mr. Cowasjee, because Sir Lawless Hepper reported direct to Mr. Cowasjee. He did not report direct to me.

Q.—Do you think that the Government of Bombay took all prudent and reasonable steps to assure themselves that the reclamation scheme as proposed by Sir George Buchanan was a practicable scheme from the engineering point of view, as well as being financially sound? Can you express any opinion on that?

A.—Sir George Buchanan's scheme was based on Mr. Kidd's scheme, which, I have told you, on the authority of Lord Sydenham, was examined by the engineers of Bombay of that day.

Q.—Do you know there was sitting in Bombay a Committee called the Bombay Development Committee in 1914?

A.—Yes.

Q.—They had before them the report of Mr. Kidd at the time, and a firm of engineers were employed by Messrs. Tata, the firm being Messrs. Jacobs and Davis, supposed to be a very respectable and responsible firm of engineers, who had called this scheme a mad scheme. Are you aware of these papers, or do you know anything about it?

A.—Which scheme have they called a mad scheme?

Q.—This scheme concerning the 1,145 acres of land. Perhaps you would just refresh your memory about it?

A.—May I see it? (*Document handed to the Witness.*)

Q.—There are various passages which I have marked setting out the opinion of Messrs. Jacobs and Davis?

A.—This is March, 1913.

Q.—Yes. The Committee was sitting in 1913, and between this and the new scheme Sir George Buchanan has not done anything new. He has simply followed blindly the report and figures of Mr. Kidd. There was no independent investigation by Sir George Buchanan at all?

A.—This report maintains that they believed that the pressure on the available area of Bombay did not warrant any such scheme of reclamation.

Q.—That was in 1913?

A.—That was in 1913. But the pressure on the available area of Bombay came into force after 1913. The report of 1913 is a report before the war.

Q.—That is right?

A.—No report condemning the scheme before the war can be applicable to the conditions after the war.

Q.—You would not, as a business man, be surprised to find that the conditions before the war were normal and that after the war everything had gone up considerably? Prices had practically doubled. In some cases they were four times as much. In spite of that Sir George Buchanan goes and gives you an estimate on a figure approaching that of Mr. Kidd's estimate. Would not the Government then have thought it prudent to get that estimate checked by some other independent firm of engineers to see whether Sir George Buchanan was not labouring under some misapprehension in merely taking the figures of 1913, which no business man could ever have thought of as applying in 1919 when things were booming, when prices had gone up four times as much, when labour had gone up, when materials had gone up, and when there was a tremendous rise all over?

A.—Yes. Perhaps you will ask Sir George Buchanan on the point.

Q.—Messrs. Jacobs and Davis, in their report to Mr. Tata, say: "Mr. Tata, I believe, will live to congratulate himself on having been persuaded from not going into this thing, if the project ever comes off." Well, his prophecy has come to be absolutely

correct. This was made as far back as 1913, and the circumstances in 1919 were entirely different. Any man having had a look at that report would have thought twice before launching such an ambitious scheme. Did you, as finance member of the Government, get any opportunity to know anything about it?

A.—About that report?

Q.—Yes.

A.—I have heard of that report, but I submit that it is quite inapplicable to the later conditions, and in spite of that report Messrs, Tata and Sons wished to take up this work. They were the principal applicants for this contract themselves, rejecting entirely this report to which you now draw attention.

Q.—That was one of the reasons which induced the Government to go in for the scheme. Is that right?

A.—The fact is that Messrs. Tata thought well of it, and other Bombay financiers thought well of it, and in fact the whole of Bombay financial opinion would have condemned the Government very seriously in 1919 if they had not taken this scheme up.

Q.—Was there any question of policy at that time which also induced the Government of Bombay to embark on the scheme?

A.—A policy for the benefit of the trade of Bombay and the benefit of the people of Bombay, who were living in very congested areas and slums which have aroused criticism from every quarter.

Q.—If the conditions remained the same as they were in 1919, you would have hardly found a critic to-day?

A.—Certainly.

Q.—But because there has been a slump later on, things have considerably changed, and it is now that you find that the scheme has been condemned as hopelessly foolish?

A.—Yes, that condemnation coming chiefly from the people who are now holders of land in Bombay.

Q.—There has been a very serious complaint that the Government of India and the Secretary of State were not consulted when the estimates were doubled. Under the Reform Scheme, what is the constitutional law. Is the Government of Bombay bound to consult the Government of India or the Secretary of State? Were they in any way bound to do so, or could they have acted absolutely independently of the Secretary of State and the Government of India?

A.—They are bound to report to the Government of India their Budget, their revenue and their expenditure, and the Government of India, if they see anything which they disapprove of, can exercise authority over the Government of Bombay for a reconsideration of the matter. But there is no necessity for the Government of Bombay, now that provincial autonomy has progressed, to ask sanction. That is the difference from the original position of 1919.

Q.—Does that mean that, under the Reforms, H.E. The Governor has got all the powers?

A.—Subject to the vote of the Legislative Council.

Q.—That means you bring the scheme, or the revised estimate, before the Council and get it sanctioned, and therefore it was a constitutional manner in which the Governor of Bombay acted?

A.—That is in accordance with the new scheme of provincial autonomy under the Reform Act of 1921.

Q.—So that if any party has any grievance against the Bombay Government in that direction I suppose it is because of want of knowledge of the circumstances—it is because of want of knowledge that the Government of Bombay are criticised in not having approached the Government of India or the Secretary of State for sanction? Is that correct?

A.—That may be the explanation.

Q.—Does the Government of India Act make that perfectly clear? Are any specific powers given to H.E. The Governor to act independently of his other advisers in matters of policy or otherwise? Has he wider powers than he had before the Reforms came in?

A.—No, certainly not.

Q.—Then if there is no alteration in the constitution, would not it be natural that the higher Government would be consulted?

A.—The alteration is that the check has been transferred from the Secretary of State and the Government of India to the Legislative Council. The control rests with the Legislative Council in their power to accept or reject the Budget.

Q.—So that nothing could be done without a vote of the Council?

A.—That is so.

Q.—In your speech before you left India, when you were entertained to a farewell dinner, you stated that no city was built on accountants' figures, such as Rome, and other places. You made some mention of that. May I read it out to you to refresh your memory?

A.—Certainly.

Q.—" Whether we survey Delhi in ancient days or the Phœnix that has now arisen from its ashes; whether we look at Rome, Athens or Paris, has anybody ever suggested that they were founded on a dividend-paying basis? The capitals of even the petty States of South America have had millions of pounds expended on them to provide the necessary appurtenances of a democratic State. It is certainly a disappointment that the State should not reap from Back Bay the enormous profits which were at one time anticipated." Those are your words as quoted in the " Times of India." How do you reconcile that statement with the statement which has been referred to coming from Sir Chimanlal Setalvad as to the tremendously huge profits of 30 crores. Apparently, when the scheme was launched, everybody looked forward to a handsome profit. When we come to the years 1925 and 1926 we are faced with a very sad outlook, and this question has been brought out that the reclamation scheme was not taken up as a dividend-paying proposition. Have you anything to suggest with regard to that?

A.—I do not quite understand what you want me to answer.

Q.—When the scheme was originally launched it was expected it was going to be a very profitable scheme?

A.—That is so, but not 30 crores. I have nothing to do with the 30 crores figure.

Q.—We will take it at 30 lakhs?

A.—The correct figure I suggest was 3 crores.

Q.—If it was 3 crores profit, then now we find there is a 3 crores loss?

A.—Very well.

Q.—Without even the completion of the scheme. If the whole scheme is to be completed one does not know what the result will be, but the Government has to make provision for an estimate of a 3 crores loss, and they have done so from last year's Budget?

A.—Yes.

Q.—How would you reconcile that statement with the statement that no city has been built on an accountant's basis—as a dividend-paying proposition? When the scheme was launched hopes were held out that it was going to be a very profitable scheme?

A.—Yes.

Q.—When the scheme has been working for three years, we find we are being faced with a very heavy loss?

A.—Yes.

Q.—How are those two statements to be reconciled? Is there any explanation for it. Is there anything which can throw light which will remove the grave doubts that the people of Bombay have about it?

A.—I fail to understand what there is to reconcile. The statement made in that speech to which reference is made is that other cities were built on a courageous scale without being based on an accountancy system.

Q.—That is quite right?

A.—On the other hand, we started with this belief, that if the cost returns were calculated on strict accountancy principles, even then it would pay, but now supposing we find it does not, then we shall be in no worse condition than the other great capitals of the world.

Q.—That is what I wanted to know so that the answer may go on the record clearly?

A.—Yes.

Q.—Then it has been suggested by prominent business men of Bombay that, though amenities for the city are desirable, the people of Bombay can only have such amenities as they are prepared to pay for, and for many years to come there will be little public money to spare for anything but necessities. Having regard to that statement, the question is, is it prudent to go on with the scheme at this stage?

A.—I am suggesting that it is a necessity for the commercial life of Bombay.

Q.—You will be sinking a very large sum of capital into it without getting any return for a number of years to come, so that instead of it being productive it will be a non-productive capital asset?

A.—For the time being, but the State can bear the burden and recoup by its returns in the course of years.

Q.—Do you think with the present condition of finance of Bombay it could bear such a burden?

A.—Yes.

Q.—Under the present finance circumstances?

A.—Yes.

Q.—You think without any further taxation the city of Bombay could bear this further burden?

A.—You are adding one straw after another. Your last words now are " without any further taxation."

Q.—That is what the people would like?

A.—Quite so.

Q.—Naturally, when they feel that they are already overburdened with taxation they do not want to pay any more. The difficulty comes in with regard to the taxation?

A.—It is a country which has not got the element of Death Duties. There is plenty of scope for further taxation yet.

Q.—That is a view that the majority do not agree with in India?

A.—I beg your pardon, the majority are strongly in favour of Death Duties. It is the few rich men who are at the top who disagree with that.

Q.—It is those very few who are always somehow very prominently listened to by the Government. It is not the masses who are heard, unfortunately?

A.—I hope they will be heard. There is money to bear this burden.

Q.—Not without further taxation?

A.—If the liabilities are heavier than has been estimated, there is sufficient financial reserve in the City and the Presidency of Bombay to meet that burden and carry it until this land becomes remunerative. That is my opinion.

Q.—Have there been any data or figures prepared or anything which will convince and satisfy the public of Bombay that there are resources at the back of the Government of Bombay for a large number of years from now to bear this heavy burden?

A.—If you investigate the Taxation Enquiry Committee's report issued only a year ago you will find there the advice on the subject of Death Duties, which is a very large potential source of revenue in Bombay.

Q.—Do you attribute the cause of the failure of this scheme entirely to the dredging and to no other reason? Is there any inefficiency in the Department which has been one of the causes of the failure of the scheme—I mean the failure in the sense that has been described now, that instead of it being a productive or profitable proposition it looks to be otherwise and is disappointing in that sense?

A.—I have heard from Sir Frederick Hopkinson some strong criticism of the engineering details on certain points which I had not heard before. I hesitate to express an opinion on those points. I should like to hear what the gentlemen incriminated would have to say before I gave an opinion on that point.

Q.—Your connection with India has been spread over more than 25 years. I do not know whether you have come across such colossal blunders in an engineering scheme as have been committed in the present scheme, no provision having been made for storm water drains in the original scheme, no provision having been made for the usual allowances of 10 per cent., whereas every engineer makes that provision, and so on. There are a number of defects of that kind. All that we will get out from the lips of Sir George Buchanan when he comes here. In view of that did the Government exercise prudence in merely depending upon Sir George Buchanan's estimate, or were they misled or were they let down? What is your personal feeling in the matter?

A.—Those events are before I joined the Government. I have never seen the estimates of Sir George Buchanan and I am not acquainted with this particular aspect of the case.

Q.—Was it not brought to your notice as the honourable Member for Finance concerning where the scheme was defective, and what serious omissions there were in the original estimate which led to the estimates being doubled?

A.—I heard that at a later stage, yes.

Q.—Having heard that, did not you think these looked very colossal blunders, from an engineer's point of view? No engineer of repute could have made such blunders on such important items as sewage?

A.—I have heard of equally large omissions in other schemes in other parts of the world.

Q.—To such an extent as that?

A.—To an equal extent.

Q.—In the course of a speech by His Excellency, in the March Session, to the Council?

A.—What year?

Q.—This year, 1926—says that the conditions are not likely to improve for some time, and in your speech as well you say you " will now confine my attention to the prosecution of the scheme as far as blocks 1, 2 and 8 are concerned." I hope you still adhere to that view and you do not want the completion of the whole scheme immediately, but as and when the resources of Bombay admit of it and permit of it, that the scheme may be carried through eventually. Is that your view?

A.—Since I made that speech in March I have seen the work progressing in block No. 8 in April and May, and I am of opinion that block No. 7 affords very favourable opportunities for the continuance of the work this next winter.

Q.—With regard to block No. 7, there are difficulties as far as development is concerned. The development is a very expensive item. If you take that into account with the interest charges, it does not look like a financially sound proposition to have that block completed. That is a matter of opinion, of course. I do not know whether you have had opportunities to study these figures. There was a Committee appointed by the Government of Bombay called the Kay Committee which has gone thoroughly into the question. They have found that it would not be profitable to undertake the reclamation of block 7 at the present stage?

A.—I have not seen their report, but I merely give you the opinion I formed when I was leaving Bombay early in June, that block No. 7 could be done easily and cheaply by means of the dredger, Sir George Lloyd, dredging from the harbour, and it would be a great pity either to leave that dredger idle this winter or to disband the crew, and that whatever action may be taken with regard to the dredger eventually, No. 7 can be filled up now with the existing pipes, with the crew well-trained and the dredger working efficiently. The subsequent disposal of the land, if that land can be reclaimed as cheaply as I believe it can now, can, I think, safely rest for a few years.

Q.—There is no doubt that block 7 can be filled in by dredging cheaper than by any other method, even in years to come?

A.—Yes.

Q.—But taking it as a whole, with the difficulty as to sewage and other difficulties which are existing in that particular area, the Committee felt a difficulty about it?

A.—What difficulties?

Q.—There is no sewage provision—there is no drain. All that will have to be provided for, which is a very expensive item. It is not the dredging alone. The dredging is a very minor item comparatively, and it is undoubtedly cheaper than dry filling?

A.—Yes.

Q.—But there are other difficulties which come in the way of the completion of block No. 7. If you have any view about it we shall certainly be glad if you will elaborate them, because we are called upon to express an opinion on that subject, and we should welcome your views and experience on it?

A.—I have not seen this report detailing these difficulties, but I am much impressed with the facility for carrying out No. 7 with the existing pipe, and before any question of scrapping the dredger Sir George Lloyd should be entertained.

Q.—I quite agree. We also appreciate that we have to give six months' notice to the superior staff in the event of our discontinuing the dredging operations. That might also be another factor which might induce the Government of Bombay to carry on with filling in by dredging in block No. 7. In your speech at the Council meeting in March, 1926, with regard to the report of the Advisory Committee you stated that the Committee have set forth a candid criticism of the scheme, and that the Government are of opinion that the recommendation of the Committee is sound?

A.—That was the recommendation to continue with 1 and 8 at that moment.

Q.—You are still of the same opinion? You have not altered that opinion since that date?

A.—At that moment we were discussing whether blocks 1 and 8 should be stopped or not.

You recommend that they should be——?

A.—That that work should go on, and that was the advice of that Committee. That is without prejudice to what could be done on the other parts.

Q.—Then a member of the Council has raised a question against you, in the course of which he says: " I want to convey to our finance member what is our idea of this policy of manufacturing land more than the need for it, which has landed us in the position in which we are to-day." That is Mr. Naranji's remark. Have you anything to suggest with regard to that, because I do not find any answer in the subsequent pages in response to that remark?

A.—What is the point he raised?

Q.—Whether by manufacturing more land in this way there would be any demand for it?

A.—I have stated I consider there will be a demand for the whole of this land in the course of time.

Q.—In course of time, but not immediately?

A.—Yes.

Q.—Then at page 129 you say that you have gone into the conditions of Bombay, which are very interesting. You give some figures, which you gave us this morning, with regard to land being sold at 1,200 rupees per square yard. But that is a small compact area in the business area in close proximity to the banking and business houses?

A.—Yes.

Q.—You cannot expect to get that value for the reclaimed area?

A.—Certainly not.

Q.—Most of that reclaimed area will be utilised for building sites. People cannot afford to pay such ridiculously high figures for building sites. Have you any idea that any part of the reclaimed area could be set apart for business or commercial houses? Surely this area will all be used for residential purposes, and not as commercial sites?

A.—We have seen London moving westwards from the City, and the same movement will take place here gradually and in time.

Q.—It has been pointed out to us that the Ballard estate scheme has not been a total success, and there are large areas still vacant. Business people would not care to go out of a small compact area because they would like to have themselves centred round the banks and commercial firms?

A.—Yes.

Q.—In view of that, is it likely that they would go as far as Kolaba and far-distant places for business purposes?

A.—Have you verified that statement about the Ballard estate?

Q.—Yes; we found most of the buildings are still vacant?

A.—Still vacant?

Q.—Yes?

A.—That is an unfortunate result of the present depression of trade.

Q.—Undoubtedly so; but until conditions materially improve you would not recommend the completion of the scheme as a whole, but would go slowly with the object of ultimate completion as and when the circumstances demand or finance permits?

A.—Yes; I think I may accept that.

Q.—In your speech you have stated such work cannot be carried to completion in a generation?

A.—Such work as what?

Q.—Such as reclamation work. That is at page 132?

A.—No; not the reclamation, but the "renovation of the city of Bombay." That is a wider thing than this reclamation scheme. It is the rebuilding as a whole of the city of Bombay.

Q.—I am very much obliged to you for the able manner in which you have cleared up some points about which some people in Bombay have great doubts. Some of your answers have particularly cleared away those points, and I am thankful to you for that.

A.—Thank you.

Sir M. Visvesvaraya: Thank you very much for your evidence?

A.—Is that all you want to ask?

Q.—Yes.

A.—Then there are one or two points I have in my memory which I should like to mention. Some reference was made at one time by a witness before you to some letter which is alleged to have been written by the late Mr. Mead to some contractors. Was that letter ever produced before you?

Mr. Ewbank: Yes, it is a letter from Mr. Mead to Colonel Grisewood.

A.—Of what date?

Mr. Ewbank: It is the 19th March, 1920. (*Letter produced and handed to the Witness.*)

A.—The suggestion was as I read it, was that this was some private or personal action by the late Mr. Mead, and I wish to make it perfectly clear that it was a letter under instructions.

Sir M. Visvesvaraya: I am glad to have this made clear.

Mr. Billimoria: Do you mean under the instructions of the Government of Bombay?

A.—Yes. It is March, 1920. It is there as a letter definitely from the Government. There is nothing whatever *sub rosa* about it. There is nothing whatever improper. The suggestion as put to you was that there had been some impropriety. I wish it to be perfectly certain that it was a purely official communication by Mr. Mead as secretary writing on behalf of the Government.

Q.—The suggestion has been that the whole of the Council was not consulted, but that is the usual practice, I take it. I take it, one member does not necessarily consult another member unless it is a question of policy, or a very broad question on which opinion has to be consulted?

A.—Yes; if it touches the branches with which some other member is concerned, then he would be consulted; but if it is entirely confined to one department, then it would be within the discretion of the member of the Council concerned, or he would take it to the Governor, or if it affected a financial point he would refer it to the finance member. It would not go to the other members in the ordinary course.

Q.—So that the insinuation that the honourable member kept back information from his colleagues is absolutely unfounded? There is no foundation for that at all?

A.—None whatever to my knowledge

Q.—Dealing on strict constitutional methods, it is left to the member in charge to carry on his departmental work without reference to other members of the Council?

A.—Yes.

Sir M. Visvesvaraya: We thank you for your evidence. (*The Witness withdrew.*)

(*Adjourned to Tuesday, 21st September at* 11 *o'clock*).

SUPPLEMENTARY WRITTEN STATEMENT PUT IN BY SIR HENRY LAWRENCE.

I will take in turn various suggestions which I understand have been placed before the Committee.

(1)

"This scheme was hastily conceived and pushed through in 1919-20."

The idea of reclamation in Back Bay dates from 1860.

In the past 25 years one Governor after another has taken it up, and pressed it on his successor to carry through. Lords Lamington, Sydenham, Willingdon, were prevented by various obstacles from achieving success. Mr. Edwin Montagu as Secretary of State decided in 1918 that the condition of Bombay required urgent improvement, and that the financial situation was favourable to success. It was therefore at his special instance, and with the approval of Lord Chelmsford, then Viceroy, that the Government of Bombay opened up negotiations once more with the Government of India in early '19. Mr. Billimoria asked whether the estimate of Buchanan with a figure of 367 lakhs was the decisive factor in obtaining sanction from a reluctant Government of India. That factor was of comparatively minor importance. The main factor was the determination of the Secretary of State to relieve the distress of the poorest classes in Bombay with which he had been vividly impressed in his recent visit to Bombay.

(2)

It is true that the scheme was turned down in earlier days on the score of Finance, but the war had altered the aspect from which all financial problems had been regarded, and the growth of wealth in India during the war had been very great, and funds were available both for private enterprise, and public loans on an unprecedented scale. For an enterprise supported on grounds of humanity by the Secretary of State for India, and the Viceroy for India, it was no longer possible to argue that Indian Finances could not bear the risk of some millions sterling, and whether those millions should be 3 or 5 or 10 was a minor factor.

I was asked whether the Government of Bombay could bear the strain of an anticipated loss of several millions, and I replied "Yes," because they have the resource, as yet untapped, of death duties. I was not asked whether they ought, unaided, to bear the loss if it should occur. The Committee perhaps do not consider that they are concerned with the possible financial expedients. I will not therefore go into the details of this aspect of the problem. It has, however, been suggested that the City of Bombay is alone concerned with the benefit of this scheme, and this view in my opinion is incorrect. The miseries of life in Bombay fall most severely on the immigrant population recruited from the interior, and they will share the benefit. The burden should therefore be also borne in part by the whole Presidency. Moreover, last spring the Legislative Council accepted a financial bill imposing fresh taxation chiefly on the City of Bombay which will shortly produce an annual revenue of 20 (twenty) lakhs of rupees, a sum sufficient to discharge the interest and sinking fund of a sum of

3 (three) crores, should that loss occur. The death duties when imposed will be chiefly paid by the City of Bombay and will be able to meet a far greater liability if necessary. Private enterprise in Bombay has succeeded in financing within recent years many large schemes, notably the iron and steel works of Messrs. Tata, the hydro-electric works of Messrs. Tata, and many new cotton mills. They have borne the burden of a capital expenditure of some 50 (fifty) crores, and have passed through periods of severe depression. There is no ground in my opinion to believe that the Government of this Presidency cannot finance a scheme which is estimated on the least favourable forecast to require about 11 (eleven) crores. The Government can afford better than private companies to wait until the period of depression is past. Moreover, if any further difficulties should occur the Government of Bombay, who were urged to take this matter up by the Government of India and the Secretary of State, have a claim to assistance from the Government of India which that Government would not, in my opinion, reject or resist.

The Government of Bombay have been charged with indifference or neglect in the administration of this scheme; and Sir Frederick Hopkinson laid some emphasis on the delay in ascertaining the results of the work of the dredger in 1924. It may help the Committee if I explain the machinery which was set up. The Director of the Development, Sir Lawless Hepper, is a Colonel of the Royal Engineers who earned a high reputation as the head of one of the largest Railway Administrations in India, the G.I.P. Railway. During the war he added to this reputation by his work in the Munitions Department, and received the honour of knighthood. For administrative purposes there was a Secretary to Government, a selected member of the Indian Civil Service. For Financial advice there was a high officer of the Financial Department of the Government of India. On the Engineering side the Director had the assistance of Sir George Buchanan whose reputation is well known; and under Sir George Buchanan a chief engineer of the Public Works Department (Mr. Lewis) who was specially recruited from Burma for his knowledge of marine engineering. Under Mr. Lewis there were several officials with specialist experience. By Indian standards of administration this was a strong and capable staff, and no complaints reached the Government from the head of this Department that further assistance was necessary. Under the normal constitution of Government one Member of Council held the Portfolio for Development, and to him the Director of Develpment made his reports. Sir Frederick Hopkinson enquired whether weekly reports of the output of the dredger should not have been submitted to the Government. This would not have been in accordance with the system of delegation of powers which is the normal system both in India and in England. I have heard persons otherwise well informed ask whether the Government of Bombay is the Government of Bombay City, and I therefore pointed out that the Government of Bombay dealt with the Presidency of Bombay, and not with the City alone. Important though the City of Bombay is, we have a population of nearly twenty millions outside the city, and the annual expenditure involved in this scheme represents only some ten per cent. of the total annual expenditure with which the Government of Bombay is concerned. The normal procedure of the delegation of powers was therefore adopted in this case. That the members of the Government failed to take any interest in the working of the dredger is I think an improbable assumption. I regret that I cannot speak more positively on the point for the following reason:—The dredger started operations on 8th December, 1923. I fell ill during that month, and was invalided to England, and did not return till August, 1924, but I know that Sir Leslie Wilson, who assumed the Governorship from 10th December, 1923, and my successor, Mr. Cadell, visited the works frequently, and made enquiries. Sir Frederick referring to the view put forward by the Engineering advisers to Government that it was impossible to ascertain the output of the dredger until the end of the dredging season in May, appeared to suggest that the lay members of Government should not have accepted this expert opinion. I think that the Committee will realise that the working of suction dredgers is a matter on which lay persons would have some difficulty in enforcing their views; and in this case the advice was given by the Engineer in charge of dredging with the support, as I understand unqualified, of the Chief Engineer, of Sir George Buchanan, and of Sir Lawless Hepper.

In considering whether the Government were indifferent or neglectful the Committee will, I hope, give due weight to this combination of expert advice.

(4)

I have explained above the administration machinery that was provided. I should add that when an important financial question arose it was referred by the Secretary of Development for the opinion of the Financial Secretary to Government, and ultimately for the opinion of the Financial Member of Council (myself). I have not observed in the newspaper reports of the proceedings of the Committee in Bombay that they have had before them either the Financial Adviser to the Development Department or the Financial Secretary to Government, or the present Finance Member. I was

asked by Sir Frederick Hopkinson whether in 1922 a *balance sheet* was drawn up in connection with the revised estimate of 702 (seven hundred and two) lakhs, and I replied that my impression was that a *forecast* had been prepared, a reply which clearly did not satisfy Sir Frederick. I should like to explain that in the normal procedure the financial results of the new estimate would have been noted upon by the financial adviser, by the Secretary to Government in the Development Department, by the Director of the Development Department, by the Financial Secretary to Government, by the Member in charge of the Development Department, and would ultimately have reached the Financial Member of Council, and the Governor. I have no doubt that these notes are in existence, and they are probably based upon a *forecast*, but I do not remember the precise form of presentation. In any case I attach no value to the ambiguous statement by Mr. Manu Subedar that " these matters do not appear to have received any consideration from Government "—a remark to which my attention was particularly drawn.

(5)

The Committee asked me no questions regarding any charges of corruption against the Staff, and I assume that they are satisfied on this point. I should like, however, to add that Mr. Cowasji Jehangir, the Member of Council, consulted me frequently on such charges, and that I was satisfied that the Director was exercising an alert and efficient supervision, and had taken steps to deal with all charges on which evidence was available, and that some of the charges which have been repeated before the Committee were wholly unsustainable. As regards corruption in the higher ranks of the Department in Bombay, I am convinced that there is no ground whatever for any suspicion of corruption.

H. S. LAWRENCE,
Oxford.

20th September, 1926.

The Committee Assembled at 11 a.m. on the 21st September, 1926, all the Members being present except the Chairman.

40th Witness, Mr. William Speirs, Dredging Master.

Sir M. Visvesvaraya.—What is your Christian name?
A.—William Speirs.

Q.—How long did you work with dredgers in Bombay?
A.—For four years.

Q.—Do you recollect from what date?
A.—Well, I could not recollect the date I signed on.

Q.—Or the month?
A.—I went out there in March.

Q.—Of 1922?
A.—Yes, 1922; but it was six months previous to that before I joined the Back Bay reclamation.

Q.—You are on leave, I take it?
A.—On leave at present.

Q.—From what date?
A.—From the 26th June.

Sir M. Visvesvaraya.—Sir Frederick Hopkinson will take your examination now.

Sir Frederick Hopkinson.—How old are you?
A.—62.

Q.—Have you had a wide and extensive experience of suction dredging?
A.—Suction dredging and bucket dredging and all classes of dredging for the last 35 years.

Q.—We will confine ourselves to suction dredging. What experience have you had of suction dredging?
A.—14 years.

Q.—Including that of Bombay?
A.—Including Bombay.

Q.—The time at Bombay is included in the 14 years?
A.—Yes.

Q.—What size of dredgers did you have before the Bombay ones? What is the biggest?

A.—28.

Q.—Where was that?

A.—Sydney.

Q.—In what material were you dredging?

A.—Sand.

Q.—What other dredgers?

A.—Bristol.

Q.—What size was that?

A.—24, 28-inch pipe.

Q.—What material was it at Bristol?

A.—Mud.

Q.—What others?

A.—Well, I was part of the time in South America at Porta Lisa and at Sewri.

Q.—What size of dredger was that?

A.—24-inch.

Q.—What material?

A.—Sand.

Q.—Were those pumping for reclamation purposes, or into hoppers?

A.—Sewri was reclamation.

Q.—And Sydney?

A.—Sydney, into hoppers.

Q.—And Bristol?

A.—Into hoppers.

Q.—Any others besides those three dredgers which you have been speaking of?

A.—The Sewri reclamation, are you speaking of?

Q.—Were you at Sewri?

A.—Yes. That is 39-inch.

Q.—How long were you on that?

A.—4½ years.

Q.—Was that mud, or mud and clay?

A.—Mud and clay.

Q.—Can you give me any idea as to the relative proportions of the two materials, mud and clay?

A.—We had about 25 per cent. of mud and the rest clay.

Q.—That is 75 per cent. clay?

A.—To begin with, of course, we had not that material, but ultimately we were reaching it.

Q.—But taking it broadly over the whole work, you had that percentage?

A.—Yes; we had about that.

Q.—So that you seemed picked out to take charge of the dredger for the Back Bay reclamation?

A.—Well, no.

Q.—But having had that experience at Sewri?

A.—Probably.

Q.—Adjoining the same harbour?

A.—Yes.

Q.—Had you similar cutters? At the Sewri reclamation you were dredging with the "Kalu" and the "Jinga"?

A.—Yes.

Q.—Were they similar cutters to the "Sir George Lloyd"?

A.—Yes.

Q.—Their specified output was 1,500 cubic yards an hour, was it not?

A.—Yes.

Q.—Did they ever do that?

A.—Yes.

Q.—Consistently and regularly?

A.—No.

Q.—Taking them approximately, did they do that approximately throughout the whole work?

A.—No; they did about 85 per cent. of it.

Q.—They did about 85 per cent.?
A.—Yes.

Q.—Of 1,500 cube yards?
A.—That is the "Jinga."

Q.—Not the "Kalu"?
A.—Not including the "Kalu."

Q.—Why is that?
A.—Well, different material to deal with

Q.—Was the "Jinga" working in clay or mud?
A.—The "Jinga" was in both clay and mud.

Q.—The "Kalu"?
A.—The "Kalu" had about 90 per cent. of mud.

Q.—What was her output?
A.—Well, her output ran down to about 1,000 or 1,100

Q.—To 1,000 to 1,100 cube yards an hour, that is?
A.—Yes.

Q.—That is only about 60 to 70 per cent. efficiency?
A.—Yes.

Q.—What was the cause of that, do you think?
A.—The soft silt.

Q.—The material?
A.—There was so little material.

Q.—The material was so soft?
A.—Yes.

Q.—Was it so soft that you could not get a proper percentage of material through the pipes?
A.—Yes.

Q.—It was so light?
A.—It was so light.

Q.—How did that compare with the mud at Bristol?
A.—Something similar.

Q.—What percentage did you get at Bristol?
A.—Well, we ran in the hopper as high as 30 per cent.

Q.—That is 30 per cent. solid?
A.—30 per cent. solid.

Q.—But if the material was so light you would lose a large proportion of that overboard?
A.—No; there was none of that put overboard—in this case, no.

Q.—It could not have been very light?
A.—No.

Q.—You would not describe that as very light material?
A.—No; I would not describe it as very light. It was light, but the percentage that we pumped was so solid that it was as much as it was possible for the machine to do.

Q.—Did you have a cutter on that dredger?
A.—No; just a trailer.

Q.—Did you ever try any pumping with the trailer only in the light mud?
A.—No.

Q.—You stuck to the cutter?
A.—We stuck to the cutter.

Q.—What percentage of the light mud did the "Kalu" do at Sewri.
A.—Probably about 15 per cent.

Q.—That is high, is not it?
A.—At times, and at other times it would rush down to perhaps 5 per cent.

Q.—How did you test that?
A.—The only way you could test it was the distance that you travelled—the amount of ground that you travelled over.

Q.—You tested by the soundings?
A.—By the soundings.

Q.—You did not attempt to make any tests from tubes taken from the output?
A.—No; none whatever.

Q.—Why not?

A.—It was too soft a ground. The pipes were laid in the ground and you could not get near them while they were buried.

Q.—You actually did not take any tests with tubes?

A.—No; one reason was the first cut off of the dredger is the best of that material.

Q.—The first cut?

A.—Yes.

Q.—Does it keep soft?

A.—When you get to 40 per cent. the next cut is less and less.

Q.—Why is that?

A.—Because the ground gets harder as you come to the bottom. You have to get the hard with the soft.

Q.—In what way does it get harder? It is the same mud. I am speaking of before you get to the clay.

A.—There was probably no clay in the " Kalu."

Q.—You just told me that the " Kalu " got 90 per cent. of mud?

A.—Yes.

Q.—I am speaking of the Sewri reclamation?

A.—And I am speaking of the Sewri reclamation. Ten per cent. was hard. It was rock bottom.

Q.—But 90 per cent. was mud?

A.—Yes.

Q.—When you are dredging with mud, as I understood you, the percentage of mud varied from 15 per cent. down to 5 per cent.?

A.—Yes.

Q.—When we were speaking of percentages let us make it quite clear what it is we mean. The point in my mind is that proportion of solid matter in the water. Is that what is in your mind also?

A.—Yes.

Q.—So that really to get it you would have to take your soundings, take different quantities, estimate the time you had been working, and the amount of water you have pumped, and then divide the solid matter dredged into that, to get that percentage?

A.—To get that percentage.

Q.—Was that done?

Q.—Yes.

Q.—Did you have an engineer on board?

A.—No; we did it ourselves.

Q.—You did that yourselves?

A.—Yes it was only for our own information.

Q.—When the " Sir George Lloyd " was ordered were you in Bombay?

A.—No; I was in Renfrew.

Q.—Were you in any way consulted by Sir George Buchanan about the dredging?

A.—None whatever.

Q.—Did he know that you had been employed for four and a-half years on the Sewri reclamation?

A.—That I could not say.

Q.—Did Simons ask you your experience of the Sewri reclamation?

A.—Many times.

Q.—That was before they made the contract for the " Sir George Lloyd," I presume?

A.—Yes.

Q.—You really went to Simons and gave them the benefit of your experience of dredging in Bombay?

A.—Yes.

Q.—I presume that would influence them, at any rate to some extent, in the design of the new dredger?

A.—Yes.

Q.—Did you describe to them the nature of the clay?

A.—In Sewri?

Q.—Yes.

A.—Yes.

Q.—How would you describe that clay?
A.—Well, as an ordinary blue clay.

Q.—Hard or soft?
A.—Medium.

Q.—Could you call it soft clay?
A.—Well, I would not call it soft clay.

Q.—Would you call it tough?
A.—No.

Q.—Not even tough?
A.—No; not even tough.

Q.—Would you call it hard clay?
A.—No; just a medium consistency between hard and soft.

Q.—Neither hard nor soft. Do you know the meaning of the word " unctuous," because Mr. Kidd, in making his borings, there described the clay as " stiff and unctuous." " Unctuous " is a word that can be used in many senses. I have never heard it used in describing clay before, but it seems to me to be a very sound definition of the clay I saw there. It means that it is stiff, not soft, but a sticky and tenacious clay.

A.—Yes.

Q.—Toughish.
A.—Yes.

Q.—Would you call that a fairly good descripion of it?
A.—Well, not as regards Sewri.

Q.—Was Sewri any different from the harbour where you dredged into Back Bay?
A.—Yes.

Q.—It was a different clay?
A.—Yes; the colour of the clay was very much the same.

Q.—In what way did it alter? Did any of the lower strata of the clay appear of that consistency I was just speaking of?
A.—Yes.

Q.—Which?
A.—The lower strata when you came to it previous to the moorum.
Q.—Was that hard or soft?

A.—It was then a hard consistency that would not cut. It was stiff and pulled the machine from you.

Q.—Do you think that was clay at all? When the cutter would not work, do you think it was clay at all? Do not you think you were on the moorum?
A.—No; it was of a clayish nature.

Q.—How thick was it?
A.—Probably about 3 or 4 feet, in some cases.

Q.—In describing this material to Simons, as I presume you did before they designed the " Sir George Lloyd," did you tell them it was medium hard or medium soft clay?
A.—Just a medium soft clay.

Q.—I have seen some samples there, but soft is not quite the right word to use in connection with it. It is distinctly stiff. I had some samples picked out for me when I was there, and it is quite stiff.
A.—After drying?

Q.—No; still in the water.
A.—Yes.

Q.—Tough, tenacious clay, and you have got to cut every bit of it?
A.—Yes; you have to cut every bit of it.

Q.—In the Sewri reclamation did you pump into a watertight lagoon?
A.—Yes.

Q.—Was it totally enclosed?
A.—Totally enclosed. There were 14 acres square.

Q.—How do you account for the loss of something like 33 per cent. of the material which was pumped into the Sewri reclamation?
A.—We pumped up until we had a level of 22, and then after that——

Q.—That is 22 level?
A.—Yes; there these pipes laid through the bank, and all the water was drawn off which came above there—water and light mud.

Q.—Do you think that accounted for the loss?
A.—Yes; there was great loss in it.

Q.—Through the pipes?
A.—Through the pipes.

Q.—So that it was a loss that could have been remedied?
A.—Well, I do not know.

Q.—Suppose you made a long weir and raised it higher and gave the mud longer time to settle?
A.—I do not think it would have dried.

Q.—No, not dried; but given it longer time to settle?
A.—Well, I believe it would have taken months before it would have settled; it was so light.

Q.—At any rate, that explains the loss?
A.—Yes.

Q.—You had a similar loss at Back Bay, did you not?
A.—Much similar.

Q.—In that case did it go through the rubble mound?
A.—Yes; I understand so.

Q.—Did you see it?
A.—No.

Q.—Why not?
A.—It is not part of my duty.

Q.—Surely!
A.—Certainly I have seen it. I have been over and had a look at it.

Q.—That is what I meant.
A.—Yes.

Q.—You have actually seen the mud go through the rubble mound?
A.—Yes.

Q.—It was proposed at one time by the Director of Development that this reclamation mound should be sealed to prevent the loss of that material. Did you hear anything about that?
A.—Yes; after the first season.

Q.—I understand Sir George Buchanan was opposed to that view?
A.—Well, I could not say about that.

Q.—You do not know?
A.—No.

Q.—At any rate, it was not done the first season?
A.—Not the first season.

Q.—Nor the second season?
A.—Partly.

Q.—Partly in the second season?
A.—Yes.

Q.—But was it entirely done in the third season?
A.—Well, no; it was not entirely finished in the third season.

Q.—Are you sure?
A.—Yes.

Q.—I think you will find it was.
A.—There were some parts which were not done.

Q.—I think you will find it was entirely finished in the third season. Was not the effect of this that you dredged a great deal more material from the harbour than was retained in the reclamation?
A.—Yes; according to the figures.

Q.—A large percentage?
A.—Yes.

Q.—Still more the second year than the first year?
A.—Yes.

Q.—And the third year the engineer's figures, I believe, show more was retained in the reclamation than was actually dredged?
A.—Well, that I could not say.

Q.—That sounds impossible, does not it? Do you think it is probably due to inaccuracy in one of the previous years?
A.—It may have been.

Q.—Owing to the difficulty of getting an exact level, owing to the soft nature of the material?

A.—Yes, that may have been so.

Q.—At any rate, if the wall had not been sealed, you would have continued to lose a large percentage of the mud that they were pumping?

A.—Yes.

Q.—That dredger, the " Sir George Lloyd," was designed to dredge 2,000 cubic yards an hour. Can you tell us in a few words the reason for that not being accomplished?

A.—The material is not suitable. The machine cannot deal with it.

Q.—Which are you speaking of—mud or clay?

A.—Clay—the lower strata.

Q.—Let us take the two separately, and begin with mud?

A.—We made a start with 2,000 yards an hour.

Q.—How do you know that?

A.—By the speed we travelled, and the quantity we have taken up.

Q.—By the speed of your cut?

A.—Yes.

Q.—What is the length of your cut?

A.—5 feet 6 ahead.

Q.—And 300 feet wide?

A.—Yes; and 10 feet deep.

Q.—10 feet deep in the mud?

A.—Yes, the depth of the cutter.

Q.—You ought to have got everything that was possible with a depth cut of 10 feet.

A.—Yes, the first cut was 10 feet.

Q.—At what speed did you travel across the cut?

A.—35 feet.

Q.—Per what?

A.—Per minute.

Q.—35 feet per minute?

A.—Yes, I think that would be the average.

Q.—One could easily average it?

A.—It would probably be more.

Q.—It is 5 feet 6 by 35 feet by 10 feet 6 deep?

A.—10 feet 6.

Q.—Let us see what that means. That is about 74 cube yards a minute. That is 4,440 cube yards an hour; but we have not done 1,000 cube yards an hour. However, I will have that calculation checked. On that calculation we have never done 25 per cent. of it?

A.—No, I am well aware of that.

Q.—What is the reason?

A.—The next cut. The next cut is probably 50 per cent. stiffer—the material to cut.

Q.—What you have given me is the first cut?

A.—Yes.

Q.—Is that clay or mud—you say clay?

A.—Clay.

Q.—But this clay did not maintain an equal depth of 10 feet 6 inches?

A.—No, it was very, very uneven.

Q.—But the surface of the clay was uneven?

A.—Yes, and the ground was very, very uneven.

Q.—Did you always get 10 feet 6 inches of mud?

A.—More or less.

Q.—Do you think that that practically coincided with the top of the clay?

A.—With the top of the clay.

Q. Because in some of these areas you will notice there is no clay at all in some of these patches where you have been working?

A.—That is as far as we could get at it by the working of the machine.

Q.—In block K there is no clay at all?

A.—No.

Q.—There is only mud?

A.—In this area here (pointing to the dredging area in the harbour as shown in the plan) in block K we had very little clay, but we have a sort of hard moorum.

Q.—You did not dredge the moorum?

A.—We had to go as far as the rock.

Q.—But you did not dredge the moorum?

A.—Yes.

Q.—You did?

A.—Yes.

Q.—What is the depth?

Q.—I should say from 10 feet as high as 18 feet *here*.

Q.—The moorum?

A.—Yes, on this part.

Q.—Here again on block H you have 4,200,000 yards of mud, and only 300,000 yards of clay, so that that is practically all mud, and the same with block G—there is no clay—at all?

A.—Well, of course there is nothing *here* at all. (The Witness pointed on block G.)

Q.—There is no clay there at all. Practically in the whole of these three blocks there is no hard material of any kind?

A.—We have it hard *here* (Pointing to block J). It does not matter whether we go round here—we have the hard bottom.

Q.—East of the Oyster Rock?

A.—Yes.

Q.—In that little block *there*, there is nearly as much clay as mud. For one of mud there is three-quarters of clay?

A.—Yes, three-quarters of clay.

Q.—That does not apply in these three blocks *here*?

A.—No. This *here* is mostly of a rough, sandy nature (The Witness pointed in block K), but mud on the top.

Q.—If it is of a sandy nature, it is good material for pumping?

A.—Yes, but little of it.

Q.—You told me the dredger in the top cut was working at the rate of 4,400 cube yards an hour?

A.—Yes.

Q.—Which is twice as much as what she was designed to do?

A.—Twice of her capacity.

Q.—My difficulty is this. The whole of the dredging work of the first and second seasons was down at the far end, was not it?

A.—Yes.

Q.—That is nearly practically all mud. Then why do we get such a poor output?

A.—Well, the output in the first season was due to one dredger, and having too long a pipe.

Q.—That was only for short time, was it not, whilst the " Colaba " was laid up?

A.—It was practically the whole of the first season.

Q.—The first season the first dredger only did 5,000 feet. You were dredging close in shore, and you had more than 5,000 feet delivery?

A.—Yes, we had more at times.

Q.—I think you will find that is right, that the first season you were dredging close in shore and the " Colaba " was not required to work?

A.—No.

Q.—Because the deposit was within the limit of 5,000 feet the capacity of the " George Lloyd," and I think only for a short time whilst the " Colaba " was being strengthened did you ever work up to 7,000 feet from distance of delivery?

A.—6,000 sometimes.

Q.—We have a statement showing all this. We will get that. Whilst that is coming, you said your second cut was 50 per cent. stiffer material?

A.—Yes.

Q.—Does that mean that it was clay?

A.—Partly clay and partly moorum.

Q.—But you had plenty of power in your cutter. We have been told out in Bombay that the cutter has 400 horse-power, and it is throttled down to work at about 160 horse-power, so that there should be no difficulty in cutting it?

A.—There is great difficulty in cutting it.

Q.—Not the clay, surely?
A.—Not the clay.

Q.—When she is working in clay, why is the output so much less that what she was designed to do?
A.—It is too hard.

Q.—But you say there is no difficulty in cutting it?
A.—No, there is no difficulty in cutting it; but we have got to take time to cut it.

Q.—The time is fixed by the design of the dredger. The cutter is designed to work 12 revolutions a minute, was not it?
A.—Between 11 and 12.

Q.—That is part of the design; and it would not make much difference whether it was hard or soft, so long as you had plenty of power. If the clay were soft, you could cut it with smaller power; if the clay were hard, you have got ample power to cut it with?
A.—Well, we may have ample power to cut it with, but there is only one way in which we can cut it.

Q.—What is that?
A.—That is coming back. Suppose we take the cutter and we are going to the right, well, we have found ground that she will not go into.

Q.—If the material is too hard, she will not go into it?
A.—It is too light, but we have not got the weight.

Q.—The cutter is not heavy enough?
A.—Yes.

Q.—It weighs 12 tons?
A.—Yes.

Q.—You mean the ladder is not stiff enough to force the cutter into the clay?
A.—No, we have not weight enough.

Q.—You have got 12 tons, plus the weight of the ladder and the power of the bow winch?
A.—Yes.

Q.—But she would not cut into it?
A.—No, the cutter will not sink into it.

Q.—That rather goes against your description of the clay, as being soft, does not it?
A.—Yes.

Q.—Then did you take your second cut on the way back?
A.—Yes.

Q.—You were cutting up against the face?
A.—Up against the face.

Q.—It looks to me as if that ought to be the easier way to do it?
A.—It is easier, but still we cannot cut enough of it to get the output.

Q.—You cannot cut enough of it?
A.—No.

Q.—Do you think you would have done more had your cutter been bigger and heavier?
A.—Yes.

Q.—You do?
A.—Not bigger, but heavier.

Q.—I do not think that that amounts to very much, because you have got all the power of your bow winch. It is the winch that does the heaving?
A.—Yes.

Q.—It keeps the cutter up to the face?
A.—Yes.

Q.—Not the weight of the cutter?
A.—The weight of the cutter must go into the ground before we get the material to cut. We must get the cutter into the ground before we can get the material to cut.

Q.—Its own weight would take it down?
A.—No, is own weight would not take it down.

Q.—The weight of it would cut its way down?
A.—No.

Q.—That is an extraordinary thing.
A.—It will cut its way down, but it will be a long time.

Q.—To make one cut down?
A.—Yes.

Q.—If it is a long time cutting down, it must equally be a long time making the side cut?
A.—Exactly.

Q.—Because the operation is precisely the same?
A.—The operation is precisely the same.

Q.—Are you short of power, or is it only the weight—you attribute it to the want of weight?
A.—And want of power.

Q.—But you have plenty of power. Your cutter engine is 400 horse-power, and we were told it was not working up to half of its power?
A.—That will not cut it.

Q.—It is not want of power in the engine-room, because you had that power?
A.—It will not cut it.

Q.—That rather disposes of what you said just now, that it was soft clay, because the softer the clay the easier it is to cut?
A.—The easier to cut.

Q.—That rather bears out the description that was given of the clay originally—that it was stiff, does not it?
A.—Yes.

Q.—We started off by making one cut right across at the rapid rate of 4,400 cube yards an hour. Now you drop your cutter into the stiff clay and you drop down to 50 per cent of that?
A.—50 per cent.

Q.—50 per cent. would still be over 2,000 yards an hour, which is more than the dredger was designed to do?
A.—Yes.

Q.—And that would have been very satisfactory to everybody in Bombay, yourselves included?
A.—Yes.

Q.—What was the total depth of the clay where you were working?
A.—Well, we vary from 15 feet to 35 feet.

Q.—Not near by?
A.—Well, we run in a hollow—probably in 1,500 feet, and we have 35 feet probably of 400 or 500 feet long, and then we began gradually to go up.

Q.—It would be gradual?
A.—Yes.

Q.—You would start away with 10 or 15, or perhaps 20 feet?
A.—We usually got about 18 feet.

Q.—And go up to 35 feet—is that your maximum?
A.—That was our maximum.

Q.—Did that take you 70 feet below low water level?
A.—High-water level.

Q.—Was the 70 feet below high-water level and not below low water?
A.—Below high water.

Q.—That is your second cut. Now coming to your third cut, what happened with that?
A.—It was still stiffer. We reduced down to about 800 at the finish of the cut.

Q.—You reduced to 800 cube yards an hour?
A.—Yes.

Q.—You had soundings daily?
A.—Daily.

Q.—Did you know how much had been done each day?
A.—No, we never knew anything that was being done each day.

Q.—You did not make calculations?
A.—No.

Q.—Although you could have done so?
A.—We could have done so.

Q.—There was no reason why a daily report should not have been sent to the office, showing exactly how much had been dredged?

A.—Yes, a report goes to the office. The Surveyor every day at 12 o'clock takes his soundings. He takes his soundings and he takes them to the office; but we never heard anything about them.

Q.—In the office they should know at 12 o'clock exactly how you had done in the previous 24 hours?

A.—Yes, in the previous 24 hours.

Q.—We were told here on Friday last that the Government did not get to know until August what had been done the previous December?

A.—Well, I could not say anything about that.

Q.—So far as you were concerned, the soundings were taken daily, and the work done could have been measured daily?

A.—Yes.

Q.—That is what I should have expected. You would not know what you were doing unless you had your soundings taken?

A.—Yes.

Q.—For your own satisfaction you would want to know exactly what you were doing?

A.—Yes.

Q.—I presume you were never satisfied out there with the rate of progress?

A.—We were never satisfied with the rate of progress. We were humbugged so much at times with the pipe line and other things.

Q.—What other things delayed you and reduced your output, because you had got down to 800 cube yards, which would still give you a pretty high average. That is your third cut. What thickness were those cuts in the clay?

A.—Well, the first would be 10 feet

Q.—10 feet?

A.—Yes; that is taking at 35 feet.

Q.—10 feet 6 inches I have got?

A.—That is taking it 35 feet for the face.

Q.—And what is your second cut?

A.—It would be about 9 feet reduced down to 4 feet

Q.—The next one is 4 feet deep?

A.—Yes.

Q.—That still does not finish at 35 feet—that is 23?

A.—The last cut would be about 4 feet.

Q.—That is still stiffer?

A.—Yes; according to the further we go down we just have to vary the cut.

Q.—Did you actually see any moorum deposit on the reclamation site from your dredger?

A.—No.

Q.—Did you see the clay?

A.—We saw the clay.

Q.—You saw the mud?

A.—We saw the mud.

Q.—And you saw the lumps of clay?

A.—We saw the lumps of clay.

Q.—What is the biggest lump of clay you ever got out?

A.—Well, that I could not say.

Q.—What is the biggest you saw, roughly?

A.—Roughly, it would be about that size. (*Illustrating a length of about 2 feet.*)

Q.—As big as your head?

A.—No.

Q.—About *that* square?

A.—Square probably about 9 inches deep.

Q.—9 inches thick?

A.—Yes.

Q.—Do you mean the cutter would take a 9-inch piece in one cut?

A.—Yes.

Q.—If she could do that——

A.—If it is soft enough.

Q.—If it was soft enough?

A.—Yes.

Q.—That was clay. Your output ought to be well up to 2,000 yards an hour if she would take 9 inches?

A.—If we could get it continuously.

Q.—But you could not?

A.—We cannot do it.

Q.—Your next blade end on the cutter could not get anything at all?

A.—No. You see we also lost two.

Q.—How close were these cutters? I only saw the cutter for a few minutes.

A.—Probably about 2 feet 6 inches at the widest part.

Q.—I think they were rather closer than that—2 feet 4 inches.

A.—From tip to tip.

Q.—Does that agree with your recollection?

A.—Yes; that is taking the width you have only about 15 inches of space in between them.

Q.—My recollection is that there were about 15 inches between the blades.

A.—That is the width—between the back of the blade and the point of the other. Your blade is about 15 inches broad.

Q.—I should like to understand this. Taking the tips of the blades, how far is one tip from the next tip?

A.—About 2 feet 6 inches.

Q.—So that it is not like a shaving machine. You would get a fairly big cut.

A.—Yes.

Q.—That would account for your people getting sometimes 9 inches?

A.—Yes.

Q.—That would mean that the cutter had been jammed over starting the cut and had taken 9 inches cut from the top, would not it?

A.—Yes.

Q.—I want to see the key plan to see where these sections are taken. In the meantime, while that is coming, will you tell us: did you ever have anything to do with the borings?

A.—No.

Q.—Did you see them being made, or was it before your time?

A.—They were made about 1912 or 1913. It was during my time on the Sewri.

Q.—They were made during your time?

A.—Yes.

Q.—You saw them being made?

A.—No; but I knew they were being carried on.

Q.—You did know?

A.—Yes.

Q.—You would see their sounding boats in the harbour, I suppose?

A.—No; that is too far away.

Q.—You know nothing about the borings?

A.—Nothing whatever.

Q.—Did not the people who were making these borings come up and see what you were doing?

A.—No.

Q.—They were not interested?

A.—No.

Q.—Although you were working in similar material two or three miles away? Did you see Sir George Buchanan before the work was started in Bombay?

A.—No.

Q.—Did he know that you had been dredging the Sewri?

A.—Well, I could not say for that, but I presume he would know.

Q.—You presume he would know?

A.—Yes.

Q.—At any rate, he did not ask to see you?

A.—No.

Q.—We have still got, according to your account, a fair average output, going from 4,400 yards an hour down to 800 yards an hour from the third cut. Was it about the same for the fourth?

A.—Much about the same for the fourth cut.

Q.—Although the dredger has never given that output as measured in the reclamation, or as measured by the soundings?

A.—You see, the great output was only momentary. It was only for the first cut.

Q.—Still, that accounts for a pretty fair quantity; 10 feet 6 inches deep over the whole area?

A.—Yes.

Q.—Even the rest was 800 yards an hour, which is better than the records show of the mud and the clay together. Your recollection does not seem to agree with the actual figures as the work was ultimately surveyed. Of course, we know that a certain proportion of the mud has escaped through the rubble mound?

A.—Yes.

Q.—It was not much good your putting in 4,000 yards an hour if they were going to let half of it escape. Do you think the dredger will ever do anything better than what she has done in the past?

A.—Well, I believe we may do a little better as we begin to get properly settled down to our work. You see, we are practically new men. You have got men with no experience in dredging, and with no experience of this class of work whatever.

Q.—It should not take long to train a dredging master on one cut?

A.—Well, no; if you are able to settle down to it properly.

Q.—It is proposed if the dredger works next season to work 24 hours a day. Do you see any objection to that?

A.—I have no objection to what hours they work. They would have to take the hours we can give them as regards working. It means we have got to have another staff during midnight.

Q.—It can be arranged?

A. -It could be arranged, certainly.

Q.—When did you go out?

A.—In March, 1922.

Q.—That was about the time the dredger arrived?

A.—Just about it.

Q.—You practically arrived together?—Yes; I went out for the erection of the pipe lines—not as dredger master at all.

Mr. Billimoria.—Did I understand you to say that you did not work on any dredger at all?

A.—The dredger was not there then. But after the pipes were erected I was taken on as dredging master.

Q.—On what?

A.—On board the "Sir George Lloyd."

Sir Frederick Hopkinson.—You went out not as dredging master?

A.—Not as dredging master.

Q.—But solely to erect the floating pipes?

A.—I was employed by the Controller of Stores.

Q.—To erect the pipes?

A.—Yes.

Q.—Were all the pipes there when you got there?

A.—Partly there.

Q.—So that you were able to start on that job at once?

A.—No.

Q.—Why not?

A.—They were not erected. There was not enough of them. There were only six of them erected when I arrived.

Q.—You said "partly," and I thought you meant half, or something like that.

A.—No.

Q.—What did you do the first season?

A.—We did nothing but erect the pipes.

Q.—You say there were only six erected?

A.—Yes; there were six that were erected when I arrived there.

Q.—Six had been erected when you arrived?

A.—Yes.

Q.—Then you went on and erected the rest of the pipes on the pontoons?

A.—Yes.

Q.—How many did you do in the first season?
A.—The first season we did about 49 of them, I think.

Q.—Forty-nine?
A.—Yes; they were 70 feet to 80 feet long.

Q.—When were you appointed dredging master?
A.—I really could not tell you the exact month it was.

Q.—Tell me as nearly as you can.
A.—I think it was somewhere about December.

Q.—December, 1922?
A.—Yes.

Q.—The dredger and the " Colaba " by this time had arrived and had been dry-docked, I presume?
A.—No.

Q.—Not dry-docked?
A.—No.

Q.—We were told they had been dry-docked and their bottoms cleaned and painted.
A.—Yes; after I took charge.

Q.—At any rate, they were lying in Bombay?
A.—Yes.

Q.—The " Sir George Lloyd " really began work in December, 1923?
A.—Yes.

Q.—Can you tell us why it was lying there for 20 months before it did anything?
A.—That I could not explain to you.

Q.—You do not know?
A.—No.

Q.—Were your pipes right?
A.—Yes.

Q.—There was no reason, as far as the dredger and the pipes were concerned, why it should not have started working in December, 1922?
A.—Yes; you could have done it.

Q.—You do not know why it was not done?
A.—No.

Q.—Had you got a full crew for the work in December, 1922?
A.—No; we had no crew.

Q.—No crew at all?
A.—No crew; just the watchman.

Q.—Just the watchman?
A.—That was all.

Q.—Can you tell me when the crew came?
A.—The crew came about a fortnight or a month before we started work in November.

Q.—That would be in November, 1923?
A.—Yes.

Q.—Was it a full crew—a double crew?
A.—A single crew.

Q.—Enough for working eight hours a day?
A.—Eight hours a day.

Q.—Were you told why you were only to work eight hours a day?
A.—We were to work according to the Sewri work—the same number of hours that were worked at Sewri.

Q.—Did they only work eight hours a day at Sewri?
A.—We practically worked nine hours—sometimes nine and a half hours. We varied it.

Q.—They did not double the shift a day?
A.—No.

Q.—Did you ever, before you went to Bombay, know of a large and expensive dredger that only worked single shift for reclamation purposes?
A.—No.

Q.—Did not it strike you as being a waste of plant to have it lying idle for two-thirds of the 24 hours?
A.—It was, certainly.

Q.—The first year's output was very poor, I believe?
A.—Yes.

Q.—Did Sir George Buchanan come on board soon after you started in December, 1923?

A.—Yes; I believe so.

Q.—Did he ask you what progress you were making?
A.—Yes.

Q.—Was he satisfied with it?
A.—No.

Q.—He was not?
A.—No.

Q.—What did he do to increase the output?
A.—Well, we had no increase that season until we got a double crew.

Q.—He was dissatisfied with what you were doing in December, and January, 1924? Did he suggest you were not working the dredger properly?
A.—Not to my knowledge.

Q.—Not to you?
A.—Not to me personally.

Q.—You would be on the dredger the whole of the time?
A.—Yes.

Q.—Living in the dredger?
A.—At that time.

Q.—In general charge of it?
A.—Yes.

Q.—So that if he had any complaint to make he probably would have made it to you?

A.—Well, I do not think so.

Q.—You do not think so?
A.—No.

Q.—Why not?
A.—Mr. Brims would be the party to make it to.

Q.—Did Mr. Brims ever tell you that Sir George Buchanan was dissatisfied with the output of the dredger?
A.—Yes.

Q.—He did?
A.—Yes.

Q.—Was any suggestion made that you were not working it properly—that you did not know how to work it?
A.—Well not to me.

Q.—Was it made to anyone?
A.—I have heard it from outside.

Q.—Do not talk of outside—I mean from engineers?
A.—No.

Q.—Responsible people?
A.—No.

Q.—Did Sir George Buchanan ever make any suggestions to you?
A.—No.

Q.—Although naturally he would see you every time he came on board?
A.—Yes.

Q.—Did he make any in the second season?
A.—Well, no. Mr. Brims had all the suggestions.

Q.—He had the suggestions?
A.—Yes.

Q.—Did he have any suggestions from Sir George Buchanan?
A.—Well, I suppose so.

Q.—Because Mr. Brims in his evidence in Bombay said that Sir George never made any suggestion to him of any kind that the dredger was not working properly, or made any suggestion for its improved working. You were there to hear?
A.—Well, I understood from Mr. Brims it was through Sir George Buchanan that any suggestion came.

Q.—What suggestion came to you?
A.—The only suggestion was that the vessel was not making her output.

Q.—That is another thing. I am meaning suggestions for improving the output. You knew that the output was not being got, but what suggestions were made to you to improve the output of the dredger?
A.—Well as a matter of fact none whatever.

Q.—None at all?
A.—No.

Q.—Neither in the first season nor in the second season?
A.—No.

Q.—Nor in the third season?
A.—No. We were doing our utmost at all times.

Q.—Sir George Buchanan has, in a published letter to the Press, complained that the dredger was mishandled. Did he ever say so to you?
A.—No, not to me; and they had their opportunity.

Q.—You have had a wide experience of dredging, especially in pump suction dredging. Did you ever mishandle the dredger?
A.—No.

Q.—Did you always do your best?
A.—Always—as much as the vessel would do.

Q.—As much as the vessel would do?
A.—Yes.

Q.—You think you got out of the vessel all it was capable of doing?
A.—All it was capable of doing.

Q.—It is a very serious thing, in the case of a man of your reputation and experience, to suggest that you mishandled a dredger of that kind. Do you not think so?
A.—Yes, it is.

Q.—If he really thought that, do you not think he would have come on board and given you the rough side of his tongue?
A.—Yes; either that or sent me home.

Q.—If he seriously thought the dredger had been mishandled, would not it have been his obvious duty to send you home, and get somebody there who would not mishandle it?
A.—Certainly.

Sir Frederick Hopkinson.—One would certainly have thought so.

Mr. Billimoria.—You said you heard just now from an outside element that the dredgers were not working satisfactorily. What is the outside element?
A.—The public outside—the people spoke about it.

Mr. Billimoria.—What people spoke about it?

Sir Frederick Hopkinson.—What we call bazaar gossip.

Mr. Billimoria.—Is that what you mean?
A.—That is what I mean.

Q.—Was there any engineer who spoke about it?
A.—No.

Q.—Or from your own Department?
A.—No.

Q.—The Development Department?
A.—No.

Q.—It is only the bazaar gop?
A.—The bazaar gop, as the saying is.

Sir Frederick Hopkinson.—The only reason you did not work double shift in the first season was because in the first place you had not orders to do it, I presume, and in the second place you had not sufficient staff to do it?
A.—We had no staff.

Q.—In the second season they doubled your staff?
A.—Yes.

Q.—You had orders to work a double shift?
A.—We had orders then to work a double shift.

Q.—There was no reason, so far as the dredger was concerned, why it should not have worked a double shift in the first season?
A.—Well, everybody was strange to it, and it would have taken the best part of the seasen to have educated them to do it.

Q.—You would not keep a dredging plant costing a million for the purpose of educating a couple of dredging masters, would you?

A.—Well, you have to educate everybody aboard of her, from the winchmen downwards.

Q.—But sailors are born winchmen, are not they?

A.—Sometimes, but not about India.

Q.—Not in India?

A.—No.

Q.—It would have paid, would not it, to get the men from this country?

A.—Well, I do not know.

Q.—Were you compelled to use Indian winchmen?

A.—Yes; I understood it was all a native crew.

Q.—It was all to be a native crew?

A.—Yes.

Q.—Except the engineers and dredging masters?

A.—Yes.

Mr. Billimoria.—Did you find any of them unsatisfactory?

A.—No, after I had them educated, I have nothing to say against them.

Q.—They were quite as good as anybody who could have come out from this country?

A.—Just as good.

Sir Frederick Hopkinson.—I am glad you got that out, because that is exactly what I was told on the dredgers out there—that the men were perfectly satisfactory?

A.—Perfectly satisfactory. I could not wish for better men.

Q.—Would you confirm what was told me in Bombay, that the crew generally, and engineers of the dredgers were quite satisfactory?

A.—Well, I would not say they were at all satisfactory.

Q.—You would not say what?

A.—I would not say they were at all satisfactory.

Q.—You must have misunderstood me, because just now you said they were satisfactory.

A.—The crew.

Q.—And the engineers?

A.—I do not consider the engineers as part of the crew.

Q.—You differentiate between the crew and the engineers?

A.—Between the officers and the crew

Q.—You say the crew are satisfactory?

A.—Yes.

Q.—And the engineers?

A.—They were not just exactly what they ought to have been.

Q.—Not quite as good as you would have liked?

A.—Not what I would have liked them to have been.

Q.—So long as you got the revolutions out of the pumps of the cutter, it did not matter very much?

A.—No, but still at times I would like a little more energy out of them—the engineers.

Mr. Billimoria.—Were the engineers local men, or sent out from here?

A.—Sent out from London.

Sir Frederick Hopkinson.—I take it you cannot suggest anything now in the way of improvements for working in the coming season, if it is decided to work the dredgers?

A.—Nothing whatever.

Q.—You are perfectly satisfied that you have done everything—as it was put to us in Bombay—that was humanly possible?

A.—That the machine will do.

Q.—You might at the same time give us your general opinion of the " Sir George Lloyd " as a dredger?

A.—She is a first-class machine.

Q.—You would not wish to alter her in any way?

A.—I do not think you could.

Q.—You think she is as good a machine as could be built?

A.—Yes.

Q.—Do you say the same with regard to the " Colaba "?

A.—The " Colaba " we have had some trouble with, but I cannot exactly point out where the trouble arises. She suffers from vibration.

Q.—There appears to be a little weakness in the hull of the ship, and you had a lot of vibration, which was shown by the chimneys coming together?

A.—Yes.

Q.—Has it ever occurred to you that there is a possible air lock in the suction pipe of the " Sir George Lloyd," and also of the " Colaba "? You have got the pipe coming up at the end of the ship like *that*, and going down to the centre of the pump like *that*. You have got an air vessel just *here*. Do you remember that?

A.—Yes.

Q.—But that the air vessel is below the top of the pipe. It is down *here*, and I believe it is not used for anything.

A.—The air vessel on the pontoon, are you speaking of?

Q.—No, on the suction pipe of the " Sir George Lloyd "?

A.—Directly above the pump?

Q.—No, on the suction side of the pump.

A.—On the suction side, but about 3 feet from the pump, going to the forward end of pump.

Q.—You know that it is blocked up? It has a plug in the top of it?

A.—No.

Q.—What is it?—It acts as a safety valve. There is a spring valve on top.

Q.—It is a spring valve?

A.—Yes.

Q.—Does it act?

A.—That I could not say.

Q.—Have you stood much at the outlet of the pipe of the dredger on the shore?

A.—No.

Q.—You have been interested enough to go and see it?

A.—Yes.

Q.—Frequently?

A.—Well, probably about once a week—nothing more.

Q.—Was it giving a full bore?

A.—At times. It all depended on the length of the pipe.

Q.—The length of the pipe did not vary much per week?

A.—Oh no, not per week.

Q.—When it was dredging 5,000 ft. did it give a full bore?

A.—At times.

Q.—Only at times?

A.—Just during the period when there may have been a little less material in the pipes. The pipes were getting a practically solid volume of heavy material, and that reduced it to half.

Q.—In your experience, what percentage of solid matter do you expect to get through your delivery pipe?

A.—I should say not more than 15 per cent.

Q.—15 per cent. would be rather an outside figure, would it not?

A.—Yes.

Q.—If you got 10 per cent. you would be doing pretty well?

A.—10 per cent. would be a very good average; that is, if it is continuous.

Q.—When it was found that this dredger was not giving its specified output, did you have any instructions to make any experiments to see if you could improve it in any way?

A.—No.

Q.—Were you told to run the cutter faster?

A.—No.

Q.—You were told nothing?

A.—Nothing.

Q.—You simply went on at the designed speed?

A.—Yes, I simply went on at the designed speed.

Q.—It would have been possible to have run the cutter faster, would it not?

A.—No; not on the material.

Q.—But, as the material varied, you could run it faster in some places than in others?

A.—If the material had been continuously consistent it would have been quite all right.

Q.—Why could not you run the cutter faster?

A.—We could not vary our speeds to suit the varying material.

Q.—Why not?

A.—We would have been too slow in varying them.

Q.—You had double horse-power on the cutter engine than what you were using?

A.—Yes.

Q.—Then why could not you have tried to work the cutter a bit faster?

A.—If we had worked the cutter a bit faster, we might have travelled about five feet quicker per minute, but that would have been no good.

Q.—You were making 12 revolutions a minute?

A.—Hardly 12; 11½.

Q.—Supposing you had worked up to 15 or 16 revolutions a minute?

A.—We could not do it; we could not get the speed up.

Q.—Why not?

A.—We had not the speed in the engine. The engine runs at 250 with 11 revolutions.

Q.—And you could not have increased that?

A.—We could have increased it, but we would have lost the power altogether.

Q.—But your engine had double the power which the cutter required?

A.—It was supposed to have.

Q.—You could have increased the speed of the cutter to make use of some of this power which you were not using, could you not?

A.—It would have been very detrimental to us on the hard material.

Q.—At any rate, you had no instructions to try any other methods?

A.—No.

Q.—Did you notice that the output fell off very rapidly, or to any extent, after you had got over 5,000 feet delivery pipe?

A.—Yes.

Q.—To what extent? For part of this season you were dredging at 7,000 feet?

A.—Yes.

Q.—What volume did you lose by the increased length of pipe?

A.—About half to three-quarters.

Q.—You mean you were only pumping at one-fourth the output?

A.—Yes, at times.

Q.—Due to the increased length of pipe?

A.—Yes, due to the increased length of pipe. You understand that with the short length of pipe our average pressure was 30 lbs. per sq. inch.

Q.—Average pressure where?

A.—On the discharge. With the increased length of pipe to a minimum it was 60 lbs. pressure. We were having then about 35 per cent. of slip in our engine.

Q.—In the pump?

A.—Yes. The material was so heavy that we could not put it through.

Q.—To go to Back Bay for a moment, the "Kalu" went out to dredge from Back Bay into the reclamation. You were in charge of that, I believe, were you not?

A.—Yes.

Q.—The first season's work resulted in a total output, I think, of about 15,400 cubic yards for a whole season's work?

A.—Yes.

Q.—The output of the "Kalu" at Sewri was designed at 1,500 cubic yards an hour?

A.—Yes.

Q.—So that, putting it into quantity, she did about 10 hours' work during the whole season she was in Back Bay. Would you give us the reason for that, as you were in charge of the dredger?

A.—The first thing is that we had to make flotation for her. We only had an hour and a half each day.

Q.—She was expected to work in a place where, if she had been left at low water, she would have grounded?

A.—Yes.

Q.—That would have been a very unsafe thing to do?
A.—Yes.

Q.—It would have probably ended in wrecking the dredger?
A.—Exactly.

Q.—Then you had an hour and a half at each tide?
A.—No—per 24 hours.

Q.—You only worked single tide here?
A.—Yes. We could do nothing in the dark there.

Q.—You had an hour and a half in which to take up your moorings, do the work, and get out again?
A.—Yes.

Q.—Would it not have been advisable to have taken a drag dredger there in small pontoons and to have dug a hole for you to go in and float?
A.—We had none suitable.

Q.—Did not the Improvement Trust or the Dock Board have anything suitable?
A.—No. I do not think there was a dredger suitable in the whole place.

Q.—Therefore, because you had not a drag dredger, or because you had no means of doing it, the dredger was kept the whole season doing a day's work?
A.—Yes.

Q.—Was not that very unsatisfactory to you?
A.—It was, but we could do nothing else.

Q.—That was all you could do?
A.—That was all we could do.

Q.—You were carrying out orders?
A.—Yes.

Q.—The next season, I think, the "Kalu" did about 373,000 yards, did she not?
A.—For the whole season.

Q.—Was she worked single-shift or double-shift?
A.—Double-shift. The double-shift constituted a little over a single-shift, the pipes being aground at low water.

Q.—Were the pipes aground at low water?
A.—Yes.

Q.—So that actually, although you were nominally working double-shift, you were actually only working single-shift hours?
A.—Yes.

Q.—Therefore, from that point of view, your output was not too bad?
A.—No. It was not too bad at all for the hours we worked and the position we were in.

Q.—Is that going to apply in the future?
A.—I cannot say.

Q.—Which pipes took the ground?
A.—A thousand feet of them took the ground from the gantry.

Q.—So the gantry has not relieved you of the pipes going aground at low water?
A.—No.

Q.—You still have that trouble?
A.—We still have that trouble, and always will have it.

Q.—Is there any reason why you should not pump through the pipes when they are on the ground?
A.—You could pump through them, but the trouble is the movement of the pipe. One end of the pipe was practically on the ground at low spring tide—at the bend of the pipe.

Q.—I see what you mean—your connection from the dredger to the pipes?
A.—Yes, at the end of the first length.

Q.—You would have to swing with an arm, so that you would be free to float?
A.—Yes.

Q.—In the proper direction?
A.—No, about 1,000 feet from the end of the ship.

Q.—There is one other question which I want to ask you. Someone suggested that there was a lot of leakage from the pipes in the harbour dredging. Is that correct?
A.—Yes. You cannot avoid that.

Q.—What I want to get at is, was it an undue amount of leakage?
A.—No.

Q.—Was it normal? Was it anything more than you would expect?
A.—No, it was nothing more than you would expect.

Q.—You have nothing to complain of in the construction of the pipes?
A.—No.

Sir M. Visvesvaraya.—Can you give a percentage of what was lost, roughly?
A.—I could not possibly give it.

Sir Frederick Hopkinson.—It would be very small?
A.—Very small. Probably the greatest part of it might not be as thick as this pencil.

Q.—It would be just the ordinary thing that you would expect?
A.—Yes, just the ordinary thing that one would expect.

Mr. Billimoria.—You said something just now about working the "Kalu" under orders. You said the output was very unsatisfactory, but that you were helpless as you had to work under orders. What were your orders, and whose orders were they?
A.—Mr. Brims'. The orders were to work as long as possible and to get the greatest amount of work done.

Q.—Did you bring to Mr. Brims' notice the various things which caused the unsatisfactory working?
A.—Well, it is not unsatisfactory working.

Q.—The various things which were pointed out by Sir Frederick just now, such as not having pontoons, or other arrangements, so that you were not able to work the dredger? Were all those matters pointed out to Mr. Brims?
A.—I do not grasp your question.

Sir Frederick Hopkinson.—This is purely a physical thing, Mr. Billimoria. In the first place, they could only work for an hour and a half on the top of the tide, because there was not sufficient water to float them. Then, when they did get a floating place to lie in, their delivery pipes went aground at low water and they could not work at low water then; so they had to wait until their pipes floated. There was no way out of it. It was due to the situation of the place.

Mr. Billimoria.—Did not they anticipate that situation?

Sir Frederick Hopkinson.—I suppose somebody did.

Mr. Billimoria.—Who was it who did not anticipate it?

Sir Frederick Hopkinson.—You cannot blame anybody. The thing is that they changed their methods. They started dredging in Back Bay when originally they had no intention of dredging there at all. (*To the Witness*): When you went out there, there was no thought of dredging in Back Bay, was there?
A.—No. It was all inside.

Q.—Was your advice asked about dredging in Back Bay?
A.—They asked me if I could do it, and I said, Yes. There is nowhere where you cannot dredge as long as you have the material, and the depth of water, and a machine with which to do it.

Mr. Billimoria.—Was any investigation made before the "Kalu" was shifted over there?
A.—Yes. All soundings and borings were taken.

Q.—And it was known, was it, that she would only be able to work for a few days in the year at the time she was taken over there?
A.—Yes, to begin with.

Q.—That was all anticipated?
A.—Yes, to begin with, but we did not anticipate that it was going to be so long—the whole season.

Sir Frederick Hopkinson.—If I remember rightly, Sir George Buchanan, in one of his reports said a similar thing had been done at Sewri in four or five days, and here it was going to take a little longer?
A.—Yes.

Q.—Instead of taking a few days, it took a whole season—seven months?
A.—Yes.

Q.—And the money spent on that seven months' work was practically all thrown away?
A.—Yes.

Q.—It produced no effect?
A.—No.

Mr. Billimoria.—That is all I want.

Sir Frederick Hopkinson.—With regard to the mud which you were pumping from the harbour, I suppose when it was discharged into the reclamation it was really about the consistency of dirty water?

A.—Exactly—just dirty water.*

Q.—It was very poor stuff for making a reclamation?

A.—Very poor.

Q.—You could not find worse material?

A.—No, I do not think you could.

Q.—It would take years for that properly to dry, if it ever did dry, even if it were put into the open?

A.—Yes.

Q.—It is very bad material indeed for making reclamation?

A.—Yes, that top part.

Q.—The clay, of course, is good?

A.—Yes.

Q.—But the bulk of the material at the southern end is of mud?

A.—Yes. There is probably about 10 per cent. or 15 per cent. of it hard at the bottom.

Q.—Did you see the dredger tried at Renfrew?

A.—Yes.

Q.—You attended the trials?

A.—Yes.

Q.—Did you think they were extensive and satisfactory?

A.—Well, satisfactory as far as I was concerned.

Q.—You thought the dredger worked all right?

A.—Yes.

Q.—Do you know the place where they try dredgers?

A.—Yes.

Q.—Had you ever seen a dredger tried there before?

A.—Yes, many.

Q.—What sort of material is it?

A.—Soft silt.

Q.—Not clay?

A.—No.

Q.—Is it the usual place for testing dredgers?

A.—It is the usual place for testing suction dredgers.

Q.—I suppose some hundreds of dredgers have been tested almost on this particular spot?

A.—Not exactly on that particular spot.

Q.—But near it?

A.—Probably within a mile of it.

Q.—There is a mile there where they test dredgers. Practically the whole of the dredgers of the country are built on the Clyde?

A.—Yes.

Q.—And they are all tried in the same spot?

A.—Yes.

Q.—This material has been dredged, and dredged and dredged over and over again?

A.—Yes. A great amount of material has been taken away in barges, but similar material still remains.

Q.—There was nothing in the nature of solid clay there?

A.—No.

Q.—So that nobody knew at the end of the tests that the dredger would dredge 2,000 yards of solid clay an hour?

A.—It was measured.

Q.—Yes, but it was not solid clay. Therefore, it could not have been measured?

A.—No.

Q.—They said at the tests they got 3,700 cube yards an hour?

A.—Yes.

Q.—And to do that the percentage of material varied from 39 to 41 per cent.?

A.—Yes.

* NOTE.—Mr. Spiers' notes that he was referring at this point to the working of the "Kalu" at Sewri.

Q.—If, as you say, 10 per cent. is a reasonably fair output, it would mean that the quantity which the dredger could ever hope to get would be about 1,000 yards an hour. They say that in the tests they got from 39 per cent. to 41 per cent. of solid matter?

A.—Yes.

Q.—Did you ever see such a thing? Did you see these tests?

A.—Yes.

Q.—It must have been almost solid material?

A.—You could not see anything at all about it, as a matter of fact.

Q.—Why not?

A.—The short pipe at the end of the vessel was only 12 feet long.

Q.—And underneath the vessel?

A.—No, direct straight out from the stern.

Q.—You could not see the outlet?

A.—Yes. You could tell nothing about it. At the speed at which it was coming out it might have been solid or it might have been nothing but water. It was dirty.

Q.—Dirty water?

A.—You could not say that it was.

Q.—Could you not see the actual outlet of the pipe?

A.—Yes.

Q. You did not get lumps of clay in it?

A.—You could not tell. The speed of the discharge was about 1,000 feet per minute. You could not tell what was coming out; it might have been solid, but it was only water as far as you were concerned.

Q. You appreciate my point? The claim made for the tests is that they got from 39 to 41 per cent. of solid matter. That would be ascertained from the area from which they dredged and which they measured afterwards?

A.—Yes.

Q.—You told me just now that you thought 10 per cent. would be a reasonably regular output?

A.—Yes.

Q.—That would be about one-fourth of what they got at the trials?

A.—Yes.

Q.—That would give 1,000 yards an hour?

A.—Yes.

Q. The dredger can do 1,000 yards an hour?

A.—Yes, she can do that.

Q.—So there seems to be very little difference between the tests as made on the Clyde and what she is doing out there, allowing for the different quality of material. In one case you are getting 40 per cent. and in the other you are only going to get 10 per cent.?

A.—Yes.

Mr. Billimoria.—In what respect was the test on the Clyde a guide for regular pumping in Bombay Harbour? How would it compare? Was the test on the Clyde a suitable one for comparison with the material which this dredger was expected to dredge in Bombay Harbour?

A.—No. I do not consider it was.

Q.—Then were the authorities justified in passing the dredger as satisfactory?

A.—That will have to be explained by Sir John Biles.

Q.—Did anyone anticipate that the dredger would not give the required output?

A.—I had nothing at all to say in that matter. I was only an employee.

Q.—The test which was applied on the Clyde was by no means a satisfactory one in reference to the results which this dredger was expected to give in Bombay?

A.—I suppose the builders and the naval architects considered it was, but I cannot say anything about that.

Q.—Without knowing the material in Bombay?

A.—I cannot say anything at all on that matter as far as I am concerned.

Sir Frederick Hopkinson.—The material at the test was totally different, so far as you could see, from the clay which you had to cut in Bombay?

A.—It was the same material over the top at Bombay.

Q.—The top cut?

A.—Yes.

Q.—Silt?

A.—Yes.

Q.—But not in clay?
A.—No, not in clay.

Q.—The clay at Renfrew, I take it, would hardly need a cutter?
A.—No.

Q.—Therefore, it all boils down to the fact that the cutter does not seem to be able to cut down more than 800 to 1,000 yards an hour. Is not that so?
A.—Not of good clay.

Q.—Because if you could cut it you could pump it?
A.—Yes. If you could cut it you could pump it.

Q.—Your cutter does not seem able to cut it at a greater rate than from 800 to 1,000 yards an hour?
A.—No.

Q.—If your cutter had been cutting that clay at 2,000 yards an hour, there is little doubt that your pump would have delivered that quantity?
A.—There is no doubt that it would have delivered it quite easily. The pump is quite efficient to do 2,000 yards an hour.

Mr. Billimoria.—Was not the cutter designed for the material?
A.—That is a thing which I really cannot go into. That is a matter which concerns the builders.

Sir M. Visvesvaraya.—What precisely were your duties on the " Sir George Lloyd "?
A.—My duties on the " Sir George Lloyd " were as a dredger master in charge of the floating plant, supervising everything, under the Development Directorate.

Q.—Were you responsible for the daily output and for the cost of execution?
A.—Well, practically.

Q.—Did you take out the quantities dredged daily?
A.—No. The marine surveyor did that.

Q.—Or weekly?
A.—The marine surveyor did it daily.

Q.—Did you know how much you were dredging daily, or what the output was per week, or per month?
A.—No.

Q.—If you were responsible for the quantity dredged, was it not necessary for you to keep yourself informed of the output?
A.—I ought to have kept myself informed, but it was probably weeks afterwards before I was informed. I was interested in other things. I never remembered any of these things.

Q.—You were informed weeks afterwards?
A.—Yes, if I asked.

Q.—You did not know at what cost the dredging was being done?
A.—No.

Q.—You are aware that the dredger was estimated to give 2,000 cubic yards per hour?
A.—Yes.

Q.—And there were to be five million cubic yards per season?

Q.—You know they are getting only about 25 per cent., or a little more than that, at present of the promised output?
A.—Yes.

Q.—What do you think is the reason of the failure of the dredger in that respect?
A.—The failure of the dredger is due to the material with which the dredger has to deal.

Q.—But was not the material it had to deal with considered by the manufacturers when they designed the plant?
A.—I should think it would be.

Q.—Usually it is done, is it not?
A.—Usually it is done.

Q.—Do you think it was done in this case, or what is your opinion?
A.—I could not say that.

Q.—You have no information on the point?
A.—No, I have no information whatever regarding that.

Q.—You do not want to commit yourself?
A.—No, I do not want to commit myself. I do not know anything at all about it. You must understand that when that vessel was built or designed I was just an ordinary employee on the works, and I was not consulted.

Sir Frederick Hopkinson.—What were you?

A.—Engineer.

Sir M. Visvesvaraya.—But you are not aware that the output is only about a quarter or one-third of what was expected, and that the cost of working is nearly double the original estimate. You also know that the dredger cannot deliver the quantity promised into the middle blocks—blocks 3, 4, 5 and 6, at least not at the speed specified?

A.—It can be delivered, but they will have to shift the pipe line.

Q.—They will have to bring it nearer?

A.—Yes.

Q.—Is it possible to shift the pipe line?

A.—It is possible, at a cost.

Q.—It means money?

A.—It means money.

Q.—And if the delivery pipe is extended, do not you think that the quantity delivered will be much less than it is at present

A.—No, I do not think it will, so long as we have the booster working continuously.

Q.—It is said by the engineers that the middle blocks cannot be filled. You do not agree?

A.—I cannot say. I have no distances as regards the middle blocks, or the position in which they are likely to put their pipes

Q.—In any case you are aware that the dredger has failed in several respects to give satisfaction?

A.—Well, the dredger has failed, certainly, but it is the nature of the ground which has failed the dredger.

Q.—I am coming to the reasons; there are reasons, of course, but the dredger is not giving the required output. It is giving very much less than the promised output?

A.—Yes.

Q.—Is there any other reason besides the quality of the material which accounts for the dredger not giving the estimated output?

A.—No, there is no other reason. It is simply the ordinary course of events, and bad weather, and suchlike.

Q.—What is the maximum output which the dredger has given under your handling?

A.—Under my handling I think it was 1,200.

Q.—For what period?

A.—You could not determine the period.

Q.—Was it for one day, or for a week, or for a month?

A.—It varies in an hour.

Q.—What is the maximum average which you have had for a week?

A.—I believe, when we were on good working ground, about 1,200 per hour.

Q.—During the time you worked?

A.—Yes.

Sir Frederick Hopkinson: It has been stated, and shown, that your percentage of lost time was about 36 per cent.; that is, for removing anchors, taking water on board, and various other things. Is that about the normal?

A.—That is about the normal in these vessels.

Q.—There is nothing special about that?

A.—No.

Q.—You would expect to lose approximately one-third of your full working time. That is to say, if your working time is 12 hours, you would not expect to get more than eight or eight and a-half hours' actual pumping?

A.—Quite so. I would have you understand that every 80 feet we travel we have to stop. We have to take a pontoon and put it in the line, and so on. For every 80 feet we work we have to put in a pontoon. That may mean half-an-hour, one hour, or three hours, according to the conditions of the weather.

Q.—No experienced man in dredging would reckon that; if he was going to pay his men 16 hours a day, he was going to get more than two-thirds of that as actual pumping time?

A.—I do not see how you could avoid it.

Q.—No experienced man would ever expect to get more than two-thirds of his total time as pumping time?

A.—No.

Mr. Billimoria.—If the total output was expected, that would be very unwise—all the 16 hours?

A.—It is impossible to do the like of those things.

Q.—Anybody calculating on that, therefore, would not be an engineer at all?
A.—No, I do not consider he would.

Q.—Any calculations based on that theory would be exploded?
A.—Yes.

Sir Frederick Hopkinson.—The quantities dredged per hour do not seem to have varied so very much as the distance pumped has varied. For instance, there is a week on the 25th November, 1925, when the quantity dredged was 1,007 yards an hour and when the discharge line of pipe was 6,207 feet; whereas the previous week the total length was only 5,900 feet and she only dredged 498 yards an hour, which is half the quantity. This rather confirms what I suggested to you—that the length of the pipe did not affect the output so much as people thought. For instance, there is one week where the pipe was 7,813 feet and she dredged 436 yards an hour. The next week, with only a difference of 280 feet in the length of the pipe, the output was double, and then the next week, when the length of the pipe was only 5,919 feet, the output was 652. I do not understand it. The week after that the length was 6,189 and the output went up to 922. There is something wrong there. This cannot all be correct?

A.—That may have been at the beginning of a fresh cut.

Sir M. Visvesvaraya.—You said that the partial failure of the dredger was due to unsatisfactory clay, or to the clay being too stiff?

A.—It was due to unsatisfactory material.

Q.—Was it due to insufficient engine power?
A.—No.

Q.—Was it due to the bad design of the cutters?
A.—No.

Q.—Was it due to the insufficient depth of the clay material?
A.—Partly to the insufficient depth of it, in many cases.

Q.—Part of the reason is that the depth of material was insufficient?
A.—Yes.

Q.—You know of no other reason?
A.—There is no other reason.

Q.—Could not the engine have been made strong enough to work through the clay?
A.—The engine is quite strong enough to do all that is necessary. As a matter of fact, in many cases it is too strong.

Q.—If it is strong enough, why should it not cut and draw the material?
A.—We have got an anchor hold, and we have only a certain weight to hold that, and if we draw that weight then we may be finished for hours.

Mr. Billimoria.—You do not attribute any defect to the dredgers themselves?
A.—No, none whatever.

Q.—It is all due to the material?
A.—It is all due to the material, as far as I am concerned.

Sir M. Visvesvaraya.—When a dredger, or any plant of that description, is supplied, is it not usual to have the tests carried out on the site?
A.—No. The tests are usually carried out where the builder has made up his programme to carry them out.

Q.—But are not the tests as to output carried out on the site, as a general rule?
A.—No.

Q.—Do you know that in the case of the "Kalu" in Bombay harbour itself they had those tests made in the harbour?
A.—Yes, I will admit that.

Q.—Then why do you think that in this case the usual guarantee should not have been carried out?
A.—That was an unusual contract.

Sir Frederick Hopkinson.—In what respect was it unusual?
A.—The vessel had to take out so many yards per hour for three months before the Bombay Port Trust would take over the vessel.

Q.—That was a term of the purchase?
A.—Yes.

Sir Frederick Hopkinson.—And that, of course, would have to be paid for?

Mr. Billimoria.—Would not that be a satisfactory term of the contract?
A.—It all depends on the people who are having the article.

Q.—Even if he had to pay a little more, you would know that you were standing on firm ground?
A.—Yes.

Q.—And it would be advisable to pay a little more and be sure of what you were getting?

A.—Yes.

Sir M. Visvesvaraya.—That is the usual thing?

A.—No, it is the unusual thing.

Sir M. Visvesvarayya.—The usual thing is to test on the site.

Sir Frederick Hopkinson.—He says it is the unusual thing.

The Witness.—It is unusual to test on the spot.

Sir Frederick Hopkinson.—It is usual to test at the builder's.

Sir M. Visvesvaraya.—But it was done in the case of the "Kalu"?

A.—Yes.

Sir Frederick Hopkinson.—But he says it was exceptional.

Sir M. Visvesvaraya.—I should not agree to anything of that sort, because it is taking risks.

Sir Frederick Hopkinson.—You said just now, in answer to a question I put, something about the engineer being unsatisfactory. Does that refer only to a particular man on the "Colaba"? It has nothing to do with the "Sir George Lloyd"?

A.—I can hardly tell you exactly what it was, but I will tell you this—that there was not enough energy in him.

Q.—The weather was very hot, I suppose?

A.—I suppose that takes a lot out of a man.

Sir M. Visvesvaraya.—In the case of the "Kalu" they had stipulated that 10 per cent. of the value should be paid after the vessel had been in operation at Bombay for three calendar months to the satisfaction of the Trustees of the Port Trust. In this case there was no such stipulation. As you remark, the contract was unusual.

A.—Yes, so far as my experience went.

Sir Frederick Hopkinson.—You have not got it right. He says the contract for Sewri was unusual——

Sir M. Visvesvaraya.—No, no.

Sir Frederick Hopkinson.—The contract for Back Bay was the usual contract?

A.—The usual contract.

Sir M. Visvesvaraya.—You say that what was done in the case of the "Kalu" was unusual?

A.—Yes.

Q.—And that what was done in the case of the "Sir George Lloyd" was the usual thing?

A.—Yes.

Q.—That is to say, that people purchase plant worth a million pounds, perhaps, on the mere chance of it working satisfactorily and without any guarantees that it will give the required output?

A.—Yes.

Q.—Is that your experience?

A.—Yes.

Q.—It is not mine. Is it not the case, in the matter of any big plant, that a guarantee is given that the machine will perform its allotted task?

A.—That is usual. There is usually a guarantee that the machine will turn out its allotted task.

Q.—You say it was not done in this case because there was no stipulation in the contract?

A.—Not on the site.

Q.—There was none in the contract?

A.—We made no test in Bombay the same as was done on the Clyde. The Clyde test was carried out and passed as satisfactory.

Mr. Billimoria: Who was responsible for such a contract?

A.—I cannot tell you those things.

Q.—Is it an unusual system of contract, or the usual one?

A.—The usual.

Q.—The "Kalu" system is much more advantageous from the purchasers' point of view, is it not?

A.—Yes, from the purchasers' point of view, certainly, but much more expensive.

Q.—In the end which is more expensive—a dredger that fails or a dredger that works?

A.—I do not say that the dredger has failed so far.

Q.—If you get your required output, it pays you hand over fist?

A.—Yes.

Q.—If you get a quarter of the quantity which you expect to get, you lose heavily?

A.—Yes, but if you have the material there I have no doubt you will get the quantity.

Sir M. Visvesvaraya: But you cannot change the material. You have to adapt your machinery to the material?

A.—Yes.

Q.—Is it not usual for dredger makers to take note of the material in which a machine has to work?

A.—I understand it is usual. They usually have the products out there sent home.

Q.—Was that done in this case?

A.—I cannot say.

Q.—Was any complaint made to the manufacturers when the machine did not give the required output?

A.—That would go through the office; it would have nothing to do with me.

Q.—You do not know anything about it?

A.—No.

Q.—If the plant did not give the required output, and you could not make it work so as to give the required output, was it not your duty to report to your higher officers and ask them to consult the manufacturers?

A.—My higher officers had the daily reports given to them.

Q.—What observations were you taking from day to day in order to see whether the dredger was giving the promised output?

A.—We took soundings every day, and the position in which the dredger was.

Q.—But no calculations were made of the quantities?

A.—At the moment, no, but they were marked on the chart. They were charted every day and taken to the office and calculated.

Q.—At what intervals did you get the results? Did you get intimation of the results from the office?

A.—Probably once a month, if I asked for them.

Q.—They were not sent to you in the ordinary course?

A.—No.

Q.—You were working, then, without knowing what the machine was producing?

A.—I was working there with the machine producing as much as the machine was capable of producing.

Q.—I quite admit that; you were doing your best.

A.—What the result was I could not determine.

Q.—What measures do you recommend should be taken to rectify these defects in future? You are prepared to work the dredger in three shifts in future, are you not?

A.—I cannot tell you that. I have no information as regards what the higher officials are going to do.

Q.—Supposing you get orders to work in three shifts, you have no objection to doing so?

A.—It makes no difference to me.

Q.—By how much do you think you can increase the output by working three shifts?

A.—Probably 25 per cent.

Mr. Billimoria: 25 per cent. by employing three shifts?

A.—Yes.

Q.—25 per cent. of what—of the total present output?

A.—Yes, but the expenses will go up a great deal more.

Sir M. Visvesvarayya: By how much?

A.—I expect they will go up by 75 per cent.

Q.—25 per cent. more production?

A.—Yes.

Q.—And 75 per cent. more expenditure?

A.—Yes.

Q.—Why is that? You have the same engine power.

A.—You cannot do your work in the dark. It takes about 100 per cent. more to do it in the middle of the night than in the middle of the day.

Sir Frederick Hopkinson: But you are already beginning at midnight, are you not?
A.—No. We go on till midnight.

Q.—You get six hours' darkness.

A.—We may have a lot of free hours before we get the pontoon in.

Sir M. Visvesvaraya: What records do you keep on the dredger?

A.—Records are kept of the total hours worked, and the repairs done during the day.

Q.—Did you take any steps to measure the quantity actually delivered into the area reclaimed?

A.—No. That comes under the Civil Engineering Department.

Q.—At what intervals were those measurements being taken?

A.—I cannot say.

Q.—You only knew it at the end of the year?

A.—I only knew it at the end of the year.

Mr. Billimoria: According to you, three shifts will not be a paying proposition?

A.—I do not think so.

Q.—There will be more expenditure than output?

A.—I think it will be much better to carry on when there is a possibility of doing so and paying the men overtime.

Sir Frederick Hopkinson: That is really what is proposed.

A.—When one shift drops off it takes some time before the other catches on again, even though the machine is working. Each man has a different idea of working the machine.

Mr. Billimoria: You mean that each shift should work a few more hours and be paid overtime?

A.—Yes.

Q.—You think that is better than working three shifts?

A.—Yes, I should say so. Many times when the weather is suitable and everything is favourable a man could go on for three hours longer. The following night the conditions may not be favourable at all.

Sir Frederick Hopkinson: That is a matter of working experience in which you ought to be consulted?

A.—Yes.

Q.—Nobody can lay down a regular law about it. You must work according to the conditions and circumstances?

A.—Yes, but they must pay for that, which they will not do.

Mr. Billimoria: Your opinion is based on your experience of the working of the arrangements as you saw them in Bombay itself, and you are absolutely confident that working three shifts will not be a paying proposition?

A.—I do not think it will.

Sir Frederick Hopkinson: That is working three shifts every day?

A.—Every day.

Q.—You suggest, however, that three shifts should be worked wherever it is possible and practicable?

A.—Yes, if it is possible.

Q.—In some cases three shifts may be a disadvantage when you cannot go on working?

A.—Yes.

Q.—And you would have to go on paying wages. In the other case you, as dredging master, would be able to say "We are not going to work from 2 o'clock or 3 o'clock or 4 o'clock to-day." Therefore you would save expense. You would judge of each contingency as it arose. Generally speaking, however, if you worked three shifts when it was practicable and proper to do so, you would gain an increased output at a smaller cost?

A.—Yes.

Mr. Billimoria.—Where would you draw the line? How would you differentiate? At what stages would you differentiate?

A.—It all depends on the weather.

Q.—But you can never foretell the weather?

A.—No.

Q.—You never can tell whether or not it is going to rain this afternoon?

A.—No; you can never tell that.

Q.—Then what is your guide?

A.—Why should we have a full staff of men there if they can do nothing?

Q.—What is your guide in deciding about anything? It is mere speculation, is it not?

A.—No, it is not speculation. It is better to pay men overtime when they can work, than to have men there waiting and being paid when they cannot work.

Q.—Therefore you are not in favour of a regulation three shifts, but you are in favour, whenever the occasion admits of it, of asking the men to work overtime. Is that what you recommend?

A.—Yes.

Sir Frederick Hopkinson.—That is what is proposed. You do not propose that there shall be three definite shifts of men, but that there shall be two shifts of 12 hours a day, in which case you can work as long or as short as you find it necessary or desirable to do so?

A.—Yes.

Q.—That is really what you recommend?

A.—Yes, but they will have to have stipulated hours.

Q.—You do not want to have three eight-hour shifts?

A.—No.

Q.—We are all thinking the same thing, only it is being put a little differently. What we mean is to work 24 hours a day so long as it is practicable and possible to do so with two full shifts of men. On one day it may be advisable and possible to work 24 hours; on the next day it may not be practicable to work 24 hours, in which case you would not pay the men, if they are not working?

A.—No, after a certain time.

Mr. Billimoria.—Would not the proposition of paying a bonus to the men be more encouraging to them to give a better output than asking them to work a couple of hours longer? Would not a bonus proposition appeal to the men more than longer hours?

A.—I do not think so.

Sir Frederick Hopkinson.—But you would have no objection to both?

A.—I have no objection to both. I think it would be a wiser proposition to pay both.

Q.—That is what I should do if I were there.

A.—It is a job to get the Bombay people to pay anything.

Sir M. Visvesvaraya.—What are the defects of the "Colaba" which you have noticed?

A.—There are no defects in the "Colaba." It is only the structure of the "Colaba" which seems to be a little weak.

Q.—The vibration?

A.—Yes.

Q.—Can nothing be done to stop that?

A.—We have eliminated about 80 per cent. of it, I should say.

Q.—Is reconditioning necessary?

A.—We have eliminated that altogether by the extra which we have put into it. We want a bit more yet to make up the total.

Q.—You expect to do that?

A.—Yes. We expect to have that done this season.

Q.—Why do you not keep touch with the volume dredged from week to week as compared with the calculated output? Would it not be a proper guide to you to enable you to improve your working from day to day?

A.—No, I do not think so. My guide is the pressures of work.

Q.—You have no test for gauging the actual output?

A.—No, I have none. There are gauges. I do not know what they do with them.

Q.—Is it not usual occasionally to have temporary tanks in order to measure the output?

A.—No.

Q.—In other dredgers, occasionally?

A.—No.

Q.—Then how do you get the correct quantity?

A.—In various ways. Every engineer has his own idea of how to take tests.

Q.—Have you read the description of the Clyde tests?

A.—Well, I have had them.

Q.—Are they satisfactory?

A.—I could not say. As far as the builders and the naval architects are concerned, they are quite satisfactory to them.

Q.—For the future, what are the measures you would take to improve the working? You say three shifts if possible?

A.—No. I am not going to say that I would not go in for three shifts at the moment.

Q.—Working longer hours if possible?

A.—Yes, longer hours if possible.

Q.—You would not make any change in the engines or in the cutters?

A.—No.

Q.—Then there is no chance of materially increasing the output?

A.—Not unless we get better material. It all depends on the material we get.

Mr. Billimoria.—And as far as your present experience goes that is not satisfactory?

A.—No, not for the material with which we have to deal.

Q.—I mean the material?

A.—It is not satisfactory for the dredger we have got.

Sir M. Visvesvaraya.—The cost at which it was expected to deliver pumped material was about five annas per cubic yard. That was the original estimate?

A.—Yes.

Q.—According to last season's experiments it was about eight to nine annas?

A.—Yes.

Q.—Do you think there is any chance of reducing the cost in future?

A.—It all depends on the material. The whole thing depends on the class of material we get.

Q.—Do you keep touch with the costs of working?

A.—No.

Q.—Nor quantities?

A.—It is all worked out for me.

Mr. Billimoria.—Can anyone say that the material is likely to be suitable in the future?

A.—That will have to be determined on the borings.

Q.—Did Sir Geoge Buchanan approve of your appointment as dredging master?

A.—I cannot say. I was appointed by Mr. Lewis. Whether he referred to Sir George Buchanan or not I cannot say. I was in Bombay when I was appointed.

Q.—Mr. Lewis was the representative, in a manner, of Sir George Buchanan as chief engineer in charge of the works?

A.—Yes.

Q.—Therefore if there was any objection to your appointment Sir George Buchanan would have objected to it?

A.—Certainly.

Q.—Did he know anything of your qualifications?

A.—I cannot say. I suppose he had.

Q.—Did he ever suggest that you were not competent or capable of handling the dredgers?

A.—No, not to me.

Q.—I am referring to Sir George Buchanan. Did he ever suggest that to anyone else?

A.—No.

Q.—Did he record it anywhere?

A.—No.

Q.—Except in the last press note?

A.—Not to my knowledge. I have had nothing but ordinary conversation with him.

Q.—In reply to a question by Sir Frederick Hopkinson you said it was no part of your duty to prevent the leakage on account of not having sealed the wall?

A.—It was nothing to do with me.

Q.—Why was it nothing to do with you?

A.—That was the Civil Engineers Department, or the head of the Dredging Department. I stop at the end of the floating pipeline. My duties stop there.

Q.—Did you report it to the civil engineer in charge?

A.—No, the civil engineer sees that.

Q.—Merely because he sees it do you think it is not your duty to report it?

A.—No, it is not my duty.

Q.—If you happen to see a material defect in a work of this magnitude do you not think it is prudent or advisable to report the matter to the civil engineer or to bring it to his notice?

A.—Certainly.

Q.—Did you speak to him?

A.—We had many conversation, but nothing official.

Q.—Did he take any steps to remedy the defect?

A.—Yes, at times he did.

Q.—Had you any personal knowledge as to whether anybody had made any investigations with regard to the material which these dredgers were expected to dredge?

A.—No further than the party's name. It is on the borings. I understand it was Mr. Kidd, whoever he may be.

Q.—Beyond that, no other independent investigation has ever taken place?

A.—Not to my knowledge.

Q.—In reply to Sir Frederick Hopkinson you said you submitted your daily reports to the office?

A.—Yes.

Q.—And Sir Frederick remarked that the Government have stated that they did not know anything of these. Do you know if your papers or reports ever reached the Government?

A.—They always reached the office.

Q.—That does not mean they reached the Government?

A.—That I cannot say. They were out of my hands after they went to the office.

Q.—Who is responsible in the office?

A.—They are supposed to go to Mr. Brims.

Q.—Are they filed?

A.—Yes, I understand they are filed.

Q.—Is no action taken on them?

A.—I have no dealings with the inner part of the office whatever.

Q.—Do you know whether any action was taken on them?

A.—I cannot say anything about that.

Q.—If you reported that the output was not satisfactory, did anybody take any pains to find out why it was not satisfactory?

A.—If the report was not satisfactory they used to come down and have a talk with me about it.

Q.—Was it brought to the notice of the Government of Bombay?

A.—Yes, I expect so.

Q.—Do you know?

A.—No.

Q.—How long have you been on this dredger?

A.—About three and a half years.

Q.—During that period we find that the average output varies considerably from time to time?

A.—Yes.

Q.—Can you assign any reason why that is so?

A.—It varies according to the material that we come up against. At times we come up against very hard material, and it takes 50 per cent. longer to deal with it.

Q.—It is not to be ordinarily expected that, when a machine is working, it should give the required output, except in the event of serious contingencies?

A.—This is a serious contingency which we are up against—this hard material.

Q. You come across such a serious contingency occasionally, but not every day?

A.—Yes, almost every day. This contingency occurs every hour.

Q.—So. according to you, the *summum bonum* of the whole conclusion would be that the material is very defective and is the main cause of the failure?

A.—It is the main cause as far as the dredger is concerned.

Sir M. Visvesvaraya.—In other words, the dredger was not adapted to the circumstances of the material?

A.—Exactly.

Sir M. Visvesvaraya.—Our next public session will be held on Wednesday, September 29, as at present arranged, by which time we hope that our Chairman will have rejoined us.

(Adjourned to September 29.)

The Committee assembled at 11 a.m. on the 29th September, 1926, all Members being present.

41st Witness, Sir J. H. Biles.

WRITTEN EVIDENCE.

It is proposed to confine these remarks to Questions 17, 18, 19 and 20.*

17. Were the specification and designs of Sir George Buchanan for the dredger " Sir George Lloyd " (hereinafter called the dredger) and the " Colaba " fit and proper for the intended work?

18. Did the makers guarantee that the dredger would discharge 2,000 cubic yards of soft clay per hour through a floating pipe line to a distance of 5,000 feet?

19. Did the dredger before delivery under proper test conditions in fact give the guaranteed output?

20. Was the dredger, when delivered, in all respects in accordance with the contract?

On 8th March, 1920, our first communication was made on the subject of the dredgers for the Bombay Back Bay Scheme the result of which was an interview which took place on 16th April between Sir John Steevens, Acting Director-General of Stores, Sir George Buchanan, and Sir John Biles. The result is embodied in Sir George Buchanan's memo. of the 16th April.

We prepared plans and specifications based on the outline specification supplied to Sir George Buchanan by Messrs. Simons in their letter of 12th September, 1919, and on 4th June, 1920. Messrs. Simons quoted to the Director-General of Stores for a dredger with electrically driven intermediate station, pipe line, etc. The dredger " Sir George Lloyd " was ordered on 15th June, 1920. It was found that the electric current could not be supplied at Bombay, and the scheme for an electrically driven intermediate station was in consequence abandoned. This change was approved of by the Governor of Bombay in a telegram to the Director-General of Stores on 3rd July. On the 15th July the order for the steam intermediate plant was placed with Messrs. Simons.

The work of construction was proceeded with, and Messrs. Meik and Buchanan received copies of all plans, which were returned to us with their comments.

Amongst other events in this connection an interview took place at Renfrew on 30th July between Sir George Buchanan, Mr Meik, Messrs. Simons' representatives, and ourselves at which the discussion of various items of detail took place in connection with the dredger, intermediate station, and pipe line. On 20th July a further conference took place at our office in Westminster at which, in addition to the foregoing, Mr. Lewis was present, and all the matters decided were noted at that time. Some of these matters required additional work which was subsequently authorised by the Director-General of Stores on 23rd August. Messrs. Meik and Buchanan were kept thoroughly posted as to the details of the work.

The vessels were launched and tried. The dredging trial of the " Sir George Lloyd " took place on 24th November, 1921, at which Mr. Meik representing his firm was present. The results of the dredging trials were that the amount dredged for two hours was at the rate of 3,701 cubic yards per hour. This material was pumped through a pipe line about the length of the vessel, and discharged through an open pipe at the stern. It is evident from this trial that more than sufficient quantity of the material to fulfil the contract requirement of 2,000 cubic yards per hour could be obtained by the cutter.

Two questions further arise.

(1) Was the material such that the contract of cutting 2,000 cubic yards of soft clay was fulfilled. The material cut is of a clayey nature easily cut by the cutter, and when the specimens were collected at the end of the delivery pipe and allowed to settle in the water as collected, they were found to be of a hard nature after the water was poured off. Further, this material when removed from the cutter after it had been stopped, was seen to be of a fairly hard clayey nature. We were therefore of opinion that this material more than fulfilled the condition of soft clay. Further this is the material available on the Clyde and has been used by us in all tests that we have conducted and has become a standard from which we can judge the subsequent performance on service. Having established that the cutter could produce the amount of material for the pump to draw, the question is: is there power enough in the pump to deliver 2,000 cubic yards per hour at the end of a 5,000 feet pipe line? The friction of this

* See Appendix I.

pipe line can be estimated and the amount of head necessary to be overcome can be determined. Our usual practice is to estimate the amount of head necessary to be overcome, and then to place an obstruction at the delivery end of the pipe and to pump only water by this obstruction. In this way the pump can be run against a selected amount of obstruction sufficient to produce a head equivalent to that which has to be overcome in the pipe line. We had to resort to this to determine the head which the pump could produce because it was quite impracticable to have a pipe line 5,000 feet long anywhere in the Clyde area.

On the 19th and 20th December, 1921, these water pumping trials were carried out with the result that a total pressure of 39 lbs. per square inch and a vacuum of seven inches were obtained. These are equivalent to a head of 97 feet. The question of what head would have to be pumped against to deliver through 5,000 feet of pipe line can be easily determined if water only is to be delivered at some assumed speed. Under such circumstances we estimate the head would be about 60 feet with water having a speed of 15 feet per second.

With reference to the additional head which would have to be overcome when spoil is in the pipe we estimate that when delivering 2,000 cubic yards per hour at 15 feet per second the head due to water and spoil through 5,000 feet of pipe line will be not more than 89 feet. Hence the power of the machinery was more than sufficient as it can overcome a head of 97 feet while 89 feet only has to be overcome to drive 2,000 cubic yards through 5,000 feet of pipe line per hour at 15 feet per second. The percentage of spoil under these circumstances is 10·4.

As confirmation of our estimate it may be pointed out that the " Sir George Lloyd's " records of pressure and vacuum on service ranging from 20th December, 1923, to 6th May, 1924, give a range of head of 86·0 to 110·9 feet when working with a pipe line varying from 5,200 feet to 7,500 feet.

To determine the actual speed of the water and spoil through this pipe line an assumption has to be made as to the relative speed of the impeller and the water. We know the revolutions of the engine and impeller, and we know by measurements of the rate of flow through a pump of similar size what this ratio is, and from these measurements we can determine that the speed in the " Sir George Lloyd " ranged from 14·1 to 14·8 per second. Hence the speeds of water in practice are not far from these assumed.

It is to be observed that with a speed of 15 feet per second when delivering 2,000 cubic yards per hour the proportion of spoil is 10·4 per cent. as stated above. With a velocity of 14·1 to 14·8 feet per second the proportion is 11·1 to 10·5 per cent. The actual amount of spoil measured as being removed over this period from December to May was 978 cubic yards per hour so that the actual spoil was only from 5·4 to 4·9 per cent. This demonstrates that on service the pump was not getting the amount of material necessary to deliver 2,000 cubic yards of solid per hour though it was pumping sufficient water this spoil against a head equivalent to what had been calculated as necessary to be overcome. If the spoil had been available the pump would have delivered it through 5,000 feet.

" *Colaba.*"

The structure of the " Colaba " as built was almost the same in scantlings as the " Sir George Lloyd." The engines were exactly the same size and ran on service from 136 to 144 revolutions per minute from 13th December, 1924, to 16th May, 1925. The " Sir George Lloyd " gave no indication of vibration and her revolutions ranged from 140 to 150 on service from 26th December, 1923, to 15th May, 1924. It seems to be evident that any excessive vibration in the " Colaba " must have been due to circumstances which did not exist in the " Sir George Lloyd."

As the scantlings and machinery were the same and the " Colaba " being a shorter vessel was necessarily a stiffer structure, the cause of the vibration must be looked for outside of the hull or engines of the " Colaba."

So far as can be determined from the evidence or any other source available there seems to be no satisfactory explanation forthcoming of the cause of this vibration, and therefore it is not possible for any one to say wherein is the defect in the design to which the vibration can be attributed, if there is such defect. There was no vibration on the trial on the Clyde more than is usual in such vessels, or more than was in the " Sir George Lloyd." It seems, therefore, that the cause is one which is due to the pipe line or the motion of the water and spoil in the pipe. It has been stated that there is a motion in the water in the pipe line which is of wave nature which affects the pressure at the " Colaba " end of the pipe. This variation which is said to be momentary may cause the engines of the " Colaba " to vary in speed to such an extent and so rapidly as to cause vibration in the structure. This wave of pressure can only be due to variation in the supply of

material to the " Sir George Lloyd's " pump, which may be due to variation in the character of the material being cut.

Whatever may be the cause of this vibration, there does not seem to be any inherent defect in the design or construction of the " Colaba." No dredger structure is designed or constructed to withstand stresses due to abnormal vibration—such vibration must be caused by an abnormal vibrating cause which should be sought for and mitigated or removed—if excessive vibration is allowed to continue it will cause rivets to become loose and holding down bolts of the engines to slacken. To impute the blame to the structure without searching for the vibrating cause is not a satisfactory way of tackling the difficulty.

ORAL EVIDENCE.

SIR JOHN BILES, K.C.I.E., M.I.C.E.

Chairman :—Your name, I think, is Sir John Biles?
A.—That is so, John Harvard Biles.

Q.—You are a Naval Architect?
A.—Yes.

Q.—Employed by the India Office?
A.—Employed by the India Office for their work.

Q.—Was it on the 8th March, 1920, that the first communication was made to you on the question of the manufacture of a dredger for the Back Bay Reclamation Scheme?
A.—That is so.

Q.—Was that communication verbal or in writing?
A.—In writing.

Q.—From whom?
A.—From Sir John Steevens who was then Acting Director General of Stores of the India Office.

Q.—He at that time, of course, was in England?
A.—He was in England—in London.

Q.—On the 16th April, did Sir John Steevens, Sir George Buchanan and yourself have an interview?
A.—We did on that date.

Q.—The subject under discussion was this question of the dredger?
A.—The subject under discussion really was the relative duties that Sir George Buchanan and I were to undertake in relation to the construction of the dredger.

Q.—In the outline of the evidence which you have given to us you say that the result of that discussion is embodied in Sir George Buchanan's memorandum of the 16th April?
A.—That is so.

Q.—Have you a copy of that?
A.—I think you have in the files of the India Office a copy of that memorandum. We have a copy of it, but I think you have it already. (*Copy handed.*)

Q.—I think we had better go through this. The memorandum says: " At my meeting with Sir John Steevens on the 25th March, he informed me that orders had been passed that no contract for the dredger was to be placed until the whole scheme had been sanctioned, but that he, along with his expert, was to go into the question of the dredger with special reference to Messrs. Simons & Co.'s tender. He also stated that Sir John Biles, Consulting Naval Architect to the India Office, would, if the scheme were sanctioned prepare detailed specification and superintend the construction of the work. I replied that I had already discussed this part of the project with the Governor of Bombay, who, I understood, would be averse to any dual control in connection with the scheme, because if the dredger failed to do its work we (the Engineers) would naturally say that as we had nothing to do with the dredger we could accept no responsibility. I pointed out that this was not an ordinary dredging proposition, as there was nearly as much work on land as afloat, and that obviously the Engineers to the scheme must have a voice in the construction of the dredger, although Sir John Biles, as Naval Architect, might reasonably be expected to see that the dredger was a properly built, sea-going dredger, and capable of doing the work demanded of her. I said the last thing any of us wanted was friction, and that we were perfectly willing to work jointly and amicably with Sir John Biles, but that we must be given an opportunity of fully discussing and approving of the details." Up to now he is not saying anything

about the interview of the 16th April. It is dated the 16th, but up till now he is only talking about the 25th March?

A.—That is so.

Q.—" In a letter from the Director General of Stores dated 10th April Sir John Steevens remarked that the approval of the Secretary of State in Council had been given that all steps short of placing the contract were to be taken in the preparation of the necessary detail plans and specification, etc., for the provision of the dredger, pumping station, pipe-lines, etc., in anticipation of full approval of the execution of the scheme being given at a later date, and the Government of India had requested that the special consideration of experts should be given to the design (or description) and cost of dredger as put forward in my report, and reference had already been made to Sir John Biles, Naval Architect of the India Office, on the subject. The dredger with its pipe-line communication with the shore, and the pontoon for intermediate station, would come under the supervision of the Naval Architect." Then he is telling you all the past history. I do not see any record of anything that took place on the 16th April. This memorandum is dated the 16th April, but that is all.

A.—There is a copy of a letter from Sir John Steevens to Sir George Buchanan dated the 26th April, I do not know whether you have that. It is the next letter in the file.

Q.—Yes.

A.—If you will read that I think you will see the reference.

Q.—It is the letter of the 26th April from Sir John Steevens to Sir George Buchanan beginning: " At our interview of the 16th instant, at which Sir John Biles was present, regarding the provision of dredger, pontoon, pipe-lines, etc., for the Bombay Back Bay Reclamation Scheme, I intimated that approval had been given to proceed with the preparation of specification, etc., for the construction thereof. We also discussed your memorandum of that date on the subject of the defined responsibility for their construction and agreed to the points which you put forward therein. I beg to confirm the foregoing and understand that you are in communication with Sir John Biles." What was the arrangement arrived at at the interview of the 16th April?

A.—I think that is clear in Sir George Buchanan's memorandum.

Q.—We should be content to have it from you, I think.

A.—I think it is all included in that memorandum which you have just read.

Q.—Which memorandum?

A.—The one you read which begins: " At my interview with Sir John Steevens on the 25th March, he informed me " and so on.

Q.—Will you just put in your own words what was the respective responsibility that you had for the construction of the dredger and that Sir George Buchanan had?

A.—I took the letter of Messrs. Simons of the 12th September, 1919, as the basis of the plans and specifications of the dredger and carried through the construction of that dredger in accordance with that letter. I kept Sir George Buchanan fully informed, as requested by him, of all that was taking place. Copies of all drawings, copies of the specifications, etc., were sent to him for his approval or modification. Throughout the whole course of the building he had the plans which were approved of for the building of the ship. That was the procedure. I think I have stated that in my memorandum.

Q.—In the letter of 12th September, 1919, to which we will come in a moment, Messrs. Simons were giving the price, were they not?

A.—They were giving the price and an outline description.

Q.—Therefore they must have got out plans by that time?

A.—I suppose they did. I do not remember.

Q.—The firm would hardly bind themselves to a price unless they had worked out the plans.

A.—They might. They might think: " Well, it is so near a preceding ship that it is not necessary to make plans." I mean that is not at all uncommon in an offer to build a vessel. Obviously when they come to build they must make plans, but not necessarily when they are making tenders.

Q.—Have you had much experience of the particular type of vessel, the rotary cutter suction dredger?

A.—Yes, of the building of it, the construction. We have been doing that work for the India Office for 20 years off and on. The indents for dredgers come from India and they are passed through our hands for the procedure that I have oulined to you that took place in connection with the " Sir George Lloyd."

Q.—In the past 20 years about how many dredgers have passed through your hands in that way?

A.—Well, I should have to count them up.

Q.—Roughly?

A.—About a dozen perhaps.

Q.—Of the rotary suction type?

A.—No, not all, but most of them are of the rotary suction type.

Q.—Did the " Kalu " and " Jinga " pass through your hands?

A.—No.

Q.—They did not?

A.—They did not. They were built for the Port Trust Bombay, which orders direct. I am told it is eleven rotary cutters. We have counted that up from the tables, which shows that my guess was not very far off.

Q.—Have you seen a copy of the evidence given in Bombay?

A.—Well, I have seen it, but I am afraid it is almost too voluminous for me to say that I have read it all through, if that is what you want me to say.

Q.—I meant really in reference to those portions as to the actual work done by the dredger in Bombay?

A.—Yes, I have read that through.

Q.—On the 12th September, Messrs. Simons & Co. are writing to Sir George Buchanan. He had evidently, as we can see from the first line of the letter, sent them a letter on the 25th, because it says: " Referring to your esteemed communication of the 25th ".

A.—So I see.

Q.—Did you, when you read this letter with the enclosed specifications, consider it workmanlike?

A.—This letter?

Q.—Were this letter and the outlined specifications in your opinion workmanlike?

A.—This is the general description?

Q.—Yes.

A.—That is what you mean, beginning on page 20, headed: " 42-inch dredger "?

Q.—You got the outline specification on page 20?

A.—Quite, as far as it went.

Q.—Suppose a buyer wanted a dredger to cut soft clay, and indicated his wish that it should be a dredger to cut soft clay, would that dredger be different in its construction to one that another buyer ordered which was wanted to cut stiff and unctuous clay—would there be likely to be any difference in the specifications by the makers?

A.—You mean in the case of stiff and unctuous clay instead of soft?

Q.—Yes.

A.—Yes, I think there would; but " stiff and unctuous " is not a very definite term.

Q.—Neither is " soft "?

A.—No, that is quite true.

Q.—But the word " soft " indicates a different consistency to the word " stiff," does not it?

A.—Yes, I suppose you would say it is different. You want to know how you would give effect to that difference?

Q.—I would rather like to know that. I am putting you for the moment in the position of a dredger builder who has a customer wanting a dredger that will cut stiff clay—hard clay?

A.—Well, I do not think he would make any difference, except, perhaps, a little in the cutter. The result necessarily is that he could not get as much output from the stiff and unctuous clay, or he might consider that he would not get as much output as he would from a soft clay.

Q.—We have seen the dredger. We have been told that the engines driving the rotary cutter are 400 horse-power?

A.—Yes, more than 400.

Q.—More than 400 horse-power?

A.—Yes.

Q.—But they are said to be 400 horse-power. In point of fact it works at about 130 horse-power, and except for the last cut of about 18 inches, has not apparently had any difficulty in dealing with the material. Would 400 horse-power, in your opinion, be sufficient to cut clay of any description, soft or hard clay of any character?

A.—I should think you would want to reduce the cutter in diameter to cut very hard clay. I think the tendency would be in that direction. But if you had to make a machine which was to cut soft and hard, varying from soft to very, very hard. you want to get an average cutter, because you cannot change the cutter as you are going on with your work. So the dredger builders put a cutter in which has some relation

to the average conditions, probably sacrificing on the harder conditions in order to make good on the softer conditions.

Q.—On the harder there would be a certain slowing up of the cutter, in your view?
A.—Yes, or it might be stopped.

Q.—It might be so stiff as to actually stop the cutter?
A.—Yes, it may be so stiff. I think some of the witnesses have said that that hard clay was hard enough to stop the cutter.

Q.—I think not. I think you will find that the general concensus of the evidence is that there was no difficulty until they came down to stiff clay. I think I am right in saying that only one witness has ever spoken to the cutter being absolutely stopped, and that was in the case of coming on to moorum or rock?
A.—Yes.

Q.—I believe I am right in saying that there is no evidence that the cutter was ever pulled up by clay?
A.—Well, I may be wrong in that.

Q.—I think that is how it stands.
A.—I think Mr. Spiers said so.

Sir Frederick Hopkinson.—No witness has ever said it was pulled up by the clay, only the moorum or rock.
A.—We are dealing with such unprecise terms in " hard " and " soft ", that it is very difficult to come to any very definite conclusion.

Chairman.—As the result of this letter, and as the result of the decision by the Government of India, the order in fact was given about May, 1920?
A.—I think I gave you the date in my memorandum. The dredger was ordered on the 15th June, 1920.

Q.—And the " Colaba "?
A.—The " Colaba " was ordered on the 15th July, 1920.

Q.—Was there any test ever made of the " Colaba "?
A.—The " Colaba " was tested for water delivery. She has no cutter on board of her.

Q.—The " Colaba " is a mere booster, is she not?
A.—A booster, a floating pump.

Q.—That is to say, she receives material which is cut by the " Sir George Lloyd ", and is passed through the " Sir George Lloyd's " pipe line, and then gives it the additional energy to deposit it on the reclamation site?
A.—It is passed into the " Colaba's " pump, which forces it on through another pipe-line.

Q.—Was she ever tested for pumping power?
A.—Yes, on the Clyde she was tested for pumping water power. We could not get a pipe-line on the Clyde of anything like that length; and we pumped water through and tested the capability of the machine to pump up to its full power on the Clyde.

Q.—There was, in fact, no actual pumping of water and material through anything like 5,000 feet of the " Sir George Lloyd's " pipe-line?
A.—No, there was not. The line of pipe that she pumped through was about the length of the ship. She took it in at the fore end of the suction pipe, which was at the fore end of ship, and delivered it over the stern, something under 300 feet, including, of course, the pipe in that length.

Q.—So that under the actual daily working conditions, neither the " Sir George Lloyd " nor the " Colaba " ever underwent a test of the daily working conditions?
A.—Not until they got to Bombay, obviously they could not; we could not get 5,000 feet of pipe-line on the Clyde.

Q.—At all events they did not have it?
A.—They did not.

Q.—There was in the contract, as we know, no requirement that the makers should deliver the dredger and " Colaba " at Bombay, and there satisfy the purchasers that they could do the stipulated work?
A.—I do not think there was. I do not remember at the moment, but I do not think there was.

Q.—You may take it that there was not.
A.—I think that is so.

Q.—What I want to ask you as an expert is this. Would that be a usual condition to insert in a contract, that the dredger maker should bring the dredger and the booster 4,000 or 5,000 miles, and should give a test of its working capacity?
A.—No, that is not usual; it is usual to complete the delivery of the dredger on the Clyde.

Q.—And, indeed, in the plainest terms the document stated it so, did it not? It is the middle of page 18: "If ordered within three months of this date, we could have the dredger ready for trial on the Clyde in twelve months"?

A.—Yes.

Q.—That was a clear indication that Messrs. Simons and Co. were willing to construct the dredger according to the specification for trial on the Clyde?

A.—Yes, that is quite clear. Of course, that is not the contract. I wanted just to get the contract. I do not know whether you have got it.

Chairman.—I wanted to see the contract. I have not seen it.

Sir Frederick Hopkinson.—There is no contract.

Mr. Ewbank.—This is the nearest approach to the contract, I think. (*Document handed to the Chairman.*)

Chairman.—It is dated the 10th November, 1920. Is that what you mean when you refer to a contract?

A.—May I correct this? I can put it perhaps better in this way. I am not quite clear that it is so in this case, but our usual practice is to issue conditions of tender, which are made into a contract when the order is given, and in the conditions of tender are stated the matters to which you have made reference, with the conditions of trial, for instance.

Q.—Anyhow, the fact in this case appears to be as follows:—On the 10th November, 1920, Mr. W. F. West, Director-General of Stores——

A.—For the Director-General of Stores.

Q.—Yes—wrote a letter which says: "Dredger and plant for the Bombay Back Bay Reclamation scheme. Gentlemen,—In the letters from this office dated 15th June and 15th July, 1920, respectively, reference is made to the preparation of a formal contract in respect of the supply of the above-mentioned dredger and plant. Subject to your concurrence, it seems unnecessary that any more formal contract should be entered into at present than is already contained in this correspondence between us. If you agree: (1) That the contract is contained in the correspondence set out in the list enclosed and in the two specifications therein referred to (these for the purpose of identification might be signed on behalf of the parties); (2) That the terms and conditions contained in the last completed formal contract between your company and this office (that of the 24th June, 1919, for the supply of a self-propelling light draught cutter suction dredger, with floating pipe-line and terminal pontoon for the Pegu Sittang Canal) shall, *mutatis mutandis*, apply to this contract." So that the correspondence was assumed to contain all the material particulars?

A.—That is so.

Q.—Did it in your opinion in fact contain all the material particulars?

A.—I think so; but, of course, this is a matter for the legal people in the India Office.

Q.—I follow that.

A.—In my opinion that is a contract which was quite binding and clear.

Q.—Then the "Sir George Lloyd" and the "Colaba," having been put in hand by July, 1920, there came a time when you went to Glasgow for the trials?

A.—Yes.

Q.—The dredging trial of the "Sir George Lloyd," I think, took place on the 24th November, 1921?

A.—That is so.

Q.—You made a report?

A.—I did.

Q.—That report is to be found at page 31 of the correspondence with Messrs. Meik and Buchanan regarding the execution of the works. You say: "This dredger was built by Messrs. Simons and Company, Ltd., and bears their yard number, 650. She left Renfrew harbour at 8 a.m. on Monday, the 21st November, 1921." On that day was it a mere dredging test as apart from a speed trial?

A.—Yes; I think it was quite independent.

Q.—That is how it appears?

A.—Yes. I cannot remember that, and I must refer back to the figures.

Q.—At page 35, five days later, on the 26th November, 1921, you were engaged in speed trials?

A.—That is so. I have seen it now.

Q.—Was the contract speed eight knots?

A.—I suppose it was—that is so, eight knots.

Q.—On that day did she in fact do 7½ knots?
A.—Yes.

Q.—It is true, is not it, that she never did her eight knots until she had her bow sheathed in?
A.—I should like to look into that.

Q.—Please take your own time. At the bottom of page 35 you will see : " The bow well was plated in for the voyage and the cutter frame hove up and secured in place."
A.—I think I may say that is so.

Q.—So that when she was in the external form of a dredger she did 7½ knots, but when she had her bow well plated in she did in fact touch eight knots?
A.—Yes; I suppose that is so. I have now our copy of the report, if I may refer to it.

Q.—Please do.
A.—On the final trial she got 8·23, and in addition to having the bow plated up she had her propellers changed.

Q.—But a dredger going from one point to another to work would not have her bow well plated up?
A.—No; only for the voyage out.

Q.—Have you any doubt in your own mind that it was the plating up of the bow well which gave her just that little extra amount of speed?
A.—Well, I do not think anybody could say. It must have been the propellers. They would not have changed the propellers without their being of opinion that the propellers were not the best that could be fitted, so that I cannot tell you. I do not think there is much in plating up the bow myself.

Q.—Have you been present at a good many tests on the Clyde of rotary dredgers?
A.—Yes.

Q.—How many?
A.—Well, seven or eight, perhaps.

Q.—Were you completely and thoroughly satisfied as to the dredging and pumping capacity of the " Sir George Lloyd "?
A.—Absolutely.

Q.—She was specified to pump 2,000 cubic yards an hour, and her pump to discharge that through 5,000 feet of pipe line.
A.—Yes.

Q.—With regard to the " Colaba," were you satisfied as to the " Colaba's" pumping capacity?
A.—Absolutely. It was the same as the " Sir George Lloyd."

Q.—The point has been noticed that the " Colaba " has self-propelling engines?
A.—Yes.

Q.—You remember that?
A.—I know. She had to be navigated out.

Q.—It is true she had to be navigated out, but when she got on site, all that was wanted was something in the nature of a pontoon?
A.—Well, it depends what you are going to do with such a plant. If you are going to move it about it is probable it is better for it to have its own self-propelling power. If it were used subsequent to the Bombay Back Bay scheme it might want to be in a place where it would have to get under way readily to get into shelter. There are advantages in having self-propelling boosters. Another point that I think has got to be made is this. The " Colaba " when she had finished the reclamation scheme might have been converted into a cutter dredger, and then it would have been very desirable for her to have self-propelling power.

Q.—Do you say that on the whole it was not unreasonable to incur the additional expense of self-propelling engines?
A.—Yes; on the whole. The cost of taking the vessel out if she had been completed in this country would have been well on to the cost of the self-propelling engines.

Q.—Surely she would have been taken out in sections, would not she?
A.—Well, that would have cost a considerable amount, too We are constantly dealing with that question of what is the best thing to do. We frequently find that it is better to complete a vessel in this country and let her navigate her own way out there rather than have to complete her and tow her out, as the cost of towing is very considerable. The third alternative is to take the plant down as erected in this country and carry it in a steamer, re-erect it out there and float it. Each particular case has its own solution. I think in this case that it was not very far out to obtain the solution that was obtained.

Q.—Have you noticed that part of the evidence which deals with the vibration of the " Colaba "?

A.—Yes, I have.

Q.—For some reason or other great difficulty has been experienced with the " Colaba " from almost the beginning due to vibration.

A.—So I understand—not from the very beginning.

Q.—I said almost from the beginning.

A.—Yes. She seems to have run free from vibration for some time, and then to have developed it.

Q.—In your view were the internal arrangements of the " Colaba " well designed as regards the balance?

A.—May I just explain a little?

Q.—Please do.

A.—The question you ask me is : were they well designed as regards the balance?

Q.—I will tell you why I ask that question. One of the witnesses said that in his belief there would have been little or no vibration if the pumping apparatus had been put amidships, in the centre of fore and aft displacement.

A.—Yes.

Q.—What do you say about that?

A.—Well, I do not think that would have made any difference. The vibration in any structure is not due to the structure; it is due to some vibrating cause outside the structure. The question whether the structure will respond to the vibrating cause and vibrate is, of course, dependent on the period of the structure's natural oscillation. In the case of the " Colaba " she was run on the Clyde, and no vibration was shown when she was pumping water through the pump There is no vibration in the case of the " Sir George Lloyd " when she is pumping spoil through the pump. The engines are exactly the same. The pump is exactly the same. The engine's seat is a little stronger in the case of the " Colaba," perhaps more by accident than anything else, than in the case of the " Sir George Lloyd." The only difference between the two vessels is that one is shorter. The " Colaba " is shorter than the " Sir George Lloyd " and therefore stiffer. Her period of vibration may be a little different, and so it may be with certain combinations of impulses from the pipe line that her structure responds to the vibratory cause that is in existence. The way to get over that is to change the period of the motion of the engines and run the speeds a little differently. I think the evidence shows when they did run the speeds either faster or slower, vibration was avoided. If you continue to run at a critical speed when the vibration is excessive you will disturb the structure in time, and something will have to be done to renew that structure. I think that is pretty much the condition of the " Colaba." What is the cause of the vibration I do not know. I do not think anybody has found out yet. If we knew that we could say something about why it has happened, and what kind of remedy could be suggested.

Q.—But vibration is always one of the matters which a manufacturer has got to guard against, is it not?

A.—Well, as a matter of fact, vibration is not generally found out until the vessel is completed. To that extent you cannot guard against it. You cannot find it out. This question of synchronism and disturbing causes and structural periodicity is not a simple problem.

Q.—What I really mean is this. The manufacturer recognises that there will be vibration, and must be vibration, on the vessel That is so, is not it?

A.—No ; I do not think that he knows. He hopes that there will not be.

Q.—But should he not, for instance, put his engines on a bed plate with such a thickness of bolts, and the bolts so close together, that he will not have the engine shaking off the bed plate no matter what the vibration?

A.—No ; I do not think that any builder would expect to connect an engine to a bed plate so that whatever the vibration was the bolts would not shake loose.

Q.—When I say " whatever the vibration " I mean, of course, the vibration during the working period.

A.—Yes. If the question was of normal ordinary vibration the bolts would hold it, but if you get an abnormal vibration the bolts will not hold it, and you must do something to remove the vibrating cause so that the vibration is not abnormal.

Q.—When the " Colaba " began to show damage from vibration were you consulted about the matter at all?

A.—Yes ; they told us what they proposed to do.

Q.—When you say " they," whom do you mean?

A.—I mean somebody in Bombay.I forget who it was, but somebody in the engineering department of the Development Directorate.

Q.—Did you agree with their proposal?

A.—No; I said that I thought they should find the vibrating cause and remove that, and the structure would be all right. I think that is a general principle that will be accepted.

Q.—But apparently on the " Colaba " the vibrating cause was the actual doing of the work for which she was intended.

A.—Now we open up the question: was she intended to do the work she is doing—she was to cut soft clay.

Q.—Not cut, but pump?

A.—Pump soft clay.

Q.—She is intended to pump soft clay?

A.—She could not pump it without cutting it, could she?

Q.—I am speaking of the " Colaba "?

A.—Yes, she was intended to pump soft clay.

Q.—The " Colaba " was only intended to pump whatever material came from the " Sir George Lloyd "?

A.—Soft clay.

Q.—Is it your suggestion that possibly she had to exert undue power to pump the material that in fact was delivered to her?

A.—No. I do not think he had to exert more power. I do not know what was the cause. I do not wish to convey that what I say now is any positive opinion on my part, but it is possible that the loading which has come on to the " Colaba " through the pipe-line has been of an intermittent nature; and sometimes it is heavy stuff that lies in the bottom of the pipe and sometimes it comes through as fairly free-flowing material, and there is a variation in the load that goes through the pipe which may cause the engine to race and cause vibration. That is just something that may be a possible cause. The real cause may be very different from that but nobody seems able to determine what the exact cause is.

Q.—This was a reclamation on a very large scale?

A.—Yes.

Q.—Larger than any reclamation hitherto attempted?

A.—I do not know. I do not know relatively about other reclamations.

Q.—Do you know of any other reclamation in any other part of the world in which it was proposed to reclaim 1,143 acres on an open sea front?

A.—I do not know. I am not familiar with these matters. I am told that Sewri was as big as this. But I do not know that. I am not a contractor or a dredger worker.

Q.—As an expert in these matters what is the first essential of a reclamation dredging scheme of this character?

A.—Well, now, I am not an expert in these matters. I am a Naval Architect who can build a dredger or take care of the building of a dredger, but I am not an expert in matters of reclamation, which are Civil Engineers' work.

Q.—I will put it to you in this way. As a Naval Architect in a reclamation scheme of this character, which would you be sure about first—the provision of a dredger or the existence of material suitable in quantity and quality for your dredger?

A.—There again it is a Civil Engineer's job to find out what is the thing with which the dredger has to deal.

Q.—Obviously.

A.—The Civil Engineer tells me what the dredger has to do and then I try to produce something that will do it.

Q.—The first thing is to be sure that you have got the material sufficient in quantity and quality, is not it?

A.—Well, I am not any judge of that. You will decide that, I have no doubt. That did not come into my purview at all. If you ask me as an ordinary citizen, well, that is another matter, but not as an expert.

Q.—I will ask you as an ordinary citizen. As an ordinary citizen, is not the first essential before you spend £650,000 pounds on a dredging plant to make sure that you have got material suitable in quantity and quality?

A.—Well, I should have thought so, and I should have thought that it was done in this case, but my opinion on that is not worth anything.

Q.—Have you noticed the results of the work of the " Sir George Lloyd "? She began on 8th December, 1923. The " Sir George Lloyd," the " Colaba " and the other craft and the pipe-lines cost very little less than a million pounds, did they not?

A.—I believe they did cost something like that.

Q.—Arriving in March, 1922, and not being utilised until 8th December, 1923, there was a loss of nearly £75,000 in interest, was there not?

A.—I accept your statement on that.

Q.—It is a matter of calculation?

A.—Yes.

Q.—Was there any reason why when the "Sir George Lloyd" was put to work on the 8th December, 1923, she should not have given her proper output?

A.—I do not know.

Q.—I am speaking generally.

A.—I know that one thing was she went ashore in getting into position.

Q.—She touched ground but she did not do herself any harm?

A.—I do not know what may have happened between the time she went out and the time she got to work.

Q.—I will tell you the point I want to make. It has been suggested that the very poor results of the first season's working, which was from the 8th December to some time in May was because the work was experimental. That has been the reason suggested. I ask you, if you take a dredger and go and moor her over a dredgable bed, is there anything experimental about the matter at all?

A.—Well, if you have got a trained crew ready to do the work, I should think not. Of course you have got to find out what the bed is like.

Q.—Exactly!

A.—I mean you find it out by dredging.

Q.—Or do you find it out by previous borings?

A.—Well, that is another method, but what I mean is you will inevitably find it out by dredging, and to that extent your dredging is experimental.

Q.—There is no difficulty, is there, in ascertaining exactly of what the bed of the sea consists in a sheltered place with an average depth of 30 feet of water?

A.—There, again, I must ask you not to treat me as an expert in that subject. The only thing I know about the bed of the sea is when you drop a lead line and find out what the depth of the water is, and you then get up something which is really the surface of the bed. I know nothing about it.

Q.—Do you know nothing about core drilling?

A.—No.

Q.—Do you know generally that by care and diligence it is quite easy to ascertain what the bed of the sea consists of when you are dealing with the bed of a sea 30 to 40 feet deep?

A.—No, I do not. I should think it ought to be easy, but I do not know.

Q.—I will now ask you a question which I am quite sure you can answer. Given a proper face—by which I mean a proper depth of dredgable material—is there anything whatever experimental in a rotary suction dredger coming up to the face and starting her work?

A.—No, I should not think so.

Q.—If you get a suffifficient depth of material of the right consistency and you get a crew who know their job you get the result?

A.—Yes, certainly; and if you do not, you do not get the result.

Q.—Will you turn to page 3 of Sir Lawless Hepper's Report? You see that Sir Lawless Hepper gives the results for 1923, 1924-25 and 1925-26. The dredging season of 1923 began, as I have told you, on 8th December. The dredging seasons of the other years began somewhat earlier. In 1923-24 the "Sir George Lloyd" pumped 1,020 cubic yards per pumping hour. That is a disappointing result?

A.—Yes.

Q.—In 1924-25 she pumped 856 cubic yards only?

A.—Yes.

Q.—And in 1925-26 she pumped 959 cubic yards?

A.—Yes.

Q.—Have you any theory to account for it?

A.—I can only take the statements of your witnesses almost wholly when they say that the pumping plant is all right and the material is all wrong. That is about what it amounts to

Sir M. Visvesvaraya.—I will ask you a few fundamental questions to begin with. It is stated that there were certain unusual features in the ordering of the dredger?

A.—I do not know what you mean.

Q.—I am only mentioning them for the moment. One is that hard clay is met with in the harbour and that the specification for the dredger referred only to soft clay. A second is that tenders were invited from more than one firm, but there is no record that they were examined when received, and that Messrs. Simons & Co.'s tender was preferred for any specific reasons?

A.—Do you want me to deal with that?

Q.—I will mention these features first, and we will go into other details afterwards. The third feature is that, although the dredger was a very important plant, the tests were confined to the Clyde; no provision was made for tests being carried out at site. Those are chiefly the allegations made. I only want to know what the truth is in each case. You are aware that the dredger is not giving the promised output?

A.—Yes.

Q.—It has only been giving hitherto between 25 per cent. and 40 per cent. of the promised output per season?

A.—I do not know the percentages. I only know these figures here.

Q.—You may take it from me that it is between 25 and 40 per cent. If that is the percentage, the dredger has failed to come up to expectations, has it not?

A.—The expectations have not been realised.

Sir M. Visvesvaraya.—You admit that?

Chairman.—I do not think Sir John admits that the dredger has failed, but the dredging operations, which is rather a different thing. The failure of the dredger is one thing and the failure of the dredging operations is another which we must keep very distinct?

A.—I quite agree.

Sir M. Visvesvaraya.—Cannot you say the dredger has failed if it does not give the promised output—for any reason; it may be because the site was bad, or the soil was bad, or anything else?

A.—Let me put an extreme case to you. Supposing the dredger had been at anchor the whole time and had done nothing, and the promised output had not been given. Would you say the dredger had failed? It had never been tried. The dredging operations may fail; the results may not have come up to expectations, but that the dredger has failed is not at all demonstrable.

Q.—But it is a doubtful point, anyway, whether it is due to outside circumstances or whether it is due to the inherent defects in the dredger?

A.—No, not in my opinion. It is not doubtful in my opinion. I am certain the dredger is all right. Do not think I am admitting that there is anything wrong with the dredger.

Q.—You only say that in the working there is something wrong?

A.—I know the results have not been realised. That is all I really know.

Q.—You are aware that she has worked three seasons?

A.—There are records for three seasons here.

Q.—In three seasons it has not been able to give the required output. After all, the essential thing is that we should get the required output, and it has failed to give that output—or, rather, the combination of working and the machine have failed to give the output?

A.—The output has not been given by the machine. That is right.

Q.—What do you think are the causes for that, from what has been put before you?

A.—I have already said to the Chairman that I only know of what your witnesses have said—that the dredger is all right but the material is all wrong. That is substantially what it amounts to.

Q.—When you designed the dredger did you get all the particulars which were needed about the material in which it had to work?

A.—None whatever.

Q.—Why was that?

A.—The dredger I was told to design was described in the letter of Messrs. Simons, and I went ahead and did it.

Q.—Messrs. Simons are manufacturers?

A.—They are.

Q.—You take your instructions from Government, do you not? It is all given there in that letter?

A. Yes, quite so. Messrs. Simons are very experienced manufacturers in dredging There are very few people who would pit their opinion against Messrs. Simons on matters of dredger building. I merely mention that in case you are not familiar with their standing over here.

Q.—The plant was designed to deal with five million cubic yards per annum?

A.—Yes.

Q.—Working 170 days, doing 15 hours actual pumping per day?

A.—Yes.

Q.—In two shifts. You will find it mentioned in the report?

A.—Yes, I am quite familiar with that statement now.

Q.—If the dredger was expected to do 15 hours actual pumping, would you expect that she would deliver the 2,000 cubic yards which were promised in the specification?

A.—I do not quite follow—if she had to work 15 hours a day?

Q.—2,000 cubic yards is the amount specified. Would they get, during the whole of those 15 hours, a uniform rate or an average rate of 2,000 cubic yards?

A.—I do not expect anything about it. I know that the vessel can do 2,000 cubic yards per hour.

Q.—But not for 15 hours regularly?

A.—That is a matter of organisation. That is not construction at all, and I was not responsible for organisation.

Q.—If the dredger is designed to give 2,000 cubic yards per hour, will it give for 15 hours an average of 2,000 cubic yards, or more than that?

A.—The machine is quite capable of doing that if your organisation is sufficiently ample to carry it through.

Q.—What is the usual practice? If a machine is capable of giving 2,000 cubic yards, what would she give in 15 hours, roughly?

A.—If you do all your changing outside the 15 hours (which, of course, is not always practicable) you can get 30,000 cubic yards, but for whatever time you have to stop when you are not pumping you lose that amount, except that the dredger in soft clay, and things like that, would be able to do more than 2,000 cubic yards, and so she might, on an average, for 15 hours do an average of 2,000 cubic yards; but I cannot say. The circumstances are so varied in dredging that it is impossible to dogmatise as to what would happen.

Q.—It is estimated that 30,000 cubic yards or so of material can be dredged for 170 days per season; if you multiply 170 by 30,000 it gives a little over five million cubic yards or tons. Would that be a right calculation to make generally in dredging operations?

A.—I am not an operating dredger man. You are the people who have to judge whether that is so. I cannot help you. That is my position.

Q.—When you design a dredger do you not take into account all the collateral circumstances and then see whether your machine fits into the position or not?

A.—If you ask me to design a dredger, and to demonstrate on the Clyde that that dredger will turn out so many cubic yards per hour, I can do it; but if you ask me to say that the dredger will continuously, for periods of years, turn out 2,000 cubic yards per hour, then I say I do not know. I do not know the circumstances under which the dredger will work. I am no authority on such a question.

Q.—But your duties are defined by the Director-General of Stores in these words: " The duties of the firm include the preparation of designs and specifications, examination and recommendation of tenders, inspection during construction and approval on completion "?

A.—I know.

Q.—When a dredger has to be designed for Indian conditions, do you not make an inquiry into the local conditions before you prepare the designs?

A.—No.

Q.—Did you read Sir George Buchanan's report before you prepared the design?

A.—I looked through it. I cannot remember what I did about it. The only thing that guided me was the outline specification supplied by Messrs. Simons.

Q.—In a scheme of this sort, if any mistakes are made it is a serious matter. Do you not go into all these extraneous details before you make up your mind?

A.—I cannot undertake to keep other people from making mistakes.

Q.—But Sir George Buchanan has mentioned in his report the existence of " Hard clay in places ". Did you notice that point?

A.—I believe the words " hard clay " are mentioned once in the report.

Q.—And also in these estimates he refers to hard clay.

A.—It is not inside the outline specification. I understand you are going to have the builders.

Chairman.—Yes. I think you will get from them what happened about the question of clay between Sir George Buchanan and themselves

A.—I do not know. It is no use asking me about that. My knowledge of the subject begins with their letter of the 12th September. Before that I knew nothing. I do not know whether that meets your point.

Sir M. Visvesvaraya.—I thought that all the collateral circumstances would have been taken into consideration by you before you prepared your design. After all, the people who write to you are not experts; they are your clients. They merely represent to you " These are the local conditions. You are the expert. Now go and design for us."

It is for you to dig out all the details from them, and then see whether or not your machine is adapted to the circumstances, is it not? I only want full information. I do not want to criticise you.

A.—Please do not hesitate to criticise me if you think I am wrong. The conditions under which the work has to be carried out are laid down by some civil engineer who has local knowledge. He then says: "I want a dredger to cut certain material". Then we have to produce that dredger to cut that material. If he says: "I want a dredger to cut soft clay," and afterwards that dredger will not cut rock, I do not think you can say that we have failed in our duty in producing a dredger which will not cut rock.

Q.—I think you mentioned, in answer to a question by the Chairman, that it is very difficult to distinguish between soft clay and hard clay; there is no demarcation line between them?

A.—I did not quite say that.

Q.—Would it not be safe to design your dredger to cut hard clay as well?

A.—Oh, no. It altogether depends on the amount of the hard clay. If it is all hard clay, of course you would design the dredger to cut hard clay; but I was not asked to design a dredger to cut hard clay. I was asked to design a dredger to cut soft clay.

Q. But did not you ask the engineers "How is it in your report you mention hard clay"?

A.—No, I did not.

Q.—You went by the letter of their instructions?

A.—I went by the outline specification.

Q.—But I think the India Office asked you to work out this in consultation with Sir George Buchanan?

A.—No, I do not know that they asked that. What they said was: "Arrange what you are to do between you." I was to look after the construction of the dredger, and he was to have the opportunity of seeing whether the dredger that we were producing was what he wanted.

Q.—But there are no watertight compartments in this matter. It is all the one business of both of you, is it not?

A.—Sir George Buchanan was in his office, and I was in mine.

Q.—This is a £650,000 contract, and all the circumstances have to be taken into consideration. Do you not feel you have a responsibility in the matter of recommending this dredger without getting all the particulars of the site, especially when you knew that in his report he mentioned hard clay?

A.—What you want me to say is that I should take care that Sir George Buchanan knew his business and did it properly. Is that it?

Q.—I think so, to some extent.

A.—That is not my function, and I would not accept any such responsibility. I could not.

Q.—I see your point.

A.—I may be wrong, but that is my position.

Q.—When you design a dredger do you not insist that careful studies and tests of materials should be made on the spot, and that there should be delivered to you the results of those tests?

A.—You mean when the dredger is finished?

Q.—No, when the dredger is to be designed.

A.—What do you mean by "careful tests"?

Q.—The quality of the material.

A.—You mean that they should give me exact information as to what the material is?

Q.—Yes, and samples of the material as well.

A.—No, that is not my responsibility.

Q.—You do not get samples of material?

A.—Sometimes we do, but I cannot say that the sample which is given to me is the stuff which the dredger is going to cut. All I can say is that that is the sample which is given to me.

Chairman.—The last question put to you was with regard to samples of material—whether it is customary to send samples of material; that is to say, suppose there is a reclamation scheme in West Africa or in the southern part of South America, would you expect to receive, or would it be a prudent and sensible thing for the people there to send you samples of material and say: "This is the sort of stuff that the dredger will have to deal with"?

A.—Sometimes they do and sometimes they do not.

Q.—Is it not a great help to you to receive such information, and also to the dredger-makers?

A.—I do not know that it is a very great help. If you say that the material is very hard clay or that it is silt, then the dredger builder has a very wide range between those two. I do not know whether words can describe the difference as well as the material itself which is sent, but I am not sure that it is a great help to the dredger builder.

Sir M. Visvesvaraya.—In this case soft clay has been specified, although hard clay is met with. Hard clay was known to exist on the spot when the subject came up to you. Hard clay is also mentioned in Sir George Buchanan's report. How is it that such an important point was overlooked by you? Did the conditions of the soil come to your notice at all, other than the soft clay?

A.—No. You say it was overlooked by me?

Q.—You have seen that mentioned in Sir George Buchanan's report.

A.—Yes, since this inquiry began I have seen it.

Q.—Not before?

A.—Not before—not that I remember.

Q.—Do you not think you are taking too narrow a view of your responsibilities?

A.—That is for you to judge. That is the view I take of my responsibilities.

Q.—You designed the dredger along with Sir George Buchanan, and the manufacturers undertook to build it. If the dredger has failed to give the promised output, who is responsible for the failure? Somebody must be responsible, must they not, in a matter of an affair of a million pounds?

A.—Again, I must say that it is your function, and not mine, to say who is responsible. My view is that I am responsible for the construction of the dredger and to see that it shall fulfil the requirements that are laid down in Sir George Buchanan's report. That is my view of my function. You may take some other view.

Q.—I understand both of you were asked by Government to consult with each other and to produce a specification which would answer what was wanted? You say you have merely taken literally what Sir George Buchanan laid before you, and confined your specification and instructions to that?

A.—That is what I did.

Q.—Did you give the dredger makers a notice of tender; that is, did you give them instructions to prepare their designs and specifications? In notifying the tender, did you give them notes as to what they should base their tender upon?

A.—We gave them plans and specifications upon which they were to tender, and those specifications are an elaboration of the outline specification which is in that report.

Q.—Did you send such instructions to several builders, or only to one?

A.—Only to one.

Q.—I understood tenders were invited from a number of builders?

A.—Not by me.

Q.—That is a very important point. You had no hand in notifying tenders?

A.—Yes, in notifying the tender from Messrs. Simons—one tender.

Q.—You were not asked to invite tenders from anybody else?

A.—No.

Q.—How is it that Messrs. Lobnitz and Company have also tendered?

A.—I cannot tell you.

Q.—There is a tender received from them?

A.—I gather from Sir Lawless Hepper's evidence that other tenders had been received.

Q.—And you took no notice of them?

A.—I did not receive them.

Q.—They were not placed before you?

A.—I never saw them. I never heard of them until I saw about them in that evidence.

Q.—Was it after a dredger-builder had been appointed by the Secretary of State that the matter came up to you?

A.—I do not think the dredger-builder was appointed in that sense. The instructions were to get a tender from Messrs. Simons, and that tender was accepted. Then they became the builders for that particular dredger. No one else was asked by the Director of Stores that I know of—only Messrs. Simons.

Q.—You know of no reason why the other dredger-builders were excluded?

A.—I cannot give you any direct evidence. I have heard, but I do not know. Other witnesses will probably give you that; I do not know.

Q.—Why were no guarantees stipulated in the specifications to ensure that the dredger gave the required output at the site of the work? Why did not you hold the

manufacturers responsible for putting the dredger in a serviceable condition on the site of the work?

A.—Firstly, it is not usual. Secondly, I do not believe the builders would have undertaken such a responsibility.

Q.—Not even if you had offered them some more money?

A.—I do not believe they would have undertaken the responsibility and if they had done so it would have been at a considerable increase in price. I must ask you to let me rely on the first, which is our usual practice. We see the dredger working on the Clyde under conditions which are the same for each dredger. When they pass those conditions we then consider the dredger has fulfilled its contract so far as its building is concerned.

Q.—I understand that in this country they do arrange for tests at site. For instance, at Aberdeen, they had recently ordered a vessel, and they do admit of such conditions?

A.—I do not know.

Q.—Do you know that in Bombay harbour itself the " Kalu " and the " Jinga " were tested at site, and that payment was made to the manufacturers after the tests were satisfactorily carried out?

A.—I understand they were.

Q.—Knowing that this was even a bigger proposition than the " Kalu " and " Jinga," why did not you advise some extra payment in order to have the tests carried out in the harbour?

A.—I have already told you.

Q.—Was not there some risk in not doing that? Especially because this is probably the biggest-sized dredger you have handled. That being so, would it not have been well to have taken the additional precautions, even at some additional cost?

A.—No. There is no additional risk in this type of dredger as compared with the " Kalu " and the " Jinga." The fact that the " Kalu " and the " Jinga " have fulfilled their contracts on the site is some justification for believing that the " Sir George Lloyd " would do the same—that the dredger would do its work. Mind you, the " Kalu " and the " Jinga " worked on one site; the " Sir George Lloyd " worked on another.

Sir Frederick Hopkinson.—But the same harbour?

A.—Exactly, but with very different conditions, I understand. Well, I do not know. I saw the " Kalu " and the " Jinga " working in Bombay at Sewri, and I should have thought the stuff they were cutting was soft clay. Anyhow, the dredger was designed to cut soft clay.

Sir M. Visvesvaraya.—You take your stand on that point—that the dredger was designed to cut soft clay?

A.—Yes, of course.

Q.—Knowing that the " Kalu " and " Jinga " were tested at site, why did you not advise the same thing being done in the case of this dredger also?

A.—I told you that it is our usual practice not to do it. Look at what would have happened in that case. You say, " We will test it on the site." You had the ships lying doing nothing for 21 months. What is going to happen while you are putting them to their test. Are the people going to wait all that time for their money?

Q.—They could have said, " If the test is not carried out within six months, we are not responsible."

A.—Then that proviso would not have been any use to you.

Q.—They might have separated a small block. They might have arranged the pumps for you?

A.—That may be. We did not do it; that is all, and that was our practice. I think the practice came about, in the first instance, because we found very often, that when plants were sent out complaints were made about them, and nobody could tell who was to blame. So we said, " We will, at any ate, show that the dredgers can do their work in this country, and when they have done their work in this country, if they cannot do their work out there, it is because the conditions are different; either the crews are not competent, or the ground is different."

Q.—In such cases you have to make reasonably sure that your dredger will do its promised work?

A.—That is our way of making reasonably sure.

Q.—Why were the precautions, which were taken in connection with another set of dredgers, not taken in the present case?

A.—I have already told you.

Q.—Is dredging an established scientific process or not? Are you sure of your results in dredging or not?

A.—You are sure of what a dredger can do under specified conditions.

Q.—Is it not very necessary to be particular about the specification of the conditions, and to have enquiries made about the conditions?

A.—It is no use to specify that a dredger shall always work at its maximum efficiency. It is no use to make that a condition. All you can say is that, under specified conditions, the dredger shall do its work as specified. Then the other conditions must follow as circumstances happen.

Q.—Was the additional cost involved a consideration in omitting that provision?

A.—Yes, of course. I am sure we should have had to pay more for it.

Q.—You can always get manufacturers to guarantee the output at the site of the works if they are offered the necessary extra payment?

A.—I do not know. You say " always ".

Q.—In most cases?

A.—You can always ask them.

Q.—If they get the money they will do it?

A.—You can always ask them. It is for them to decide.

Q.—If they will not do it, somebody else will?

A.—The field of selection in this case was not very wide. We were told to go to Simons.

Q.—That is one of the reasons why you say you had to confine yourself to the specifications given?

A.—I do not quite follow.

Q.—There was only one manufacturer, so you could not bind him down too strictly?

A.—I say that our field of selection was very limited. You said you could ask somebody else. In this particular case you could not.

Q.—With regard to the tests on the Clyde, it is said that the bottom of the Clyde is soft clay and silt; that the material is often churned about and moved over and over again. It must be extremely soft, must it not? It does not represent the natural conditions of a soft clay bed, does it?

A.—Yes. It is soft clay. It represents the condition of soft clay, in my opinion.

Q.—It has been so often stirred up?

A.—No, it is not like that. It is not one hole. It is not as if you took a hole and stirred the stuff up and dropped it in again, and then stirred it up again and dropped it in again. There is a large area over which you can dredge.

Q.—But so many experiments are made there, that very often it is worked up over and over again at the bottom?

A.—No. We have made 11 suction dredgers in 20 years. That is not a very large number in 20 years. There is not a very great number of dredgers built on the Clyde.

Q.—So you think the bottom is as good as a natural bottom?

A.—Absolutely. It is an absolutely fair test of the material which is there; and the material is not stirred up as you suggest. It is just what happens to come down at the bottom of the river. If you cut a hole once, you do not go and dig that hole again. Besides that, one sees the stuff that comes up. It comes up on the cutter, and you can see it.

Q.—The " Sir George Lloyd " had to pump through 5,000 feet of pipe line. Your test was only from one end of the ship to the other—a short length of pipe—was it not?

A.—That is so.

Q.—How could a test of that character indicate work under natural conditions?

A.—I explained that in my memorandum.

Q.—They say the test was not under normal working conditions. What have you to say?

A.—You ask me how it could represent normal conditions.

Q.—Yes, working conditions?

A.—I explained in my memorandum that we cut 3,700 square yards per hour of that material and threw it overboard—pumped it out. That shows that the cutter can cut an ample amount of that material. The question whether it can pump it through a pipe line can only be demonstrated in one of two ways. You can make a calculation based on certain assumptions, or you can put it through the pipe line itself. We could not put it through the pipe line on the Clyde, so what we did was to estimate the amount of power, or head, necessary to force it through a pipe line, and we estimated that the power which the engines have is more than ample to pump it through the pipe line. That is all we can do.

Q.—The conditions in the pipe line at site are very varying. There would be leaks and air cushions formed. Your tests make no allowance for all such obstacles?

A.—The pumping through 5,000 feet of pipe line will not be affected by leaks in the pipe. The air will not get in through that pipe line.

Q.—It does get in?

A.—It is under pressure all the time.

Q.—It is a floating pipe?

A.—Yes, and you are forcing stuff through it.

Q.—Would not there be additional friction for all these reasons?

A.—That is all allowed for.

Q.—Anyhow, it is a theoretical assumption, after all?

A.—You can call it what you like.

Q.—It is not testing under normal working conditions?

A.—It is not testing through a pipe line, I know that. I should very much rather test it through a pipe line, but you cannot get a pipe line on the Clyde.

Q.—They say the dredger cannot cut the clay properly—that the dredger is too weak to cut this hard clay?

A.—I do not know. It is no use asking me that.

Q.—Assuming that it is so, can you not improve the working by increasing the horse-power of the engine, or by increasing the propelling power of the cutter?

A.—As I said just now, you may possibly increase the cutting power of the cutter for hard clay by reducing its diameter. You will then make it less effective for all the rest of the work it has to do.

Q.—It will not be a balanced machine?

A.—No.

Q.—Are you in favour of the dredger working three shifts? That is outside your purview, is it?

A.—I do not know.

Q.—Are you concerned with the engineering side at all?

A.—The civil engineering side?

Q.—Are you concerned with the building side or the engineering side?

A.—I am a naval architect concerned with the building of a dredger.

Q.—Its capacity also included, I suppose?

A.—Its capacity included, obviously.

Q.—When was the report made that the dredger did not come up to expectations?

A.—I cannot tell you that. I suppose that was made in Bombay, was it not?

Q.—Was any reference made to you about it?

A.—The first intimation I had was at the beginning of this year.

Q.—You had heard something about how and why the dredger was not giving satisfaction?

A.—No, I had heard nothing. I was in Bombay in November, 1923, and in April, 1924. They had not begun in 1923. In 1924 I did not know what was happening.

Q.—But did they not make any report to you that the dredger was not working satisfactorily, and seek your advice?

A.—Not until January of this year.

Q.—Have you replied to that?

A.—Yes.

Q.—Have you given your advice as to what action should be taken?

A.—We did.

Q.—May I ask if you could produce that letter, or state briefly what you said on that occasion?

A.—With regard to the "Sir George Lloyd," there was nothing to say. With reference to the "Colaba," what we said was that we thought that the oscillation in the pipe line might perhaps be controlled by opening the sea valve to let water in when the pump was not getting water through the bottom line. They said they had tried that and that the effect was that material went out through that sea valve, and they did not think that was satisfactory.

Chairman.—They said it took two men twenty minutes to do it.

Sir Frederick Hopkinson.—And they ran the risk of sinking the ship.

Witness.—Which is slightly inaccurate.

Chairman.—They were not enthusiastic about it when we saw the boat at Bombay.

Witness.—You have all this here. It is printed. I am only trusting to my memory now. We suggested that perhaps it would be desirable to actuate this valve for letting the water in by a valve which was connected with the vacuum in the pipe. We suggested a machine which would do it. They wrote back and said the effect was so momentary, and the vacuum was so small, that they did not expect they would be able to get any control on that valve for that purpose, and there the matter ended. That is as far as we have gone, but it is quite impossible for me at this distance, knowing so little as I do of the circumstances that are connected with it, to prescribe a remedy. Somebody on the spot can do it with a fuller knowledge. That, I think, is an answer to your question.

Sir Frederick Hopkinson.—But nobody on the spot has your scientific knowledge?

A.—That may be; I do not know. There ought to be. I am ignorant about a good many things.

Sir M. Visvesvaraya.—You are very modest. When a machine which you have built has failed, is it not your business to call for all the information, and to study the case properly, and to see how it can be put right?

A.—I should like to, but I cannot do everything in the world. I have other things to do.

Sir M. Visvesvaraya.—May I ask who wrote to you about this in January last?

Chairman.—That correspondence related to the "Colaba."

Sir M. Visvesvaraya.—I did not know that.

Chairman.—It does not relate to the "Sir George Lloyd," but to the "Colaba"?

Witness.—I started by saying there was no complaint about the "Sir George Lloyd."

Sir M. Visvesvaraya.—Yes, you said so.

Witness.—The Chief Engineer of the Reclamation Branch wrote to me.

Chairman.—That would be Mr. Elgee at that time.

Sir M. Visvesvaraya.—Nobody brought it to your notice that the "Sir George Lloyd" was not giving the required output?

A.—I think they did that at the same time.

Q.—They did not ask you for any remedy in that connection?

A.—I do not think they did; I cannot say, but you can see from the document.

Q.—When the dredger failed to give the promised output, whom should the Government have consulted in order to rectify the complaint?

A.—I suppose they should have referred the matter to the Director of Stores, and ask my opinion on it.

Q.—But they have not done that on this occasion?

A.—I say, yes. At that time they called attention to the fact that the dredger was not giving its output.

Q.—You did not call upon the builders to put it right?

A.—No. You see the vessel was finished in early 1922—four years ago.

Chairman.—If I may interpose for a moment, the difficulty arises in the form of the question. Sir John does not suggest that there was anything to put right in the "Sir George Lloyd." He says the "Sir George Lloyd" is a thoroughly efficient machine. (*To the Witness.*) That is your point?

A.—Yes, that it is.

Sir M. Visvesvaraya: But you have since been informed that the material to cut is not soft clay, but hard clay?

A.—Yes, I suppose I have been.

Q.—Have your thought of any remedy?

A.—I have not been informed officially of that. The only think I know about it what has come out in the evidence in this enquiry.

Q.—Is it not rather unusual that the machine should have been working unsatisfactorily for two or three years and that you were not kept informed?

A.—I do not know. I do not think I can answer that question. I do not get too much information from India about the working of these machines; in fact, we have had to write to various places and ask them to be good enough to tell us how the machines were getting on. If they are getting on all right we do not hear anything, but we do like to know what their output is.

Q.—When a machine does not put forward what is expected of it, is it not usual for the principals to write to you and keep you informed, and, through you, to communicate with the dredger makers and ask them to put matters right?

A.—Yes. If there is something about the machine which is wrong and which can be put right, the builders put it right.

Q.—But the principals only knew that it did not produce the required output and did not make good what was promised. The Government only knew that the plant was not giving satisfaction, and it was for the experts to advise what should be done to put it right. However, you have not been approached in the matter?

A.—I am not an expert to advise them as to what has to be done—as to getting material. My point is that the dredger is a satisfactory dredger for the purpose for which it was designed, which was to cut soft clay. If you are cutting hard clay, and you are cutting murum, and you do not get the output, all I can suggest to you is that if you cannot cut that stuff you had better get another dredger and double your output.

Q.—You cannot improve the present dredger?

A.—No, not cutting that stuff.

Q.—Then if the material there was hard clay, and you got information that it was soft clay, whose fault was it?

A.—That is for you to judge—if there was any fault.

Q.—You do not think there was any fault?

A.—I give no opinion.

Q.—You are non-committal?

A.—It is not my function.

Q.—Then is the problem to be given up as hopeless, with so many advisers and engineers?

A.—I have offered you one solution, and I have no doubt you will get a great many others. If the dredger, on account of the material, is only able to produce half the output which was expected, then one way of getting the whole of the output is to double the dredging plant. That is one way; I do not say it is the only way.

Q.—That is true, but it means doubling the cost?

A.—No, it only means double the cost of the dredger, and it does not mean even that at present prices.

Q.—Anyhow, you have not been approached for a solution and they have not reported to you how things were getting on?

A.—No.

Q.—That is a very important point?

A.—Do not please say they have not told me anything about it. You will find that has happened in the correspondence.

Q.—Someone has to be held responsible out of the three parties—the engineers, the naval architect, and the builders. Whom are we to hold responsible in this case to improve the working of the dredger. May I ask what is the usual practice?

A.—The dredger is not capable of improvement. I have already stated that the dredger is doing its work perfectly well—the work for which it was intended. If you wanted to cut hard clay, and you find it is only doing half its output, it is doing as much as it can do. If you want to double your output and make it 2,000, you must double your dredging plant. At least that is one way to do it.

Q.—Anyhow, the fact remains that the dredger does not give the required output?

A.—That is so.

Q.—You only give us the technical explanation that you were informed that it had to cut only soft clay, and you do not suggest how to remedy the position now?

A.—I have made a suggestion; I do not know that it is the best one. Your own witnesses say that the dredger is working well, and that the reason that it is not giving the desired output is that the material is not the right material. If you are bound to those conditions, then you have to submit to one-half of the output which you want, unless you get another machine which will give you the other half.

Q.—Whatever may be the reason, whether it is due to insufficient information or data, a mistake has been made and we have to rectify it. Do not you consider it your duty to advise on the point?

A.—I have advised. I offer you that advice.

Q.—It is a very poor consolation for us to know that we have to go in for another dredger?

A.—There may be other ways. I have not given this matter much consideration; I did not think it was my duty. You asked me, and I might go into the thing more fully. There are other ways than that.

Q.—You have no remedy to suggest now, except that one?

A.—I say that is a possible remedy. I do not say that I recommend you to do that. I have not given the matter enough consideration.

(Adjourned for a short time.)

Sir M. Visvesvaraya.—The design is usually furnished by the builders, is not it?

A.—Not in my experience; but I think perhaps what you say is correct. Generally the shipbuilder makes a design and makes an offer on that.

Q.—You check the design and satisfy yourself that it is in order?

A.—We check it. We went over it. We made out a new set of plans which were very much like the former plans of similar ships, and we made a specification. A detailed specification would include a great many things that were not in the outline specification, and that are necessary to be put into the construction of such a ship.

Q.—You do not mind my asking you what was the fee you were paid for the work?

A.—Well, I do not know whether I am under an obligation to answer that question.

Q.—It is well-known. It is given in the correspondence. I only wanted to see what your view was.

A.—It is one per cent. on the cost.

Q.—One per cent. on the cost of——?

A.—Whatever the sum was.

Q.—Are you not required to keep in touch with the working of the machine and satisfy yourself that what you designed was a success?

A.—Not for that fee, that I know of. We do, as a matter of fact, try and find out what the machines do for our own experience.

Q.—After the builders are asked to give a design they give a design, and then the other conditions have to be attended to by the consulting engineers of the principal. Your duties then must be exceedingly light. Tell me if that is not so, taking a sense of proportion in these matters?

A.—Well, " light " is a very indefinite term.

Q.—You know the materials from the specification and the conditions are given by the engineers, so that what remains can be done by you perhaps in two or three days' time, from your experience?

A.—Certainly not, I have to see the construction through the whole of its stages.

Q.—They do the work, and you only test it at the end of the time?

A.—No; we see it through while it is being done, and see that it is being done satisfactorily. We review all the drawings to see that the structure is being made in what we think is the best way.

Q.—But the consulting engineers also do that sort of work, do they not? They claim that they have gone through all the detailed plans?

A.—For the dredger?

Q.—Yes?

A.—Well, I do not really know what they claim; but I think I know that Sir George Buchanan had two per cent. for the work.

Q.—He had one per cent. The two per cent. was divided between you and him?

A.—That is right

Chairman.—Generally two per cent., but in respect of this particular transaction you divided the percentage?

A.—That is it, so that Sir George Buchanan had one per cent. and we had one per cent. Now it was not necessary for both of us to do the same work.

Sir M. Visvesvaraya.—But one would be a check on the other?

A.—Absolutely.

Q.—They have not kept you in touch with what is going on about the working of the dredger? You have not thought it necessary to call for the information?

A.—Well, they have not kept me in touch. I suppose if I had asked I should have got some information. I do not think they would have refused it.

Sir Frederick Hopkinson.—Who actually designed this dredging plant?

A.—Do you mean in all its details?

Q.—In all its details?

A.—Well, the drawings were made, in the first place, by us.

Q.—The original drawings?

A.—The general arrangements. Then when the work began the builders made out their working drawings which we see in their works while they are being made, and copies are sent to us to our office to be reviewed in our office by our staff in relation to the former work that has been done.

Q.—That is the actual detailed working drawing?

A.—Yes; we see every one of these all through.

Q.—But the general arrangements you are originally solely responsible for?

A.—Well, I cannot say we are originally solely responsible.

Q.—That is what I want to get at. Who is responsible?
A.—I am responsible, but you said "solely responsible."

Q.—You are the marine architect in charge of the construction of the dredging plant?
A.—That is so.

Q.—As such you are, I assume, solely and entirely responsible?
A.—Well, there I do not quite agree, because the builders have responsibility.

Q.—Only for carrying out your designs and instructions?
A.—Well, if you look at their contract you will see that they have got to make the thing work notwithstanding any omissions in the specification.

Q.—Yes?
A.—They cannot get off their responsibility by saying that I am entirely responsible. I think that is so.

Q.—I quite follow you? Did you design the engines?
A.—No; they were designed under our superintendence.

Q.—But makers like people who build these dredgers have got stock drawings of these sort of engines, have not they?
A.—Yes.

Q.—And the pumps?
A.—Yes.

Q.—Did you design the cutter?
A.—No, not in the sense that you say. They drew up the cutter and we supervised it.

Q.—You passed it?
A.—We passed it—that is what it is.

Q.—There must be some sort of relation between the cutter and the work it has to do.
A.—Yes.

Q.—Because quite obviously if the cutter does not cut the clay the pump cannot pump it.
A.—Obviously.

Q.—Would you design the same kind of cutter for soft clay as for hard clay?
A.—Well I suppose not. It is difficult to answer that in terms of "soft" and "hard" is it not?

Q.—Would you call soft clay on the Clyde anything like that piece of clay there. I should like you to examine that piece very carefully. (*Piece of clay handed to the Witness.*) Look at the broken face and feel the weight of it?
A.—Yes.

Q.—It has a pretty high specific gravity, has not it?
A.—Yes. I suppose it has.

Q.—Would you call that soft clay?
A.—It might have been soft clay.

Q.—When?
A.—When it was cut.

Q.—You think it might have been?
A.—It might have been. I think I could show you clay from cuttings on the Clyde which are almost like that.

Q.—You would not describe that as hard clay?
A.—I do not think so. I do not know. I should like to see it wet.

Q.—I have seen it wet and I certainly should not call it soft clay.
A.—You would not?

Q.—Most certainly not.
A.—I would sooner see it wet, and then describe it.

Q.—You have not seen it wet when you were out there in May, 1924?
A.—No, I never saw any kind of cutting. The only time I have seen Bombay material that was clay, was in the Sewri Dock.

Q.—The Sewri Reclamation?
A.—Yes. I think that was about 1907 or something like that.

Q.—It was 1908. Can you tell me how the description "soft clay" ever got into the specification?
A.—I do know, but I would rather not because I am only told by somebody else.

Chairman.—You can tell us by whom.

A.—I have been told by the builders how it came in, and they will probably tell you how it came in.

Chairman : We shall see the builders.

Sir Frederick Hopkinson : Sir George Buchanan in his original report described it as hard clay.

A.—Did he?

Q.—He did, not once but several times.

A.—Yes?

Q.—He presumably would see it when it was wet?

A.—You are making that statement I suppose?

Q.—Before he described it?

A.—Yes.

Q.—A man of Sir George Buchanan's experience would not describe something he had not seen.

A.—Well, I do not know.

Q.—Will you agree with me that it is an essential factor in designing a dredger to know what it has to do?

A.—Certainly.

Q.—That is why I want to know how we get the definition of soft clay. Did you see any sample of it?

A.—No.

Q.—Then what were you designing on?

A.—On what was in that letter.

Q.—On the term soft clay?

A.—On the term soft clay.

Q.—Do not you think you ought to have made some investigation to know what you were designing this large and expensive dredger for. Do not you think you ought to have had a sample?

A.—Well, I do not know. I did not. That is all I can say.

Q.—I put it to you in this way. A dredger has been designed for Bombay which has so far proved a failure?

A.—I beg your pardon.

Q.—To dredge clay at Bombay?

A.—That may be so.

Q.—That is why it has proved a failure.

A.—You see it has not dredged the clay, as I understand it, that it was originally intended to dredge.

Q.—To dredge clay in Bombay.

A.—It was originally intended, as I understand it, to dredge it on the R.I.M. ground.

Q.—In the Harbour. There is no change of site of the dredger.

A.—Well, I think they changed it to Back Bay.

Q.—We are not dealing with Back Bay. The " Sir George Lloyd " never went into Back Bay.

A.—I did not know that.

Chairman : The " Sir George Lloyd " never dredged in Back Bay at all. The " Sir George Lloyd " invariably dredged in the Harbour.

A.—Did she dredge where she was originally intended to dredge?

Chairman : Yes. I will show you where she dredged. (*The position was explained on the plan to the witness.*)

Sir Frederick Hopkinson : In area G where there is no clay the " Sir George Lloyd " has dredged : in area K where there is no clay at all : in area J where there are about three parts of mud to clay : in area H where there are about 4 parts of mud to 3 of clay. So that practically they have done very little clay dredging. It has been very largely mud.

A.—Is this all what they have lifted out?

Q.—No, this is what there is to be lifted out. These are Sir George Buchanan's figures sent out to Bombay as the dredging programme.

A.—I see. Is this piece of clay a sample of the dredging?

Q.—That is a piece of clay which has been dredged by the " Sir George Lloyd."

A.—That is the clay they say is too hard?

Q.—They say in one case it is excellent material and better than they expected—that is for reclamation purposes. Then the Director of Developments says it is too hard, but I take it that that is the clay that the cutter was designed to cut?

A.—The cutter was designed to cut soft clay.

Q.—Then I will put it in another way—that the dredger ought to have been designed to cut?

A.—Well, that may be so.

Q.—This actual material?

A.—Yes?

Q.—I am going to suggest to you that to the general public and to the world we have got a position here in which a dredger and dredging plant at a cost of £850,000 has been supplied to do certain work. It seems to me that unless there is some adequate reason for it, a certain stigma attaches to anyone who has had anything whatever to do with the designs or construction of that dredger?

A.—That is your opinion?

Q.—I put it to you?

A.—Well, I shall not admit that.

Q.—You would not?

A.—No I shall not admit that a stigma attaches to anyone.

Q.—Not to the Engineer in charge of the work or the designer of the dredger?

A.—Well ——

Chairman.—Do you mean to someone or do you mean to everyone?

Sir Frederick Hopkinson.—To anyone who has had anything to do with the design of the thing.

Chairman.—Even though there was not enough material?

Sir Frederick Hopkinson.—It is not a question of there being not enough material. It is a question of being able to dredge this particular material. I suggest to Sir John that he ought to have had samples so that he would know what he was designing his dredger to do. You have apparently designed a dredger to do something other than the work to be done in Bombay?

A.—Other than work that has been done in Bombay.

Q.—To be done; because Sir George Buchanan describes it as hard clay. He is the Engineer who is responsible for giving you instructions?

A.—Yes, I suppose so.

Q.—You carry out his instructions?

A.—Yes.

Q.—If I may say so without offence, somewhat blindly—you did not have a sample of clay?

A.—I did not interfere with his instructions at all.

Q.—What I suggest is that you ought to have had a sample?

A.—What do you mean by I ought to have had it?

Q.—You ought to have had a sample.

A.—He ought to have given me a sample?

Q.—Certainly, you ought to have asked for it?

A.—I had instructions.

Q.—You were designing a dredger to do a certain thing. You did not know what it was going to do. You have simply made a note that it is soft clay?

A.—Yes.

Q.—Would not a competent designer say: "Let me have a sample of this so that I may know what I am going to do"?

A.—No; I should be content to take the definition of "soft clay" as usually interpretated such as a dredger builder would understand to be the nature of soft clay.

Q.—I must take your answer. You would be satisfied to take what somebody tells you, notwithstanding, as Sir George Buchanan has said, and probably told you, as he tells everybody, that this was the biggest dredging proposition of modern times?

A.—I was interested in producing a dredger to instructions given to me.

Q.—A dredger to do something?

A.—To do something.

Q.—Which it has not done?

A.—I beg your pardon.

Q.—Which it is incapable of doing?

A.—Which it has done, excuse me, according to the instructions which were given to me.

Q.—You do not get away from the fact that we are dealing with this clay at Bombay. This dredger was designed to dredge clay in Bombay?

A.—Yes.

Q.—It has not done that, and apparently it is incapable of doing it?

A.—It was designed to dredge soft clay, which I was instructed was the material that had to be dredged in Bombay. If it turns out that it was not soft clay then some other action must be taken about it.

Q.—What I am suggesting is this: that as a prudent man you ought to have had samples and decided for yourself as a dredger-designing expert what your dredger had to do.

A.—Well, that is your suggestion.

Q.—Do not you think so?

A.—No; I do not think so. I do not think I can go any further than I have gone. I was instructed to design a dredger which was to cut soft clay. The dredger will cut soft clay.

Q.—I say that this clay in Bombay is not soft clay.

A.—I was not told that.

Chairman.—The position is this. Sir John says: "I had certain information given to me. I was told to design a dredger to cut soft clay, and I did it." That is your view?

A.—That is my position.

Q.—" I do not think that it was a necessary part of my duty to require specimens of clay to be sent from Bombay "?

A.—That is so. You see, Sir George Buchanan came back with full knowledge of what was there. But the builders had made dredgers which had cut in Bombay a large quantity of material, and I think that I was justified in relying on Sir George Buchanan and the builders to know the kind of cutter that would be required for that material.

Sir Frederick Hopkinson.—What I was suggesting to you is that Sir George Buchanan himself described the clay as hard, and yet the builders' specification calls it soft.

A.—That may be. I do not know how that is.

Q.—You speak about the other dredgers dredging the Sewri. Do you know that neither of these dredged 2,000 yards an hour?

A.—I am afraid that is not correct.

Q.—I have the official figures.

A.—Of course, I do not know, but I ask you to take the builders' statement on that because the builders' statement has some relation to the inference in the matter.

Chairman.—It is said that the " Kalu " did 406 cubic yards an hour at her best.

Sir Frederick Hopkinson.—I do not think that is true. The " Kalu " did an average of 1,400 cubic yards an hour, and the " Jinga " did under 1,000.

A.—Is not it the other way round?

Q.—You are quite right. The " Jinga " was the better of the two, although they are identical.

A.—I have heard there is a difference which is attributed to the management.

Q.—I am told in order to get over that difficulty they changed the crews over, but it did not make any difference. The " Jinga " dredged an average of 1,426 cubic yards an hour.

A.—She was designed to do 1,500.

Q.—She was designed to do 2,000.

A.—1,500, I think.

Q.—2,000.

A.—I am told she was designed to do 1,500.

Q.—It is 2,000. This is the official paper given to us. This is from the Port Trust: " The dredgers ' Jinga ' and ' Kalu ' were built in 1908 by Messrs William Simons & Company, Limited, Renfrew. They were designed to be capable of dredging 2,000 cubic yards of soft clay and mud per hour from a depth of 30 feet and, discharging the material so dredged a distance of 4,500 feet on shore."

A.—My information is it was 1,500.

Q.—This is information given by the Port Trust, the owners of the boats.

A.—Mine comes from the builders.

Q.—If we are wrong the builders will, no doubt, correct us; but that is the information given to us.

A.—39-inch pump against 42 in this case.

Q.—But only 30 feet dredging depth subsequently increased to 40 feet; whereas the " Sir George Lloyd " is 70 feet.

A.—Well, I may be misinformed about that.

Q.—All this information was available to Sir George Buchanan. He knew the Sewri reclamation had been done, and he could have passed this information on to you. Did he do so?

A.—No.

Q.—Would it be possible to run that cutter faster than 12 revolutions a minute? Would it be practicable?

A.—The cutter was run on trial 107 to 121 revolutions—the engines were run at that.

Q.—I am speaking of the cutter. You know about it. You designed it. What is the cutter designed to run?

A.—I cannot remember it.

Q.—It is geared down.

A.—I take it from you that it is.

Q.—That is what we were told out there. I cannot tell you from my own knowledge.

A.—Suppose we take it at that, this cutter can run at 160 revolutions as against, say, 114 on an average; therefore, you could increase the number of revolutions of that cutter in the proportion of 160 to 114.

Chairman.—You get it running about 16 a minute, under those conditions.

A.—That is about it.

Sir Frederick Hopkinson.—The point in my mind is this. Would you authorise the running of that cutter at 16 revolutions a minute? Would it be safe?

A.—I should like to look at the design again.

Q.—I should be very glad if you would let me know, because it is one possible way out of the difficulty as it exists to-day. If the cutter can run at 16 revolutions it will, obviously, be able to give much more for the pump to do?

A.—Yes; if she can cut the stuff at these revolutions.

Q.—I should be much obliged if you would look into this, because it is rather important to the Bombay Government for the future.

A.—Certainly.

Q.—I am not sufficient of an expert to say run it faster, but if they could get an opinion from you I am sure they would be very grateful for it.

A.—Yes; I do not think there is any doubt about running the engines faster. My doubt is, and I do not know without looking, whether the present cutter would stand that.

Q.—That is what I want you to tell me.

A.—But if it would not stand it I should think it is quite likely another one could be made to be put on.

Q.—Would not that be a partial solution of the poor output of the dredger if you could cut more? Are you satisfied that the pumps can pump 2,000 yards an hour?

A.—Quite.

Q.—If you can cut it, will not that be a possible solution?

A.—Yes.

Q.—At any rate, a partial solution?

A.—Yes; if you can cut it—if you can cut the quantity increased in proportion to that increase.

Q.—You have no doubt of the pump being able to discharge it?

A.—Not the slightest.

Q.—You spoke, in answer to the Chairman, about the average rate of cut, but at any rate, whatever the clay is, as long as it is clay it must cut at the rate of 2,000 yards an hour, must it not?

A.—It must be cut at the rate of 2,000 yards an hour.

Q.—In order to get 2,000 yards an hour through the pump?

A.—Yes.

Q.—It is purely a question of cutting, as far as the clay is concerned.

A.—That is what I said in my memorandum. We cut 3,700 cubic yards an hour.

Q.—We are coming to the quality of the clay. Why did you, in your report of trials, call it black clayey silt?

A.—That is the description, I suppose, that covers what is looks like.

Q.—But that is not a description of clay.

A.—But it is a clay really. I think that description of it got in from the output of the water pipe, because it flings it about in small particles and makes you feel it is a flakey silt.

Q.—You cannot turn clay into silt.

A.—You can powder the clay.

Q.—But then it is not silt.

A.—Perhaps it is not a good description. I know what the material is, but whether the description is right is another thing.

Q.—Flakey, clayey silt you have not necessarily got to cut—it will run.

A.—But they do cut it. It comes up in flakes—thick flakes.

Q.—Could you see them, because your discharge pipe was below the water line, was it not?

A.—No; above the water line. You can see them when the cutter stops. It is on the cutter.

Q.—You can?

A.—Absolutely.

Q.—It has been suggested that all the dredgers built on the Clyde have been tried at or near this particular place, and that all that stuff has been turned over and over again.

A.—No; I do not think so.

Q.—What area is there for trying the dredgers there?

A.—Quite a considerable area. Do you know the Clyde?

Q.—Very slightly, and not down there.

A.—It is along that shore, between Craigendoran and Helensburgh. It is the same stuff throughout.

Q.—All the dredgers built on the Clyde have been tried there?

A.—I cannot say all of them, because some of them are not tried.

Q.—Most of them? All that are tried are tried there?

A.—All that are tried are tried there when they are tried for soft clay.

Q.—The whole success of this dredger lies in that definition of clay. If your cutter had been sufficiently good to cut through 2,000 yards of hard clay an hour, we should not have had this trouble?

A.—I admit that.

Q.—To come to the question of cutting, should the dredger throw 2,000 yards an hour?

A.—I should think so.

Q.—Up to the present we have not realised an average of half that?

A.—No.

Q.—That is a very important thing?

A.—I understand the importance of that.

Q.—The dredger was designed and intended to do 5,000,000 cubic yards a year?

A.—Yes.

Q.—Dredging for 170 days, 15 hours a day. We were told in Bombay that the percentage of necessary stoppages from actual time work and reducing it to pumping time was 36 per cent. Several witnesses have told us that they did not consider that unreasonable. Have you sufficient knowledge of actual dredging to say whether you think it is reasonable or not?

A.—I do not know.

Q.—That is what we have been told?

A.—Yes?

Q.—Consequently, under no circumstances could this dredger have done 5,000,000 yards a year unless she had actually worked for 15 hours a day for 170 days a year?

A.—Yes, unless she had thrown more than 2,000 yards per hour.

Q.—One never hoped for that.

A.—Well, I do not know. All dredgers when they are tried throw out a great deal more.

Q—We generally find that builders' trials are far better than we can ever get afterwards?

A.—Very likely.

Q.—I do not know whether that has been your experience?

A.—Sometimes. Sometimes it is not. A builders' trial is under selected and chosen conditions and they make the contract on that.

Q.—It is like speed trials?

A.—Yes.

Q.—Where you pick your coal and pick your men and do anything else in order to get a satisfactory trial?

A.—Yes, and they generally give more than they contract for.

Q.—Sometimes they do. The " Colaba " was never tried at all?

A.—Well, I do not know what you mean by tried. She was tried with pumping engines, and she ran with pumping engines pumping water.

Q.—But no head at all, just passing water through. You would not call that a trial?

A.—These are the pressures. You have got the " Colaba " trial, have you not?

Q.—We have never seen them. I did not know she had been tried. I have never seen any tests of the " Colaba."

A.—The following readings were taken during the full power endurance pumping trial which lasted 4 hours. The vacuum is given at $5\frac{1}{4}$ inches, and the pump discharge in lbs. per square inch 33 lbs. that is 72 feet of head.

Q.—How was the delivery choked on the " Colaba "?

A.—I do not think it was choked.

Q.—How was it then?

A.—I beg your pardon, it must have been in order to try to reproduce a head corresponding to the pipe-line discharge. The pipe was partially closed and a bend was fitted through the bow inlet.

Q.—Is that the " Colaba " or the " Sir George Lloyd "?

A.—That is the " Colaba."

Q.—We have never seen these. Where did these come from?

A.—Well, I do not know how you got the others. I do not think we supplied them.

Q.—You must have done. You are responsible for them. They are your trials. They must have come from you.

A.—That is originally, but may I ask who sent you the copies?

Q.—We got them in a printed volume. I should like to see those, because we have never seen them?

A.—Certainly.

Q.—That does away with some of my questions. I thought the " Colaba " had never been tried.

A.—That is why I questioned what you meant by tried. You will notice the head there. That was 76 feet, and the vacuum was $5\frac{1}{4}$ inches, so that we had a head of 82 feet.

Q.—Why did you not put a vertical pipe behind the " Lloyd " in order to try her in working conditions?

A.—How high?

Q.—The necessary height of 80 feet?

A.—5,000 feet long?

Q.—It is not necessary to do it for 5,000 feet. That is horizontal. I am speaking of the vertical pipe?

A.—Well, I do not know.

Q.—There is no difficulty in doing it in a place like the Clyde. You have floating cranes there which would lift 80 feet high?

A.—You could not do it in the river.

Q.—Not where your dredger was tried?

A.—You might have done it there.

Q.—That is what I mean.

A.—You would have to go down the river with this pipe in place 80 feet up.

Q.—Could not you lift it up when you got it there?

A.—Not very easily.

Q.—I should have thought it could have been done?

A.—What purpose would that serve?

Q.—It would reproduce your actual working conditions.

A.—We got a pressure head

Q.—You did not with the dredging. That is only with water.

A.—You mean we ought to have thrown it. We ought to have pumped the stuff 80 feet up.

Q.—Yes, for a proper test. This is not a little 12 inch dredger, this a dredging plant costing between three-quarters and a million of money.

A.—I know.

Q.—Therefore its dredging tests were of the very greatest importance.

A.—I do not think it would have made any difference to the result, because I think you know pretty accurately what the resistance of the pipe is.

Q.—At any rate the " Colaba " was never tested with anything but water?

A.—That is all.

Q.—It struck me when I was out there that the " Colaba " need not have been a self-propelling pontoon at all, but an ordinary pontoon as Messrs. Simons originally quoted for?

A.—Electrical?

Q.—It does not matter whether it is electrical or steam. That would have been very much cheaper than a sea-going ship, surely?

A.—Well, I do not know how much.

Q.—Surely it would have been very much cheaper?

A.—Not very much.

Q.—You only want a square pontoon which you would make out there?

A.—It would not be very much cheaper.

Q.—Probably the engines of the " Colaba " are only used twice a year, one day to put her into position, and one day to get her back again?

A.—Yes.

Q.—Do not you think that is an unnecessary expense?

A.—You have got to go into the cost, the whole cost of navigating the ship out there.

Q.—You do not want to navigate her. You build the pontoon out there?

A.—It is the cost of navigating the ship under her own steam against the cost of sending out the material, the engines and the plates and re-erecting them out there.

Q.—I should think it would be very much cheaper to re-erect it out there?

A.—I do not know. I cannot tell you right off, but I do not think there is very much in it.

Q.—I have no hesitation in saying it would have been a very, very great saving?

A.—Well, you can investigate that. I doubt very much whether there is very much in it.

Q.—To come back to the vibration on the " Colaba," the Engineer of the Royal Indian Marine, I think his rank is that of Commander, who has examined the " Colaba," told us that when the " Colaba " was working her funnels were working fore and aft like that, moving as much as 6 inches?

A.—Did he measure it?

Q.—Yes?

A.—How did he measure it?

Q.—I do not know?

A.—It is very difficult to measure at the top of funnels, is not it, with the ship steaming?

Q.—You and I would be able to tell pretty closely. I understand she was not steaming but she was anchored?

A.—She was steaming with the funnels.

Q.—She was anchored?

A.—I know, but her funnels were hot and her boilers were hot and she was steaming.

Q.—She was raising steam?

A.—She was pumping.

Q.—I think you or I could tell, even by looking at it, whether it was 6 inches or 8 inches, could we not? I feel sure I could at any rate?

A.—I do not know how far apart are the funnels.

Q.—Not very far. Six inches is an extraordinary amount, is it not? You would call that a very excessive vibration?

A.—No, I do not think I would.

Q.—You would not?

A.—This vibration question is a question of oscillation of a structure which is more or less rigid at the base.

Q.—No, if it had been more or less rigid at the base these rivets would not have come out. There must have been oscillation at the base?

A.—The base of the funnel?

Q.—No, in the bottom of the ship? That is where the rivets came out?

A.—I do not admit that follows—the funnel is standing on a more or less rigid base, that is to say it is not very rigid and it is free to oscillate if you give it an oscillating force—a vibratory force

Q.—Would you not think 6 inches is quite abnormal?

A.—No, I do not know that I should. The ship did not open up so that the funnels came 6 inches.

Q.—I do not suppose they would?

A.—It is the funnel that is oscillating.

Q.—I know, but on the base?

A.—On the base, which is a very thin place—where the funnel is.

Q.—But it is sufficient for many hundreds of rivets to work loose?

A.—Yes, if it is long continued.

Q.—It was not long continued. They took it in fairly good time. In fact, the engineer said in his opinion it would have been dangerous to have continued its working for many days longer?

A.—Many days?

Q.—Yes?

A.—You would soon shake the rivets if you had a vibrating engine for a day, even.

Q.—He said it would be dangerous to work the ship.

A.—Because the rivets had got so slack—that is what you mean?

Q.—Yes?

A.—If it had continued they should have taken steps to prevent the vibration.

Q.—They did not know what to do, and evidently you cannot tell them what to do?

A.—I do not know what it is.

Q.—If anyone should know, surely you ought to know?

A.—I do not agree, because I do not know what took place out there.

Q.—They pumped half their proper quantity. That is what took place?

A.—They pumped half their proper quantity, but did they pump at half speed, or what?

Q.—That I cannot tell you.

A.—You cannot tell me what is the cause of it? They were pumping hard all that time, and they were getting half the quantity, so that all the water that is going through there was all right. The stuff that came, which is half of the 2,000, possibly may have come along in waves, as they expressed it.

Q.—If it came along in waves there is no reason why it should come along suddenly. If you can get it at one minute you should be able to get it at another minute?

A.—You get it choked where the cutter is, and suddenly that is released and it suddenly comes along in a gulp, and that kind of thing.

Q.—There is nothing in Bombay making that abnormal?

A.—It depends on the material that you are cutting. You would not get that in soft clay.

Q.—Well then, that goes to prove that it is hard clay?

A.—There is no doubt about that.

Q.—You said just now you would call that soft clay. You would not call it hard clay?

A.—That stuff?

Q.—Yes.

A.—But there seems to be something in the clay which prevents it from coming at the rate of 2,000.

Q.—Or it may be something in the cutter which will not do it.

A.—The cutter did cut the stuff.

Q.—Not this clay?

A.—It cut what I call soft clay.

Q.—Not this clay?

A.—What the builders intended to cut as soft clay.

Q.—They ought to have known what it was, because they have built the "Jinga" and the "Kalu."

A.—They have cut stuff out there.

Q.—At certain speeds. No doubt they have the official records of what the boats do.

A.—The builders say they have cut an average of 2,700 cubic yards for three weeks when they were running the plant themselves. We got that from them—2,700 in the "Kalu" on the Sewri scheme.

Q.—In that case surely it would have paid the Port Trust to have the builders out there to run the dredgers for them?

A.—It may be so.

Q.—Instead of one running at 926 yards an hour?

A.—I should think it would be so, but did they pay anybody to make it worth their while?

Q.—That I cannot tell you.

A.—Did they have a system of working which was sufficiently good to make the men produce the quantity?

Q.—They had a dredging master recommended by Messrs. Simons, Mr. Spiers. Do you know him?

A.—Yes.

Q.—He is a man of wide experience?

A.—Yes.

Q.—He came here the other day, and he struck me as being a very useful sort of man.

A.—I have seen him.

Q.—You know him?

A.—Yes.

Q.—Are you satisfied with him as a dredging master?

A.—I should have to see him work. I have not seen him at work.

Q.—He was a man recommended by Simons?

A.—Yes.

Q.—Presumably the best they could get, it being the biggest dredger they had ever made?

A.—It may be that Messrs. Simons do not take enough trouble to develop these men. I am somewhat of that opinion, that it is a very important job. I do not think you can say that that man, Mr. Spiers, was a highly intelligent man who should be put in charge of a job of that sort.

Q.—It all depends. He is not a scientific man, and he is not an educated man, but I should say he is a very competent man at his job. A man in that position requires supervision?

A.—Yes, he does. My own feeling about it is that this kind of work has become so important that it is worth while for a different class of man to take it up. I have spoken to the builders about it, and they said they were developing them, but the War came and cut off all their supplies of men. They would have men for doing this kind of thing, but the War has stopped it.

Q.—You told the Chairman that you knew nothing about the method for getting samples of clay. There is nothing easier, is there?

A.—I should think not.

Q.—On this particular site in 1912 they took over 1,300 borings showing the nature of the material?

A.—Yes.

Q.—That ought to have been ample, ought not it?

A.—I should think so.

Q.—You could not complain that for a comparatively small area like that they did not take enough borings?

A.—No; I should think not. When I answered the Chairman I did not know—I meant, from my own personal experience I have never taken any borings in the harbour.

Q.—It is a very simple matter?

A.—I quite agree.

Q.—If you cannot take a boring you can take a grab and get it in that way, or you can take a bucket dredger and get a bucketful or so. There is no difficulty about it?

A.—No.

Q.—In a matter of spending a million of money on plant, the expense of sending a bucket dredger to work there for a week would be infinitesimal comparing the total cost with the value of the information you would get?

A.—Absolutely.

Q.—There is nothing experimental about this work at all?

A.—Well, I do not know. I am not a dredger expert, you know.

Q.—If you have built eleven suction dredgers, do not you think you ought to be?

A.—Well, do you think that I have investigated all the places that have been cut by these dredgers?

Q.—You take an interest in your children?

A.—I take an interest in them, and I get occasionally to know about them, and what they do.

Q.—You would not be able to take advantage of experience if you did not know what was going on?

A.—No, I should not.

Q.—You said just now that everybody was agreed that the plant was all right but the material was all wrong?

R.—That is what I said.

Q.—The material has not changed since this dredger was ordered?

A.—No, it is only the name of it that has changed.

Q.—No, that is not changed even.

A.—Well, it has since it was ordered.

Q.—It has not.

A.—Because it was ordered to cut soft clay.

Q.—But the material itself has not changed.

A.—I said the name of it.

Q.—Nor has the name of it changed. It was hard clay in September, 1919, and it is hard clay to-day.

A.—When it was ordered it was ordered to cut soft clay. Now you say it turns out that it ought to cut hard clay. I say the name has changed.

Q.—You cannot give me an answer to the question who changed its name from hard to soft?

A.—I do not know.

Q.—Perhaps we will get somebody who can tell us.

A.—I think you will get somebody who will tell you the story.

Q.—You only sent the specification for the price to one firm?

A.—Yes.

Q.—That is Simons?

A.—Yes.

Q.—Do you not think that is an extraordinary occurrence?

A.—It is rather unusual.

Q.—I want you to go further than "unusual" and say that it is extraordinary that you should go to one builder only for a dredging plant costing nearly a million for the Government.

A.—I say it is unusual.

Q.—You would not go so far as to say it is extraordinary?

A.—No.

Chairman.—Extraordinary means something out of the usual.

A.—It is not common practice.

Sir Frederick Hopkinson.—As adviser to a commercial firm would you ever advise them to do it?

A.—Yes, sometimes.

Q.—You would?

A.—For special reasons.

Q.—Although a very large sum like that was involved?

A.—Yes.

Q.—And remembering that you have dredger builders quite as good as Simons?

A.—I am not disputing that.

Q.—Would you not, if you were advising a commercial firm, say: "Get tenders from all the best firms you knew of and could recommend"?

A.—Certainly.

Q.—You would?

A.—Yes, unless I were ordered to the contrary.

Q.—You do not know why this was not done?

A.—Well, as far as I am concerned, I was told to take tenders only from Simons. I think that is in Sir George Buchanan's report.

Q.—No, he said prices were asked from three other firms?

A.—Yes, but that was before, I understood—before it came to me.

Q.—You see he took the price from Simons on the 12th September, 1919?

A.—Well, I do not know, but I guess from what was said by Sir Lawless Hepper that about that time he also booked in tenders from other people. That is all I can say.

Q.—There are three paragraphs in Sir George Buchanan's report. One said that he invited three from other people. One said that they could not tender, and another said they wanted a lot of information about it before they could tender, and one sent a

cable. Now that looks as if Sir George Buchanan must have been in Bombay when that was sent, otherwise why should they send a cable. This third firm quoted £840,000 for two complete dredgers, each of 2,000 cubic yards capacity. I do not know whether that is two dredgers and two boosters, each of which would do 2,000 yards and 10,000 feet?

A.—I do not know. I do not know anything about that. What is that report you are quoting from?

Q.—This is the report from Mackie, from the Government Department.

A.—I am only asking that because I want to refresh my memory as to whether I could have seen that before.

Q.—This is dated 26th February, 1920. That was after you had designed the dredger.

A.—No, 16th April was my first active connection with it.

Q.—1920?

A.—Yes.

Q.—But the dredger was actually ordered in May, 1920?

A.—15th June.

Q.—Did you do the whole thing in two months?

A.—Yes.

Q.—Who accepted the tender?

A.—I suppose the Director-General of Stores. That is the usual form.

Q.—Were you asked to advise on the tender?

A.—Yes.

Q.—Did you advise that it was a reasonable and proper tender?

A.—Yes.

Q.—You did?

A.—The price was a considerable addition to the price quoted in the September previously, and I went into the question fully as to why the price had gone up and explained as well as I could the causes of the increase—on account of the increase in wages.

Q.—Did you not think it was very high?

A.—A very high price.

Q.—It came to something like £140 a ton deadweight?

A.—It is a very high price. Everything was a very high price at that time.

Q.—The price of such a dredger pre-war was about £36 a ton deadweight?

A.—Well, I could not say positively, but I know that generally the cost of work about that time was about four times more than it was pre-war, so that about fits in.

Q.—Was not it three times?

A.—I know in some things it was four times.

Q.—Shipping plates were £7 15*s*. against £22?

A.—We paid £28 a ton for plates.

Q.—That was in 1920?

A.—In 1920 and 1921 we were paying it. You had to pay what the price was.

Q.—Did you consider two hours a satisfactory test for this dredger?

A.—For cutting?

Q.—For anything, for a full test of the dredger " Sir George Lloyd "?

A.—That is what we usually do.

Q.—You thought that was ample?

A.—It gives you a good idea of the cutting power of the cutter. That is all we attempt to measure.

Q.—You think that is a satisfactory test?

A.—Certainly.

Q.—Did you design the shore pipes and floating pipes?

A.—Yes.

Q.—What did Sir George Buchanan actually do towards the design and construction of the dredger?

A.—Well, he had all the working drawings sent to him after we had reviewed them for his comments; and he made whatever comments he saw fit.

Q.—Did he make any?

A.—Yes, he made some comments.

Q.—Can you tell from your own knowledge what was about the peak price at the time of the peak in 1920?

A.—I could not tell you now. I could find it out, if you like.

Q.—Did prices fall about 20 per cent. in 1921?

A.—I should not think so, but if you would like to know, I would find out. I cannot remember now, but I do not think it was that much.*

Q.—There was a very sudden rise and a very sudden drop?

A.—Not a very sudden rise. It went steadily up from 1918, and it was going up in 1920. I cannot tell you right off, but certainly by 1922 they had begun to fall.

Q.—Take the price of ship-plates. The average price in 1907 was £7 2s. 6d; in July 1919 it was £18 5s. 0d; in May 1920 it was £27; in November 1920 it was £25 10s., and in June 1921 it had dropped to £15?

A.—Are those official quotations?

Q.—Yes, these are actual figures.

A.—I did not think they had fallen quite so soon as that.

Q. It is a very sudden drop in seven months. They have fallen 40 per cent?

A.—Yes. A good deal of that £27 steel was imported from America, I think.

Q.—In 1920?

A.—Yes. You could not get enough in this country.

Q.—It does not matter. That is the price?

A.—That is the price.

Q.—And that is the drop?

A.—Directly your demand stops, the price went down fairly rapidly.

Q.—That is what I am pointing out—that it did drop 40 per cent. in 1921?

A.—Yes, steel plates.

Q.—Ship plates?

A.—Labour did not drop 40 per cent.

Q.—No. There was no guarantee of the dredging plant after it left the Clyde?

A.—For material and workmanship there was the usual six months' guarantee.

Q.—That is a most unsatisfactory guarantee, is not it, when you are buying? They generally say: If you can prove a defect in the plate, and you will send it back to our works free of charge, and we find it is so, we will give you another plate?

A.—That is the usual thing.

Chairman.—Are you sure it was not three months?

A.—I do not think so.

Mr. Billimoria.—I think it is six months?

A.—That is the usual thing.

Chairman.—" We will be responsible for good quality material and workmanship employed in the construction of the plant, fair wear and tear excepted, for a period of three months from the date on which the dredger is set to work "?

A.—That is the first offer. We should have altered that afterwards to six months, I am sure.

Q.—Was it six months in fact?

A.—Yes.

Q.—You are sure?

A.—I am sure.

Mr. Billimoria.—In the original tender it is six months?

A.—This is the one the builders signed. This is the specification. You object to the word " contract," but this is what we call the specification and contract. The builders are to guarantee the vessel and her machinery against defective material and workmanship for a period of six months after the trials. The difference between the three months and six months represents what we put into the specification.

Sir Frederick Hopkinson.—The one is the builders' original specification and the other is the one on which the so-called contract was made?

A.—Yes.

Q.—After you had been called in to advise the Government?

A.—That is so.

Q.—It is understood that all the contracts stipulations are for working under ordinary conditions?

A.—Yes, I suppose so. I do not quite know what the application of that principle is.

Q.—There were no other trials than those we have referred to. Now we have the " Colaba's " trials, there are no others beyond those?

A.—No other trials were made beyond those.

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* Information supplied by Sir John Biles in his letter dated October 8th, 1926. See Appendix II.

Q.—Was there anything in the specification as to the consumption of fuel, because in your report you say that it was very high on the trials. Was not there a specification as to fuel consumption in that document?

A.—I do not think there is.

Q.—Is it not usual to put one?

A.—No, not in that kind of vessel. The work is so uncertain and so irregular that you could not tell exactly.

Q.—Is there more regular or more certain work than dredger pumping? I should not have thought there was?

A.—Well, we did not do it. That is all I can tell you.

Q.—We always have it. We would not buy a dredger without it.

A.—The effect of it is that the builder says something which is very much higher that it generally works out to be.

Q.—We do not take what the builder says. We tell him what it has got to be.

A.—But you say in your contract that is shall not exceed a certain amount. The builder fixes that amount. He will not agree an amount that he cannot very easily do.

Q.—We should not give him an order until he agreed to what we think was right.

A.—You have not a very big field to select from. That is the difficulty.

Q.—I do not suppose you will agree with me, but I am going to suggest that the trials generally of the plant were of a perfunctory nature?

A.—No, I should not agree with that. I should like to know how we could do it better under the circumstances.

Q.—I should not have been satisfied with a two-hours' run for that dredger.

A.—I see.

Q.—I should not have been satisfied, from what I have seen, with the trial of the "Colaba."

A.—What would you have expected to find, if you went more than two hours?

Q.—I should want to try it under working conditions.

A.—You cannot do that without taking the vessel to Bombay.

Q.—I do not agree with you. There are the working conditions in the Clyde, so far as they applied.

A.—Well, I should like to know how we could do it. I do not know anybody that does it under any more onerous conditons that we are doing it.

Q.—Had you seen that sample before you designed the "Sir George Lloyd" dredger, would you have designed it as it is built to-day?

A.—If I was told that we had to dredge that and nothing else?

Q.—That and mud?

A.—Well, mud you can dredge. The bigger your cutter the better.

Q.—You do not want a cutter.

A.—You do not want a cutter? It depends on how dense and heavy the mud is, does it not?

Q.—It would not be very dense, going through the pipe—it is only dirty water.

A.—Anyhow, if you have got to cut this stuff——

Q.—Obviously you have to.

A.—If you have got to cut this stuff——

Q.—You have to cut it up, so that the pump will throw it?

A.—What I want to say is this: If you have got to cut this mud stuff, if the mud is of such a character that it will not flow into the suction pipe by the mere pumping, but you have got to cut it—then, if there be a large proportion of that mud, you want a big cutter to get your quantity. If you had at the bottom of that a harder stuff to cut, then that big cutter is not suitable for it, and you want something else.

Chairman.—Sir Frederick Hopkinson's question to you is: If you had had that sample in your hands at the time when you were considering the design of the dredger, would you have designed it in the way in which you did design it?

A.—Well, you must tell me something more about what there is besides that hard clay.

Sir Frederick Hopkinson.—Mud.

A.—Well, then, the quantity of mud in relation to that must also be considered.

Q.—You had to throw 2,000 yards of that hard clay per hour?

A.—Apart from mud?

Q.—Apart from mud.

A.—Then, as I have said before, you would want two dredgers to do it instead of one.

Q.—You could not have designed a cutter which would have cut 2,000 yards of that stuff an hour, could you?

A.—Well, I do not say I could not. I should think that probably the best thing is to cut with two dredgers at 2,000 yards an hour.

Q.—This clay was described, when it was originally bored, as being stiff and unctuous. I have never heard the expression before. I asked the chief engineer out there if, after his three or four years' experience of this clay, he could find me a better definition. He thought for some time and then said he could not. My own personal opinion is that I do not think I could find a better description of that clay after seeing the lot of it.

A.—Is *that* what you call stiff and unctuous?

Q.—Yes.

A.—Well, I should not.

Q.—Would you call it hard?

A.—I would call it hard.

Q.—That is unctuous when it is wet.

A.—If it is as hard as that when it is wet, that is a different story.

Q.—No, it is not.

A.—Then it is a different kind of clay.

Q.—No, it is the same.

A.—I could not judge of that clay in its present form, because it is dry.

Q.—Is not its weight a sufficient indication to you? You feel the weight of that, and tell me if you think it does not go about 16 feet to the ton?

A.—Supposing you take soft clay and let it dry, will not it be as heavy as that?

Q.—No, certainly not.

A.—I am not so sure. I have told you I am not an expert in clays.

Q.—You got a percentage of solid material on your trial of 39 to 41 per cent.?

A.—It was only what was scooped up from the tail end of the discharge pipe, and put into buckets. It was not any good.

Q.—It was not a fair test?

A.—No. I do not consider that is a fair test at all.

Q.—What would you think would be a fair dredgable quantity? On what do you base your calculations—what percentage?

A.—About 10 per cent., and this trial turned out from 25 to 31 per cent. of stuff——that is the cutting trial.

Q.—39 to 41 per cent. is what is given to us.

A.—That is misleading.

Q.—I think so too.

A.—I know exactly what happened. They got buckets, and every now and then they take the effluent, let the buckets settle and then measure.

Q.—It is not a fair test?

A.—No, it is not a fair test at all. I object to the test, but there it is.

Q.—The only fair test is to take the quantity actually removed from the bed of the sea, and divide it by the time?

A.—Yes.

Q.—You know what your pump will throw of water, and the mud or clay, or whatever it is, is a certain percentage of the total volume. That is the only fair way to take it?

A.—That is the only fair way to take it. If you know the velocity of the water and the amount you cut, you know then the percentage.

Q.—What velocity is the "Sir George Lloyd" designed to work at?

A.—About 15 feet a second.

Q.—That is very high, is it not?

A.—That is what she is running at.

Q.—The "Kalu" and "Jinga" only went at 12?

A.—I think I have expressed it here in figures. It is estimated what the head would be at 15 feet per second, and we obtained more than the head in the pump.

Q.—What do you reckon that pump would throw of water and solid matter at 15 feet per second—how many cubic yards?

A.—That is in this statement.

Q.—I wish you would find it for me?

A.—The percentage of spoil under those circumstances is 10·4. The speed is 15 feet per second, and that 10·4 is 2,000 cubic yards, so it would be round about 20,000 cubic yards.

Q.—That is an extraordinary quantity, is it not?

A.—Water and spoil.

Q.—It is an extraordinary quantity, is it not? I calculated it out at 700 feet per minute. That only comes to about 12,000 cubic yards an hour. You go faster than that, but that only gives 12,000 cubic yards an hour?

A.—It is only a matter of arithmetic. I am only guessing from the figures I have given. I will give you a corrected statement if you like.

Q.—I would like it, because to get your 2,000 yards an hour you must throw 20,000 yards of water and solid material, must you not?

A.—Yes.

Q.—It is a matter of arithmetic. We can calculate that at 15 feet per second?

A.—9·6 is the area of the pipe in square feet. 15 feet per second is 15 multiplied by 3,600, multiplied by 9·6 and divided by 27. I have not got the calculation here, but my assistant makes it 19,200.

Q.—That gives you your 10·4. You have got to do that to get 2,000 yards an hour?

A.—That is so.

Mr. Billimoria.—It has been suggested in India that, because of the unemployment in this country in about 1920, orders for dredgers to the tune of one million pounds were placed in this country. Have you any observations to make with regard to that?

A.—There are many evil suggestions made in India as well as elsewhere. I have nothing within my knowledge that those dredgers were ordered on account of the unemployment in this country—nothing whatever.

Q.—You can say that very definitely—that if for political reasons such a suggestion has been made it merely exists in the imagination of those who make it, and that it really is not a fact?

A.—As far as I know that is so.

Q.—Then can you tell us where was the hurry in placing this order for dredgers? The dredger arrived in Bombay and was lying in the harbour for over a year unemployed. Where was the hurry for placing the order?

A.—I do not know.

Q.—You know for a fact that the dredger was not used for over a year?

A.—I do.

Q.—You know that prices were very high in 1920 and that subsequently they came down considerably?

A.—I do.

Q.—If the order, therefore, had not been placed in that desperate hurry, a sum of money both in respect of principal and interest would have been saved?

A.—That I do not know.

Q.—The facts go by the figures?

A.—But you have only stated two of the facts. There may have been other facts which came into it which would have made the dredgers cost more; I do not know.

Q.—But the prices as a matter of fact did come down subsequently to 1920?

A.—That is so.

Q.—And if the order had been placed later on it is just possible you would have been able to secure much more favourable terms?

A.—That is so.

Q.—And if you had to pay a smaller amount you would have saved considerably both as regards principal and interest?

A.—I do not know about that.

Q.—That is a natural consequence. If you do not want to answer it, that naturally follows it.

A.—I do not know what consequences would have followed the dredger not being delivered at that time.

Q.—Is it usual to allow a commission of 1 per cent. to the naval architect? Is that the usual procedure?

A.—That is a fixed scale which has been agreed between the Secretary of State and the naval architect for the last 40 years.

Q.—Is it in connection with any order placed by the Government of India in this country that the naval architect comes in for his share of 1 per cent. commission?

A.—Not any order placed by the Secretary of State, but any order in which the naval architect is employed.

Q.—So you take a certain responsibility when you accept this 1 per cent. commission? What was your responsibility?

A.—I think I have defined that already. It was to see that the dredger was designed and built in accordance with the conditions laid down by the engineer to be fulfilled.

Q.—Were you responsible then for the specifications?

A.—Yes.

Q.—You designed a dredger for a material which you say has now proved not suitable for the dredger?

A.—I did not say so.

Q.—Well, it has been proved otherwise. If the dredger is not at fault, it is the material which is at fault?

A.—You say it is, yes.

Q.—Is it prudent for any business man, particularly for a gentleman of your experience, to place an order for one million pounds for an article which is not going to prove successful in the end?

A.—I suppose the obvious answer to that is that it is not prudent, but that is not what I did. I advised the Director of Stores to place an order which was to fulfil certain conditions and that order did fulfil those conditions. That is all I have to say.

Q.—So when you received a certain amount of remuneration in connection with the placing of the order, and seeing to its execution, did not you think it desirable to advise that you ought to be acquainted with more details about it before placing it?

A.—No.

Q.—It was not part of your duty?

A.—No, it was not part of my duty. I had sufficient information to carry out that order.

Q.—You merely relied upon whatever Sir George Buchanan suggested. Is that what it comes to?

A.—I did not interfere with Sir George Buchanan's judgment on these things. It was no part of my duty to review his works. I had definite instructions what to do, and I did it.

Q.—From whom?

A.—From the Director of Stores. I was to carry out the specification which was outlined in the report.

Q.—Why were you brought in at all? Sir George Buchanan could just as well have drawn up a specification, and gone to the builder and said, "Here you are, you prepare this." Where did you come in? What was your advice wanted for?

A.—The reason I was brought in was that the order was given by the Director of Stores, and the Director of Stores has to have someone to advise him that the order is carried out properly.

Q.—You simply looked to the building of the dredger, and nothing more?

A.—I looked to the building of the dredger and to the carrying out of what I was instructed to carry out.

Q.—Under what circumstances was Simons engaged on this job? There were other tenders invited. You have told us in the course of evidence this morning that none of those tenders were placed before you. You were not consulted. Why was Simons preferred in particular?

A.—You must ask somebody else that question; I do not know. That is what I was told to do.

Q.—Did you not enquire if there were any other tenders available, or otherwise, before placing the order?

A.—I did not.

Q.—Was it not part of your duty?

A.—No, it was not. I did not know that other tenders had been taken.

Q.—Did not you consider it prudent to call for tenders from other builders on the same specification to see whether you could get more favourable terms?

A.—My orders were to deal direct with Simons.

Q.—Who gave you those orders?

A.—The Director of Stores.

Q.—You did not enquire why Simons were to be preferred?

A.—I did not.

Q.—Either officially or unofficially?

A.—Either officially or unofficially. So far as I remember, I did not.

Q.—Do you thereby suggest that other tenders which were invited were more for a matter of show or formality than anything actually coming out of them?

A.—I do not suggest anything about it.

Q.—Do you consider that the test on the Clyde was absolutely sufficient—a two-hours' test on the Clyde, without knowing what material this dredger was going to pump in Bombay harbour?

A.—I have said so already.

Q.—You still adhere to that opinion?
A.—I do.

Q.—You know that the material in the Clyde is not the same as in Bombay?
A.—I do.

Q.—Do you not think it would have been desirable for you to have ascertained as to whether it was the same kind of material or different which this particular dredger was expected to pump?

A.—I was told the material which the dredger had to be designed to cut.

Q.—They did not submit to you any sample?
A.—They did not.

Q.—And you did not think it desirable to call for any sample?
A.—Not with an engineer giving me orders on that subject—certainly not.

Q.—You suggested that, in the event of a trial being given in Bombay harbour, the manufacturers would have called for a higher price. Do you not think it would have been desirable and prudent to have paid a better price and to have had the right sort of machine, than to have paid a lesser price and to have the whole scheme a failure?
A.—Of course, that is obvious now. You can say that now.

Q.—At the time it did not strike you?
A.—Do you think that I knew that the whole scheme was going to be a failure?

Q.—No, but is it not better to pay 10 per cent. or 20 per cent. more and be sure of your ground, and to know that it is going to pay you rather than pay something which, in the end, results in a terrible loss?
A.—Would you have been sure of your ground by paying 20 per cent. more?

Q.—We could have held somebody responsible for it if the dredger had failed.
A.—That would not have helped the scheme, would it?

Q.—To a very great extent, certainly. We could have got back the money from the builders of the dredgers. As it is, we have paid a million pounds and we are nowhere.
A.—Perhaps the builders would not have been able to have given you back a million pounds.

Mr. Billimoria.—That is another matter.

Chairman.—The builders would have said, " We bargained to cut soft clay."

Mr. Billimoria.—That would have been a different story.

Witness.—Could you have been sure to have got the builders to undertake that work?

Mr. Billimoria.—In certain other cases, as a matter of fact, manufacturers of machinery always give a guarantee that a certain quantity of output will be given.
A.—Do you know of any gun-maker who will guarantee that any man can knock down so many birds with his gun?

Q.—I do not know about a gun-maker, but I know about ordinary manufacturing concerns where that sort of guarantee is usually given?
A.—The guarantees are different under different circumstances, and the builders in my opinion would have been quite justified in refusing to undertake any such guarantee.

Q.—Was any attempt made in the direction of securing a guarantee of that nature?
A.—No, not that I know of.

Q.—Who is responsible for drawing up that contract specification—the printed document which has been read out?
A.—I am.

Q.—Do you think it is an exhaustive document drawn up in the usual course of business?
A.—It was exhaustive enough to build the vessel and see that she fulfilled the conditions laid down in the contract.

Q.—If she fails to fulfil those conditions, what are the remedies?
A.—She did not fail.

Q.—She has not been giving the output of 2,000 cubic yards an hour?
A.—She did not fail to fulfil the conditions laid down in that contract.

Q.—But that is what the actual result proves.
A.—No. The dredger has not failed at all. The dredging operations have not been as successful as somebody wanted them to be.

Q.—Dredging operations would mean what—the material or the labour employed?
A.—There is the material, and there are the people employed—all things which are independent of the construction of the dredger.

Q.—Have you any positive proof or information to substantiate the statement that it is not the fault of the dredger but is purely the fault of the men employed and the material there?

A.—You have the evidence given by several of your witnesses. I am only quoting from the evidence.

Q.—You are simply relying on what other people have stated?

A.—And also upon what I know myself.

Q.—You are absolutely positive that the dredger has not failed?

A.—I am.

Q.—And that if the material for which she was intended to be built had been there, she would have given the necessary output?

A.—She would.

Q.—Then anybody who gave you the instructions to get the specifications prepared for a particular class of material would be the person solely responsible for the failure?

A.—You must judge of that.

Q.—I want you, as an ordinary prudent business man with a vast experience, to answer that question?

A.—I am not going to answer it, if you will kindly excuse me.

Chairman.—I think Sir John is right. That is what we have to decide, and I doubt if we ought to take the opinion of any witness on the point.

Mr. Billimoria.—Then I will leave it at that. Where there are two or three shifts at work you do not expect to have the same output for every shift, do you? There would be a little break, and naturally the average would go down.

A.—I did not quite catch that.

Q.—If a dredger is working with two or three shifts, the output on the average would not be the same per hour?

A.—I do not know. The machine, if it is working, would give the same output. Whether the men could keep on making the machine do the work, I do not know

Q.—This dredger was intended to work for 15 hours. Would she have given 2,000 cubic yards an hour continuously for an average of 15 hours—that is, 30,000 cubic yards during the day?

A.—No, I do not suppose she would.

Q.—So anybody who based his calculations on such a theory or basis would be entirely wrong?

A.—You must judge again, please. I have already dealt with that question. The dredger might have got more. Some people say she could do 3,000 cubic yards per hour, and if she worked 15 hours and lost one-third of the time on 3,000 cubic yards per hour she would do 30,000.

Q.—In the course of your evidence you have suggested that the only remedy you can suggest is the doubling of the plant—to employ two dredgers instead of one in order to get the necessary output?

A.—I did not say it was the only remedy I could suggest.

Q.—It was one of the remedies?

A.—That is the only one I have suggested, and, as I said, I do not know that I am prepared to recommend that; but that is a way.

Mr. Billimoria.—A doubling of the plant means a doubling of the initial cost?

Chairman.—That will not meet with enthusiasm in Bombay.

A.—I expect not.

Sir Frederick Hopkinson.—Under the circumstances it is impracticable.

A.—It would not have been impracticable three years ago.

Mr. Billimoria.—Why does the question crop up now, when originally one dredger was expected to produce 2,000 cubic yards? Why is it now suggested that there should be a double plant? If she had given 500 cubic yards you would have suggested four plants instead of one. Is that what it comes to?

A.—The material has turned out to be such as it is, in which you can apparently only cut 1,000 cubic yards per hour.

Q.—The cost, both as regards the cost of the plant and of the working, would, therefore, double?

A.—No. You would not pay double now for a dredger.

Q.—Because prices have gone down?

A.—Yes.

Q.—And it would be proportionately less?

A.—Yes.

Q.—But the working costs would be double if two dredgers had to be worked?
A.—Yes, I suppose so.

Q.—And interest on the amount already spent and to be spent would have to be added to the cost?
A.—I suppose so.

Q.—Which would make the scheme, which at one time appeared to be profitable, a losing bargain?
A.—That I know nothing about.

Q.—This morning you suggested something about the "Colaba"—that she was built principally with the object of being able to be converted into a dredger. I could not quite catch exactly what you wanted to convey thereby. I thought you said that she had been built with the object that she could subsequently be converted into a dredger and be used as such instead of as a pontoon?
A.—I do not think I said she was built for that purpose, but I did say she could be converted from a booster to a dredger by fitting the cutter in front, and then her propelling engines would be of use to her.

Q.—Do you think, as she is built now, that she could be so converted?
A.—She could be used.

Q.—Is she long enough for it?
A.—She might have to be lengthened a little.

Q.—That would mean all material alterations?
A.—Of course.

Q.—And adding considerably to the cost of the plant?
A.—It depends on what you sold the plant for or what you valued it at at the time. You would have to spend money on the "Colaba" in order to make her into a cutter, of course.

Q.—I want to ask you one last question. I do not know whether you will be prepared to answer it or not. It is this: Is it the usual practice with builders to allow commission openly or secretly to an individual who places an order?
A.—I do not quite follow that.

Q.—Is it the practice, or is it usual, to allow any commission, openly or secretly to anyone who places an order, or anyone who favours a manufacturer or a builder with an order?
A.—As far as I know, it is not the practice.

Q.—Is it done in some cases?
A.—You must ask somebody else.

Q.—As far as your experience goes?
A.—No.

Q.—It is never done?
A.—I do not say it is never done. As far as my experience goes, I say no. I do not know whether you have anything in your mind with reference to me personally?

Q.—No. It is not in connection with you. I make that perfectly clear. I do not suggest anything against you, Sir John, but it has been suggested that there was a certain amount of hurry because somebody wanted to make some profit out of it.,
A.—I did not want to and I did not make any, and, as far as I am concerned, that ends the thing, does it not?*

Q.—You have made your position perfectly clear by telling us that you did not care to know what the other tenderers did actually offer, or what the tenders were, and why one particular firm of builders was preferred.
A.—No, I did not say that. I was told to go to that builder alone.

Q.—It was all cut and dried. You were simply asked to do a certain thing?
A.—I do not know what you mean by "cut and dried."

Q.—Everything pre-arranged.
A.—It was considered, under the circumstances, that the right thing to do was to go to Simons. That is all I can tell you. Under the circumstances, it was considered the right thing to do, and I carried out my instructions.

Sir Frederick Hopkinson.—We were talking just now about the speed of the dredging—the effluent, 15 feet per second. Since then I have had a word with the chief engineer in charge of the works out there, and he says that, with the engine going at its full normal contractual speed, they did not get more than 12 feet per second.
A.—How did he get that?

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* Sir J. Biles has asked that it should be made clear that the commission or profit here referred to is distinct from his official fees. The only money he made was the fees paid him by Government on the usual scale for work done.

Q.—The measurement was made by a Mr. Settle, who is now a partner of Sir George Buchanan, I believe.

A.—How did he do it?

Q.—He took it from the curve of the discharge.

A.—Well, if you get a certain pressure behind a mass of water, you can drive that at a velocity, and only one velocity, can you not? You have the friction of the pipe to take account of.

Q.—I would not say only one velocity. It depends what power you put behind it.

A.—I said a head—a certain pressure behind.

Q.—It is the usual practice, in measuring flow of velocity, to take the curve, is it not?

A.—The effluent curve, yes. That is one way.

Q.—If that is the case, and they never got above 12 feet a second, it destroys the whole of your figures about the 2,000 yards an hour, because it brings it down to about 1,200 yards an hour?

A.—What it would do would be to alter the percentage of spoil that went through the pipe. I do not admit these figures at all. We have measured these things on similar ships. I do not know the circumstances under which this 12 feet was measured.

Q.—If the engine is running at its designed speed, and you only get a discharge rate of 12 feet per second, it does away with your possible 2,000 cubic yards an hour?

A.—Why?

Q.—Because you cannot get it.

A.—What you have to do is to increase the percentage of spoil that goes in the pipe, and you get your 2,000 cubic yards. I have assumed 15 feet a second. I have assumed that 2,000 yards goes through. Then I find that percentage to be 10·4. If you say it is not 15 feet per second but only 12, and the 2,000 cubic yards go through, then the percentage of spoil is higher.

Q.—But you have told us that 10 per cent. would be a reasonable percentage to expect?

A.—You asked me what we used to work to.

Q.—10 per cent.?

A.—Yes.

Q.—If you had asked me, I should have said the same thing. Here we have a definite statement that the speed was 12 feet per second. At 10 per cent. you would not get anything like 2,000 yards an hour. You must have a larger percentage of solid matter?

A.—That is right.

Q.—And we do know that the results given show that the dredger was only doing half its stipulated output. Therefore, you could not have much more than 5 per cent.?

A.—That is so.

Q.—5 per cent. of solids?

A.—Yes. Therefore, there was not enough material going in the pipe. We do know that the cutter cut enough of the stuff on the Clyde to put through about 28 per cent.

Q.—It is no good you and I talking about the Clyde and Bombay. *That* is the clay which had to be cut there, and you designed a cutter to cut something entirely different. Therefore, there is something wrong somewhere, is there not?

A.—Something different.

Q.—There is something wrong from my point of view

A.—I do not know it is wrong from my point of view.

Q.—Of course, the dredger was designed for ordinary dredgermen to work. You did not expect to get supermen for it?

A.—No.

Q.—But only the best you could get?

A.—Yes.

Mr. Billimoria: Would the length of pipe line in any way interfere with the output of the dredgers?

A.—Of course. You were running in some cases up to 7,500 feet. You must have less output at 7,500 feet than at 5,000.

Q.—At the time the order was placed was not that particular point carefully considered—as to what length the pipe line was to be?

A.—Certainly. It was specified at 5,000 feet.

Q.—Was there any occasion to increase it? Had the circumstances so altered as to necessitate an increase in the pipe line?

A.—You must ask somebody else that. I do not know.

Q.—That would be one of the reasons for a smaller output?
A.—There would be a smaller output with that.

Chairman.—With what?

Mr. Billimoria : With a lengthened pipe line.

Chairman.—But as long as the pipe line was limited to 5,000 feet you would get your specified output, would you?
A.—That is so.

Q.—On the occasion when the " Sir George Lloyd " was working by herself she did, in fact, run up to something over 7,000 feet?
A.—That is so. Then the output would be less.

Q.—Then Mr. Billimoria's point would come in—that you would not expect the same output?
A.—That is so.

Q.—But the figures are very curious about that. In one or two instances you get quite a high output with 7,000.
A.—But you could not say that, if you had taken 2,000 feet off of that pipe, you would not have got a higher output at that time under those circumstances. You cannot say that putting on 2,000 feet of pipe has increased the output.

(*The Witness withdrew.*)

42nd Witness, Mr. William Lochiel Sapte Lovett Cameron, C.S.I., A.M.I.C.E.

WRITTEN STATEMENT.

Successive Governors of Bombay had been impressed with the opportunity offered for reclamation by the rocky foreshore on the West of Colaba. Committees had been appointed and reports prepared but no definite action had been taken. When Lord Lamington was Governor, however, further progress was made, soundings were taken and a rough scheme prepared under the control of the late Mr. W. H. White, Chief Engineer. When Lord Sydenham, then Sir George Clarke, became Governor further investigations were made, and, in reply to a question in the Legislative Council inquiring what Government proposed to do in connection with the reclamation, a long reply was published. Mr. White's soundings had been taken on the West side of Colaba, but Mr. W. Kidd, who had recently completed a contract on which he had been engaged, and who, hearing of the intentions of Government, had submitted proposals, said that extensive reclamation could be effected only with the aid of powerful suction dredgers combining the latest improvements. Such dredgers, he said, could not work efficiently or economically in the Bay owing to the deposit of sand being so shallow. He stated, however, that he believed that plenty of suitable material could be obtained on the harbour side. At his own expense he took some soundings and borings in the harbour, and he informed me that the result exceeded expectations. The quantity of harbour silt was small, and below it was a great depth of excellent, odourless blue clay. He believed that the quantity would be ample, but, naturally, he could not guarantee this until detailed surveys had been made. A rough preliminary estimate was made, and early in 1911, I think, a letter was sent to the Government of India giving the history of Back Bay from the time of the unfortunate " Share Mania," stating what the proposals of the Government were, and asking for administrative approval in the first instance.

When Mr. Kidd was invited by Government to make a complete survey and prepare a detailed scheme on the lines already laid down, that is for a reclamation of a little over 1,100 acres with an outline of pleasing curve, I was no longer in the Service, but my interest in the great scheme was unabated. I had many conversations with Mr. Kidd, and I was pleased, but not surprised, to learn that the detailed survey of the harbour had fully confirmed the information he had gathered from the original soundings. The quantity of material to be found within working distance of the shore was considerably more than that required for the whole reclamation. But he repeated what he had said before, viz., that the dredger would have to be specially designed to do the work required of it. The dredging chart would, of course, have to be carefully prepared before work was started, and it was imperative that it should be rigidly adhered to if confusion was to be avoided.

Had I still been in Service and had I been responsible for the final estimates I should not have had the slightest hesitation in accepting Mr. Kidd's survey and soundings as correct. There would be two reasons for this. In the first place I know Mr. Kidd to be most cautious and careful, and one who would never make any statement

unless he could by personal observation vouch for its accuracy. In the second place his pecuniary interests were inovlved. It appeared certain at the time that when the undertaking was sanctioned its execution would be entrusted to him, and then, if events proved that his calculations were faulty and that the estimated cost would be increased owing to the dredger having to move further into the harbour than intended, he would, under the arrangement that had been made with him, suffer considerable pecuniary loss. This knowledge would have instilled caution even into one who was not habitually careful and cautious.

In conclusion I should like to say a few words on the finance of the original scheme. At an early stage it became apparent that the reclamation could not be financed if the actual work was done in the cheapest way; that is to say, if it was pushed on vigorously and completed in some seven years. The area of land that could be taken up annually for building purposes was comparatively small, and an enormous area would for a long series of years have lain infructuous, and the capital at charge would have mounted up at ruinous speed. At the time, i.e., in 1910-11, the Government of India could borrow at the low rate of 3¾ per cent. but even at that low rate of interest, Rs. 100 would in 60 years have amounted to no less than Rs. 910. It is clear therefore that the important factor was not so much the initial cost of the work as the increasingly rapid growth of the capital at charge. Lord Sydenham, it is hardly necessary to state, appreciated immediately the importance of compound interest and of a low rate of interest, and he approved without hesitation of trial estimates being made of the cost and the financial result of doing the work in sections. The advantages of doing the work in this way would be considerable. The area reclaimed would never have been hopelessly in advance of the demand; the experience gained in completing the first section would have been invaluable; and Government would have held control of future operations, deciding when to start the next section and whether the rate of progress should be accelerated or retarded. Apart from the necessarily increased cost, the only disadvantage, as far as I could see, would have been that the expensive plant, if not disposed of, would have lain idle for some years, and provision would have had to be made to meet the interest on its cost and the maintenance charges of all kinds. The financial results of one trial scheme of sectional working based on figures of cost supplied by Mr. Kidd was worked out before I left India, and it showed that the reclamation not only would be a beautiful addition to a beautiful City, but also could be made highly remunerative. The assumptions made in preparing the financial forecast were (1), that on the average 60,000 square yards would be taken up annually, and (2), that the letting rate would be that based on a value of Rs. 25 per square yard. The figure of 60,000 square yards per annum had appeared in Mr. White's scheme, and it was adopted tentatively, as there was no reason to alter it. On this point, however, Lord Sydenham's Government hoped to obtain guidance from public opinion. But public opinion was silent, and eventually Government appointed a Committee of prominent Bombay citizens to advise them. The Committee reported that the Government estimate was not unduly optimistic and therefore the figure remained. The price of Rs. 25 a square yard on what would have been a magnificent site I considered low. After my retirement other tentative schemes were prepared, but of them I am not in a position to speak.

Oral Evidence.

Chairman.—Were you Secretary to the Government of Bombay Public Works Department and Chief Engineer during the years 1906 to 1911?

A.—I was.

Q.—Did the Public Works Department take any borings whatever of the harbour during that period?

A.—Yes. Mr. White, who was the Chief Engineer before me, took borings—or rather, he ordered borings and soundings to be taken. They were in the Back Bay.

Q.—That was not my question. My question referred to the harbour.

A.—I beg your pardon. No, none.

Q.—Were you in office at the time Mr. Kidd made his report?

A.—In 1910-11, yes, I was.

Q.—When he made his report?

A.—Not his final report. He made a report in 1912. While the project was going on I was in the office.

Q.—Were you present at any time when Mr. Kidd took any borings?

A.—No. In my time only a preliminary estimate was made. No detailed borings were made until afterwards when the Government invited Mr. Kidd to go out.

Q.—There was a preliminary estimate made, and then I think Mr. Kidd suggested that for 75,000 rupees, plus 87,500, he would give a full report. You remember that?

A.—I do not know the figures. That was the case. That was just after my retirement.

Q.—The report came after your retirement?

A.—The call on him to make the detailed survey came just after my retirement.

Q.—Therefore, so far as the sufficiency or accuracy of any of Mr. Kidd's borings are concerned, you are quite unable to give any information whatever?

A.—Quite.

Sir M. Visvesvaraya.—Did Mr. Kidd utilise any of the surveys which had been previously made by the Public Works Department officers?

A.—No, because I think the previous soundings had been taken on the West of Colaba, that is in Back Bay and round by Malabar Point. Mr. White had not gone into the harbour itself. The actual area of reclamation had to be re-surveyed for the outline adopted in my time was entirely different from that in the original proposal. The detailed survey for this was undertaker by Mr. Kidd.

Q.—No soundings were taken in the harbour by the P.W.D. officers?

A.—Not that I remember—certainly not by me, and I do not think by Mr. White.

Q.—The filling of the reclamation area—the depths to be filled—was ascertained on surveys made by the P.W.D.?

A.—The depths to be filled where? Do you mean in the reclamation area?

Q.—Yes, in the reclamation area?

A.—The quantity of filling was ascertained by surveys, but soundings were made on the west by Mr. White. There was not enough material in the Bay, so they went outside Malabar Point, and round there, taking soundings.

Q.—Was not the Basin Survey made by you—I mean the 1,100 acres. Were not the soundings taken there by the P.W.D.?

A.—The quantity of filling required for the reclamation was ascertained by surveys carried out under Mr. White, but the soundings in the harbour to ascertain the quantity of material available there were taken by Mr. Kidd. In my time all that we could do was to make a preliminary estimate. We wanted to get administrative approval only. We only wanted to show that the scheme was feasible and that, if carried out according to the rough lines which were laid down, it would be remunerative. We merely wanted administrative approval. On getting administrative approval from the Government of India, then we would have worked on the ordinary lines of the P.W.D. and would have worked out detailed schemes.

Q.—But for your preliminary information you had to take soundings at the Basin?

A.—The figures of filling had been calculated from Mr. White's rough survey, but new surveys had to be made owing to change of outline, and they were carried out by Mr. Kidd.

Q.—Was not Mr. Kenball doing some of the surveys?

A.—Not in my time. I do not know if he did afterwards. He succeeded me as Chief Engineer.

Q.—From your experience of the area there, could not the filling have been made by murum or earth at a reasonable cost?

A.—I never considered the question at all, because it seemed to me that, for a huge area like that of 1,100 acres, it would have been perfectly hopeless to do the work by the spadeful. In my opinion, you had to go in for the thing on a comprehensive scale, and to do the work with modern appliances.

Q.—The estimate in your time was about 325 lakhs?

A.—Yes, for works.

Q.—For 325 lakhs it would have paid to have purchased dredgers and to have worked them by scientific methods?

A.—That was the arrangement.

Q.—But if the cost went up to 702 lakhs, would you have still adhered to your dredging proposition?

A.—One would have to consider trial estimates and to see what the cost would be, and what the returns would be—whether the revenue would come up to, or exceed, the expenses, including interest and all the various charges.

Q.—These questions did not arise in your time?

A.—No.

Q.—You thought it cheaper to do the work by dredged filling.

A.—Yes.

Chairman.—What work?

A.—The reclamation—the filling.

Q.—What reclamation?

A.—On the Back Bay—that sweep which there is on the Back Bay.

Sir M. Visvesvaraya.—What was the rate per hundred cubic feet in your time, roughly, for murum filling?

A.—A little over 2 rupees for a hundred cubic feet.

Q.—That means about 12 annas a cubic yard?

A.—Yes.

Q.—Mr. Kidd promised about 8 annas per cubic yard in his estimate. We have it here.

A.—It was rather less than that—the first one. They kept on varying. We had a large scheme and then a smaller scheme, and the smaller you made the scheme the more expensive it became per cubic yard.

Q.—If you are told now that the total cost would be about 460 lakhs—dredgers, working expenses, and everything—in order to do the reclamation by dredger, which would you prefer?

A.—If I could get murum, in every way I would prefer murum filling at a reasonable cost. With regard to the other, I should try to work it out by taking the costs, interest, depreciation, and all those things, and then compare one set of figures with the other. If I went in for murum filling, the plant required would be merely a few thousand wagons and nothing more; whereas with the other, I should have to have very expensive plant. The dredging plant would be very expensive. The interest charges on that would keep going on. All those things I would have to consider. It would be perfectly impossible for me to say that one system would be cheaper than the other until I made the actual calculations and saw what the result was.

Q.—In your time it was about 12 annas per cubic yard?

A.—Yes.

Q.—Now it is much more. It is about 1 rupee 4 annas per cubic yard murum filling because prices have gone up. If you knew that, in order to complete the reclamation, it would cost about 1 rupee 8 annas per cubic yard or more than that by dredging, you would certainly have preferred murum?

A.—In every way I prefer murum as a material, and if it was not going to cost more than the other, I should certainly go in for murum, but I do not know which would cost the more.

Q.—At present you may take it that the estimate comes to about 460 lakhs for dredging about 28 million cubic yards. You would certainly consider that a very expensive proposition?

A.—Certainly.

Q.—That is without taking interest and depreciation into account. They have opened a new Development Department in order to carry out this work, along with other development works, have they not?

A.—Yes.

Q.—Do you think it was safe to have entrusted the work to a new agency, when Government had their own Public Works Department?

A.—It would be difficult for me to speak on that matter. I was the head of the Public Works Department, and I should have preferred to carry on the work ourselves; and we should have been able to do it.

Q.—Could not you have supplied two or three engineers who could have done the work under the advice of a consulting engineer?

A.—Yes.

Chairman.—When did you leave India?

A.—1911.

Q.—We are now talking about 1920. The Development Directorate was created in 1920. It is rather a difficult question for you to answer, is it not? You were asked whether, you, having left India in 1911, the Government were wise in 1920 in creating the Development Directorate and whether you could not have found engineers capable of doing this gigantic task?

A.—I thought the question was if the point had arisen in my time.

Sir M. Visvesvaraya.—If the question had arisen in your time would you have done it through the Public Works Department or have started a separate department?

A.—I would have done it through the Public Works Department, but with proper expert advice, because we realised very fully that there is nothing more expensive—I might say ruinous—than amateur engineering.

Chairman.—And the Public Works Department would want the assistance of proper marine experts?

A.—Undoubtedly.

Chairman.—And not indulge in amateur engineering.

Sir M. Visvesvaraya.—The engineering side of it, apart from the reclamation point of view, is very simple, is it not? You have a sea wall and earth filling?

A.—The civil engineering part is very simple.

Q.—The hugeness of the scheme depends upon earth filling practically?

A.—Yes.

Q.—Apart from a few technical details which have to be taken from consulting engineers, the rest is all a plain engineering proposition?

A.—Yes.

Q.—The Sukkur Barrage work is being done on the same lines now, is it not?

A.—I do not know.

Q.—In any properly established department you have permanent officials who remind you about the various processes—accounts matters and technical matters. There are subordinate officers who remind the head of the department about these things?

A.—You mean carrying out ordinary works?

Q.—Yes.

A.—We have accounts, and we have a register of works showing how the work is proceeding month by month. We have everything like that.

Q.—In an old established department all these things must and will go through properly, but in a new department they are liable to be omitted?

A.—There is a danger of that.

Q.—And there has been that danger in this case?

A.—Has there?

Q.—Have you any remarks to make about the methods of construction? They commenced constructing the sea wall from both ends. Would you have tried to do so from your knowledge of the position?

A.—When I went into the question of that awful compound interest, I saw it was perfectly hopeless to do the thing in the cheapest way. It was absolutely necessary to keep the reclamation not too far ahead of the demand. What we had to do was to cut the reclamation into sections and do a piece at a time. When you do one piece you can so arrange it as not to go too much ahead. You then get invaluable information, and Government would have the whole thing under constant control. With regard to that expensive sea wall, you would merely make the little piece that was required; you would make your blocks for the section, and when you carried on again those blocks could be used for another piece of wall, and you would make your line up and put other blocks against them. That seemed to me the only way in which I, at all events, could make the works feasible.

Q.—Otherwise it gets beyond control, as it has happened in the present case?

A.—It would with me.

Q.—What are your views on the financial position of such works generally?

A.—Approximately what I have put down in my note—that you must take into consideration the cost of doing the work year by year; the interest you have to pay on it; the sum you have to borrow the next year for doing the work and for paying the interest on the former work, and so you go on. In that way, with the schemes I was connected with, I certainly found that the compound interest mounted up to such an enormous sum that the cost of reclamation became, I will not say trifling, but it was small compared with that awful incubus of compound interest.

Q.—That was the reason why you were very anxious in those days to push on with the scheme?

A.—Certainly.

Mr. Billimoria.—Would the murum filling have been as expeditious as dredger filling?

A.—I should imagine not. I have had no actual experience, but I certainly think not, because, as I say, the murum filling would be done by the spadeful, and when you have an enormous area like 1,100 acres to fill in I think the only possible way of doing it is to get this enormous mass of material being passed in through these huge pipes coming across the island and delivering the clay on the other side.

Sir M. Visvesvaraya.—The question of cost comes in now. If it costs you less to do it by murum than by dredging, would you not recommend murum?

A.—I would.

Q.—You may be aware that they are doubling the lines on the G.I.P. and the B.B.C.I. They are working by electric power partly. Could not you get murum from both sides and get the quantity you would require?

A.—You would only get it in by the trainload, and when you have a huge area like that a trainload is a small thing.

Q.—We have calculated all that. Sir Frederick and I went to the Agents there and made enquiries, and we found it was quite possible to get the material as fast or faster than you would do it by dredging. There is one advantage in murum filling, namely, that you can reclaim land speedily, and will be in a position to dispose of it gradually. Both operations may go on side by side.

A.—When you are doing the work by murum filling, you can do the work to-day and sell it to-morrow.

Q.—So that your capital is not locked up?

A.—Quite so.

Q.—There is an enormous advantage in the saving of interest; the work comes out eventually cheaper, and as and when the demand comes you can dispose of the land and go ahead with the reclamation?

A.—I should say, if the reclamation becomes cheaper, that is a matter which can be calculated very easily. It is merely a matter of figures.

May I make one remark before I withdraw, Sir. In my note I said that the dredgers could not work efficiently in the sand of the Back Bay owing to the deposit of sand being so shallow. There was another reason which came into that. It is very exposed to the south-west monsoon, and the dredgers would have become very much knocked about. In fact, we could not have done the work in a monsoon. The other point I want to emphasise is this. In my note I said that we endeavoured to get public opinion expressed on this, and that public opinion was silent. I should like to say that Lord Sydenham, who was Governor of Bombay, was exceedingly anxious to have public opinion focussed on this great question. He did everything that a Governor could possibly do to get an expression of opinion.

Chairman.—What year are you speaking of?

A.—1910-11.

(The Witness withdrew.)

The Committee assembled at 11 a.m. on Thursday, the 30th September, 1926, all the Members being present.

43rd Witness, Sir Sydney D'Aguilar Crookshank, K.C.M.G., C.B., C.I.E., D.S.O., M.V.O., A.I.C.E.

Called and examined.

Witness.—You must understand that my connection dates back to the period between 1919 and 1923, so that I am speaking almost entirely from memory.

Chairman.—I quite understand that. I think your full name is Sydney D'Aguilar Crookshank?

A.—Yes.

Q.—You were Secretary to the Government of India Public Works Department at the time when you wrote your memorandum of November, 1919?

A.—That is correct. After the war I went back to India and was appointed Secretary in the P.W.D.

Q.—Sir Claude Hill was the Member in Charge?

A.—Yes, at that time.

Q.—It might be convenient for you to have your memorandum in front of you. *(Same handed to the Witness.)* You wrote this memorandum in the ordinary course of your office work and it would be circulated throughout the office?

A.—Throughout the Government of India Offices.

Q.—That was in relation to the reclamation scheme which at that moment was a great concern of the Government of Bombay?

A.—Yes.

Q.—This memorandum begins: "Public Works Department. It is a great pity that this Back Bay reclamation work should not have been taken in hand earlier as the value of the scheme for building purposes in the town of Bombay, and as a profitable financial undertaking, is immense and growing day by day." As regards building purposes the only relief that that reclamation would give would have been in the business area—at least the only direct relief?

A.—And the residential area.

Q.—The business and residential area?

A.—Yes, because at that time land was being sold in Bombay at a colossal rate. I remember that particularly because the Government of India had cause to make inquiries in connection with sites for certain houses they wished to erect. If my memory serves me aright the cost of those sites was so high that we had to give up all idea of providing residences for the officers we wished to see housed.

Q.—The advantage to the poorer classes of Bombay would have been from the profit which was expected to be derived?

A.—Yes, very largely. I presume the cost of land would have gone down generally as a result of the reclamation works and there would not have been the same acute situation as existed at that time.

Q.—The point I rather wanted to put to you was this. There was a criticism in the Legislative Council that this scheme was for the benefit of the classes as opposed to the benefit of the masses. The answer that was given was that the resulting profit could be used in any way for the amelioration of the poorer classes. That is not unreasonable?

A.—That is what I understood the situation to be. It was for the benefit of all. It was not for the benefit of the few rich people who might purchase sites in the reclamation area.

Q.—You continue: "No time should be lost in getting down to business. There is really only one scheme, which is that drawn up by Messrs. Lowther, Kidd & Company in 1912 and estimated to cost 325·23 lakhs." Taking the rupee at 1s. 6d, 325 lakhs represent £2,437,000. You may accept that from me?

A.—Yes.

Q.—"I consider this to have been a very carefully and ably prepared project, although there are points in it which call for reconsideration." That is a reference to what has been called the Kidd Report?

A.—Yes.

Q.—Had you any previous experience of reclamation upon an open sea front?

A.—None whatever.

Q.—Did you examine Mr. Kidd's figures given at page 9 of the Report?

A.—I examined the whole estimate very carefully indeed from such general experience as I had had, and the somewhat exceptional experience I had had in France as Director General of Transportation to the British Expeditionary Force where I had occasion to do a good deal of work in connection with the construction of docks, and my opinion was that this was an extremely good estimate. As I mentioned there, I had no occasion to criticise it, except in a few minor details which I am not prepared to go into now.

Q.—Do you think if that document had been submitted to half a dozen of the most eminent contractors in the world that they would have been able to tender upon it?

A.—I do.

Q.—"As regards the estimate, I have no occasion to pass any remarks upon it, and I do not attach any value to Sir George Buchanan's comparative estimate of 241·9 lakhs. It is useless to frame estimates now on might-have-been conditions in 1912 and, anyway, both these estimates are out of date." This memorandum of yours is being written on the 28th November, 1919?

A.—Yes.

Q.—The prices of materials such as were required here had risen, had they not, between 1912 and 1919 by three times?

A.—I would not say exactly that, but they had risen very largely, and that is what I base my remarks on.

Q.—We have got some figures here. Had they risen at least twice?

A.—Yes, to my knowledge they certainly had.

Q.—"Sir George now submits a revised estimate amounting to 367·6 lakhs." That is £2,760,000. Did you consider that the figure of Mr. Kidd as at 1912 was a reasonable one, 325 lakhs?

A.—I did.

Q.—Did it occur to you, therefore, that Sir George Buchanan's figure of 367 lakhs must have been far too low?

A.—I think you will find later on I suggest that some more should be added to it.

Q.—You do; you suggest 20 lakhs.

A.—I think it is a little more but I am not quite certain.

Q.—To be very precise it is 33 lakhs. You suggest bringing it up to 400 lakhs?

A.—Yes.

Q.—For loan purposes. But if the figure of 325 lakhs was a fair figure in 1912 the work could not possibly have been done in 1919 for less than 650 lakhs, could it?

A.—Well, the rise which you refer to was mainly on machinery.

Q.—Was not it on cement as well?

A.—Yes, but not on ordinary coolie work.

Q.—Rates of labour?

A.—I do not think the rise would have been as much as that during that period—at least that is the impression I gained.

Q.—We have the rise in the rates of labour and you may take it that coolie labour rose about 100 per cent. between 1912 and 1919?

A.—Yes.

Q.—And materials, you say, were at least twice as much?

A.—That is what I should reckon.

Q.—My suggestion to you is that they were three to four times as much?

A.—Yes.

Q.—I will put the question to you once again. If as you have told us you thought that 325 lakhs, that is £2,437,000, was a reasonable estimate of Mr. Kidd, how could Sir George Buchanan have done the work for anything less than 650 lakhs, or £5,000,000?

A.—Well, on the face of multiplying by 2 in one case and by 3 or more in another he could not.

Q.—I have only multiplied by 2. I have taken your own figure. Twice 325 is 650. How could Sir George Buchanan have done the work for anything less than 650 lakhs, roughly £5,000,000. He could not, could he?

A.—I can only say in reply to that that I went into his figures with him. He, of course, criticised Messrs. Kidd's figures for dredging and said they were excessive. On going through it with him, I came to the conclusion that this estimate of his of 367 lakhs, plus what I had added on myself, would be sufficient to work on.

Q.—Then you thought, on the 28th November, 1919, that the whole of the work as specified by Kidd could have been done for 400 lakhs?

A.—That is the view I held then as a result of going into the figures of Kidd's estimate and Buchanan's estimate.

Q.—That is £3,000,000?

A.—Yes.

Q. Had you seen Sir George Buchanan's report at this date. Sir George Buchanan's report is dated September, 1919, and was undoubtedly in the hands of Government in October, 1919. Had you seen his report?

A.—I imagine I had. I had it before me.

Q.—If you had been in consultation with him, it would be the basis of your discussion, would it not?

A.—Yes.

Q.—In contrasting the two, that is, the estimate of Mr. Kidd and of Sir George Buchanan, you point out: "The estimate differs from that of 1912 in that it provides for a heavier section of sea wall throughout the greater part of the whole length, on which point I am in entire agreement." One object of the sea wall was to retain whatever was pumped into the reclamation area, was it not?

A.—Yes.

Q.—Are you aware that some 46 per cent. of the material appears to have escaped through the sea wall?

A.—I am not up to date in the matter in any way. I did not suppose that it would, because I presumed that they would construct the wall in such a way that it did not.

Q.—But in all these matters you must have been to a very large extent in Sir George Buchanan's hands?

A.—In that I had no personal experience on a large scale of any work of that nature, I admit that I was.

Q.—You do make a suggestion with regard to the dredger in which you say: "I cannot pronounce on the design or cost of the proposed dredger, and I am not in a position to question Messrs. Simons' merit and the figures. In a case of this sort I should prefer, before coming to a decision, to refer to Sir Alexander Gibb and also perhaps to Sir Ernest Moir and Sir Brodie Henderson in a consulting capacity." You will not object if I say that that was a very prudent suggestion. Your view, I take it, was that in a work of this magnitude you wanted some checks and some counter checks?

A.—If I had had the execution of the work in my own hands I would not have attempted it without getting opinions from specialists such as I have named.

Q.—Sir George Buchanan had put forward Messrs. Simons as builders of a dredger to a certain design?

A.—That was the position at the date of the interview, yes.

Q.—Were you unacquainted with rotary cutter suction dredgers?

A.—I was.

Q.—Whatever may have been the eminence and position of Sir George Buchanan and the eminence and position of Messrs. Simons, you thought it prudent to have the advice of one or more specialists in the matter?

A.—I went further than that. I was not prepared to accept their opinions as final.

Q.—Would this note of yours have gone to the Government of Bombay?

A.—No.

Q.—It would not.

A.—No.

Q.—" The engineering features are by no means difficult or doubtful." You had to accept that, of course, from Sir George Buchanan?

A.—Yes, together with such general experience as I had myself.

Q.—" And the whole project really hinges on the efficiency of the dredger." Did it?

A.—Well, in my opinion it hinged on the success or failure of the dredger, as far as one could see from the two reports which I had before be at the time—apart from the organisation and administration.

Q.—Were you aware that Sir George Buchanan was proposing to dredge 30,000,000 cubic yards of material that was the property of the Port Trust?

A.—That is a point I am afraid I did not take into consideration. I had Messrs. Kidd's statement before me that there was plenty of material there, as taken from their borings, of which they took 1,000 or so, and I had to go, as Secretary, on the fact that an examination had been made locally and the necessary inquiries instituted and whatever arrangements were required had or would be made.

Q.—The first essential was to obtain the permission of the Port Trust, in whom the bed of the ocean was vested by Statute?

A.—Yes. You understand that was rather outside my scope and activities as Technical Secretary.

Q.—Let us come back to this report again: " The whole project really hinges on the efficiency of the dredger." Did not the whole project really hinge upon the question whether there was enough material in quantity and quality to provide spoil for the filling in?

A.—Well, that would be wrapped up in the efficiency of the dredger as a whole.

Q.—Surely not. Surely they are quite distinct?

A.—Well, in a way.

Q.—However efficient a dredger is, it cannot dredge unless it has got material to dredge?

A.—No, but then I had to take it more or less for granted that the material was there and available.

Q.—Did you really have to take it for granted. You were advising the Government of India, were you not?

A.—Yes.

Q.—Did you notice a very significant phrase in Mr. Kidd's report on this? Would you just turn to page 2, paragraph 6, of his report. " A system of borings by hydraulic tubes was devised." Does not that strike you as a very singular phrase?

A.—You mean as throwing some doubt?

Q.—As suggesting that Mr. Kidd improvised some appliance, which I agree he says was successful, to ascertain the depth of the material forming the bed of the sea?

A.—Yes.

Q.—It is a very curious phrase, is it not?

A.—It is, but then he goes on to say that he made so many borings and they had all been sunk to a hard bottom.

Q.—He goes on to say, " which proved to be perfectly reliable as well as rapid in action "?

A.—Yes.

Q.—In November, 1919, were you familiar with the ordinary method of ascertaining what lies below the bed of the sea?

A.—No.

Q.—But I suppose you know that at a depth such as 35 feet of water it is just as simple to ascertain what is the nature and extent of the material at the bed of the sea as it is to ascertain it on dry land?

A.—Yes, but I wish to explain that I looked upon it in this way. I had before me a statement from Messrs. Kidd, whose report I considered to be of immense value. I considered that that statement had only been made after suitable investigation and presumably after consultation with the local harbour authorities, and that, therefore, as far as the material required was concerned, it was good enough to go on. Thereafter I stated in that note that the project hinged on the dredger. I had in my mind in making the statement first of all the efficiency of the dredger as a mechanical appliance, and, secondly, that before any work was undertaken or the dredger had been provided, a guarantee would have been obtained that this material was available and would be produced by the dredger and the pumps.

Q.—But where in your memorandum is there any suggestion that a guarantee would be obtained as to the sufficiency of the material?

A.—That would go with the efficiency of the dredger.

Q.—I am endeavouring to point out to you that the efficiency of the dredger is a totally different thing from the existence of material. Do not you agree?

A.—Well, it does and it does not, if you look at it from my point of view. My point of view is, that if you are placing an order for a dredger you would get a guarantee through the suppliers of the dredger that it was thoroughly reliable and efficient, and probably you would make them work it for about a year to see that it was. Therefore, it would be up to them to send representatives out and make necessary investigations on the spot before they gave this guarantee. As engineer in charge, that is the way I would have done it.

Q.—But, surely, you are not suggesting that Messrs. Simons would give any guarantee as to what the bed of the sea consisted of?

A.—I consider that before an order was placed with them or any other firm of dredger builders some guarantee should have been given that they themselves had satisfied themselves that the stuff was there, and that their dredger would carry out the job.

Q.—That a dredger-building firm on the Clyde should go to Bombay and take core borings or shell-auger borings to ascertain that their dredger would do the work?

A.—They certainly ought to have sent a representative to Bombay.

Q.—Surely, not. Is not it the duty of the man who is going to undertake the reclamation scheme to satisfy himself, first of all, that there exists in that harbour sufficient material to be placed in the reclamation? Is it not the duty of Sir George Buchanan and not that of the dredger builders?

A.—I consider it the duty of Sir George Buchanan, but I also consider it the duty of the dredger people to make sure before they supply the dredger that all the conditions are favourable.

Q.—What happened was that Messrs. Simons were told that a rotary cutter suction dredger was wanted to cut soft clay at a rate of 2,000 cubic yards per hour.

A.—Yes.

Q.—And on that they built their dredger?

A.—Yes.

Q.—But, surely, you cannot suggest that they were under any duty to go to Bombay to ascertain if the stuff was there?

A.—Not as you put it now; but if they had been required to give a guarantee, I think in their own interests they would have sent somebody out to find out what the conditions were. They could not have given a guarantee without satisfying themselves on that point, could they?

Q.—Not if the guarantee were to dredge 2,000 cubic yards an hour in Bombay harbour. But that was not the bargain. The bargain was a dredger capable of dredging 2,000 cubic yards of soft clay per hour, trials on the Clyde. That was the bargain.

A.—In that case they had no occasion to take any further interest in what happened at Bombay.

Q.—Exactly; and, therefore, the sole responsibility for the existence or non-existence of dredgeable material in 1919 rested on those undertaking the reclamation?

A.—Exactly; based on Messrs. Lowther and Kidd's report that the material was there.

Q.—I agree. Did you have any conversation with Sir George Buchanan as to whether he was quite certain about the quality and quantity of the dredgeable material?

A.—That I cannot remember; but, generally speaking, I have carried away the opinion that the local conditions were favourable.

Q.—At paragraph 4 of your Report you say: "I understand that Sir George Buchanan, on behalf of his firm, offers to undertake his supervision at 2 per cent. on

the expenditure. I do not recommend the acceptance of this proposal." In point of fact, that proposal was eventually accepted?

A.—Yes.

Q.—But you had advised against it?

A.—Yes.

Q.—" And I consider that the work should be wholly done by the Bombay Government, and a special staff should be entertained." I do not quite know what that means. " Entertained," probably, is not the word?

A.—It is probably " appointed."

Q.—" A special staff should be appointed for the purpose, at the head of which I have in mind a docks' engineer who, by reason of his ability and experience, stands out prominently for selection." Then you made a suggestion that a certain very eminent gentleman should be put at the head of the whole matter?

A.—Yes.

Q.—" And that with the assistance of selected Public Works Department engineers and subordinates the whole project may be safely placed in his hands to be carried out "?

A.—Yes.

Q.—That was not accepted?

A.—Well, you will see that, arising out of my note, both my recommendations were not taken into consideration.

Q.—The firm of Messrs. Meik and Buchanan was appointed as the actually responsible engineers to the work, but at this date, the 28th November, 1919, you were dealing with Sir George Buchanan alone?

A.—That is right.

Q.—Now I come to another point. I want you to take in your hand the document called " History of the Scheme," and I am referring to page 9, line 14. The point is this: We are a little in doubt as to the manner in which Sir George Buchanan was employed and as to the original arrangement to employ him. You see there it says: " A telegram was sent by this Government." " This Government " means the Bombay Government, so that that should read: " A telegram was sent by the Government of Bombay to the Secretary of State on the 26th May, 1919." I need not read all that. There is a reference to the difficulty of getting Mr. Palmer. Mr. Palmer was a gentleman in the firm of Palmer, Rendall and Tritton: " My Government . . . . in view of the difficulty of getting Palmer out before October decided to employ Buchanan, who is at present engaged upon the work, and will probably, after concluding a preliminary investigation, proceed home to make further enquiries regarding dredging plant and material." That telegram was dated the 26th May, 1919. That is some five or six months before your note of November?

A.—Yes; I was in France at the time.

Q.—Do you happen to know whether the Government of Bombay had consulted the Government of India as to whether Sir George Buchanan should be employed?

A.—No.

Q.—You see how it reads?

A.—They had apparently made up their minds at that early stage.

Q.—It reads as an accomplished fact, does not it?

A.—Yes.

Q.—" My Government decided to employ Buchanan, who is at present engaged upon the work." Therefore, the decision to employ him was antecedent to the 26th May, 1919, the date of the telegram?

A.—Yes.

Q.—You cannot help us at all as to whether the Government of Bombay had any communication with the Government of India saying that they proposed to employ Sir George Buchanan, and enquiring if he would be acceptable to them?

A.—No; I have no information as to that. I can only surmise that Sir Claude Hill, who was my principal at the time, and was himself a Bombay official, was in constant communication with the Government of Bombay, as he was very interested in this project; and he may, if he did not suggest the employment of Sir George Buchanan, have known that he would be consulted and employed, or, at any rate, consulted. At the time I was Secretary, P.W.D., Sir Claude Hill himself, I remember, went down to Bombay and went into the matter of this project with Sir George Lloyd.

Q.—Was Sir Claude Hill in any sense an engineering expert?

A.—No; but he obviously had been in communication with the Government of Bombay about their ideas and proposals in the matter.

Q.—Undoubtedly.

A.—That is before I came on the scene.

Q.—As to the interview in November, that would be at Delhi, the interview of the 28th November?

A.—Yes; that would be in Delhi.

Q.—At this interview with Sir George Buchanan, and before you wrote your memorandum, did you have anybody else there in consultation with you—any Public Works Department official?

A.—No.

Q.—Or any engineering expert?

A.—No. If my memory serves me aright, Sir George Buchanan came up to Simla very shortly after I took up my appointment, and I talked it over with him before the Government of India went down to Delhi.

Q.—Simla would be in the summer time. What time was it?

A.—No; that was quite late in October.

Q.—Just before you would go down?

A.—Just before I wrote that note, I think. There is one point I would like to make clear, and that is in connection with the design and ordering of this dredger. I personally withdrew all responsibility.

Q.—It is quite obvious that that is so, because you say: "I cannot pronounce on the design or cost of the proposed dredger, and I am not in a position to question Messrs. Simons' merit and figures," and then you suggest that other experts' advice should be taken. That is quite clear.

A.—Yes; but later on I went further than that, and I said I wished entirely to dissociate myself from the purpose of the dredger.

Q.—Is that some memorandum?

A.—It is in writing on the file.

Q.—I am afraid we have not got it. Do you remember about what time that would be?

A.—It may be about a month afterwards. Before proceeding any further, there is one point which I want to make perfectly clear, and that is that the specific recommendations which I made in my memo. as to the examination of the project by consulting specialists, and to the organisation for the execution of the works, were not taken into consideration.

The Chairman nodded assent.

Sir M. Visvesvaraya.—In what years were you Secretary to the Government?

A.—From about towards the end of October, 1919, to June, 1923; latterly, as the Secretary to the Government of India had been abolished, I was consulting engineer to the Government of India.

Q.—In 1923?

A.—Yes, from May, 1923, to July, 1923.

Q.—You are aware that the original estimate was for 367 lakhs, and it was increased to 400 lakhs?

Q.—The Government of Bombay themselves recommended putting the figure at 400 lakhs.

A.—That was my suggestion that, roughly speaking, it should be taken as a 400-lakh project.

Q.—Was this addition made by you or by Sir George Buchanan, because the Government of Bombay themselves have written to the Government of India to the effect that the cost should be taken at 400 lakhs?

A.—I made that addition to Sir George Buchanan's estimate after I had been through the project with him, and entirely on my own.

Q.—Was it before the Government of India had addressed their official letter on the subject?

A.—I think it was before the despatch went to the Secretary of State.

Q.—In the despatch to the Secretary of State you said: "With the addition of 10 per cent. the estimated cost of the work is, roughly, four crores, and we are satisfied that the work can be carried out for this sum."

A.—Yes.

Q.—There was a similar statement in the Government of Bombay's letter addressed to you previously. I suppose you have not followed the subsequent fortunes of this scheme since 1923?

A.—I have followed them to a certain extent, but in no way in a sense of responsibility.

Q.—From a professional interest in the scheme?

A.—That is right.

Q.—It went up to 702 lakhs by revision?

A.—Yes; I understand that is the case.

Q.—And you will probably take it from me it is now estimated to cost 1,000 lakhs or 10 crores?

A.—Yes.

Chairman.—1,000 lakhs, with the rupee at 1s. 6d., is £7,500,000.

A.—Yes.

Sir M. Visvesvaraya.—Do you, as an engineer, know that had the reclamation been done by dry-filling the cost would have been between four and five crores?

A.—I had no occasion to take out any figures for that.

Q.—If they had not committed themselves to the dredging proposition before the estimate was sanctioned, dry-filling would have been cheaper?

A.—Had I been engineer-in-charge I should have placed more reliance on dry-filling myself.

Q.—That is a very important statement. The original estimate was for 367 lakhs. If the Government of India and the Secretary of State had known that it was likely to be materially exceeded, and if they had had before them a dry-filling estimate, they certainly would have preferred the dry-filling estimate on the figures?

A.—You cannot say that. I have no doubt if the estimate for dry-filling had been about the same, or cheaper, they would naturally have said: "What is the good of spending £600,000 on the dredger?"

Q.—That is an important point. The estimate was for 367 lakhs. As such it was justified for a dredging proposition?

A.—Yes, it seemed to be quite a good proposition.

Q.—That estimate was sanctioned; and then they committed themselves to the dredger proposal?

A.—Yes.

Q.—Then they could not change afterwards, so the result was they went in for a 702-lakhs estimate, while the work could have been done for about five crores?

A.—We have no evidence to that effect.

Chairman.—We have no evidence to the effect that the work could be done for five crores, because nobody on earth can tell us where the dry-filling is to come from. I want that fact kept very prominently before you.

A.—It would have had to come in by train.

Q.—Where is the dredging face?

A.—Any way, no alternative estimate was framed as to the cost of dry-filling at the time.

Q.—That is the real answer. The only proposition you were considering was a dredging proposition?

A.—Yes.

Sir M. Visvesvaraya.—The Chairman may not be aware that Mr. Elgee has himself deposed that with five crores you can get the work done by murum filling. As regards the question whether murum is available, Sir Frederick Hopkinson and myself went to the Railway Officers and we found that murum can be got cheaper in the neighbourhood.

Chairman.—I have read the evidence, but there is nothing in the evidence of that.

Sir M. Visvesvaraya.—It is in the report of Mr. Elgee's evidence. At present the estimate comes to 10 crores. What do you think, speaking as an engineer, must have happened to bring about such a great change?

A.—That is rather a difficult question.

Q.—I understand you have followed in an academic way the fortunes of the work. Could you tell us roughly what you think must have happened? It is rather extraordinary, is it not, that an estimate of 367 lakhs should have gone up to 1,000 lakhs?

A.—It must have been obvious from the first that the dredger was a failure.

Q.—You think it is the failure of the dredger?

A.—The failure to work up to its estimated capacity.

Q.—And other circumstances, of course?

A.—I do not see why other circumstances should have affected the situation very seriously. Of course the cost of labour may have gone up in Bombay. As I pointed out in my note, the whole thing hinged on the dredger. Unless the dredger functioned to its full capacity, you could not expect the work to be carried out at the original estimate.

Q.—You think that the excess over the original estimate was partly due to the dredger having failed to give the output?

A.—Yes.

Q.—The Government of India were originally opposed to the project. Till 1917 they were opposed to any reclamation project; but changed their opinion in about 1919. Previously they had turned down such proposals two or three times?

A.—It would not have been from an engineering point of view, I think. Possibly the financial situation would not have been sufficiently satisfactory to embark on such a project.

Q.—Here is a letter from the Bombay Government. It is dated the 4th December, 1919, which reads: "I am to add that the Governor in Council is prepared, in view of the possible increase of rates for labour or materials, to add 10 per cent. to the total of the scheme as estimated by Sir George Buchanan; and the total cost of the project must be roughly taken as four crores for the purposes of finance." They may have done that after your memorandum?

A.—That is right.

Q.—Within a month of your memorandum they wrote to the Government of India in these terms?

A.—Yes.

Q.—What was the ground for this change of opinion on the part of the Government of India? The world conditions remained unsettled. This was a very huge scheme, and they were uncertain about working it within the estimate, for prices had gone up. On what ground did the Government of India change their opinion in such a short time?

A.—I should imagine—I cannot say from any knowledge of the facts—that the reason why the Government of India backed up the project in the way they did was because of the congestion in Bombay at the time, and the necessity for expansion.

Q.—And the high rates for land?

A.—The very high rates which obtained for land at that time; but I think the congestion might be said to be the chief reason.

Q.—In any case, they abandoned their usual attitude of caution on this question?

A.—I do not think you can altogether say that. I think they exercised a certain amount of control over the project up to a certain point.

Q.—The Member in Charge was Sir Claude Hill?

A.—Yes.

Q.—He was a Bombay civilian?

A.—Yes.

Q.—And he knew all about conditions in Bombay?

A.—Yes.

Q.—Having been a Member of the Government of Bombay himself?

A.—Yes, he knew Bombay inside out.

Q.—I take it he helped to push the scheme?

A.—Yes, he was very keen. He was helping Sir George Lloyd to get on with the job.

Q.—The Chairman asked you a question about who recommended the appointment of Sir George Buchanan. You said that it was the Bombay Government themselves, and that the Government of India had nothing to do with it?

A.—I do not think the Government of India had anything to do with it.

Mr. Billimoria.—In a telegram it has been suggested that it was at the instance of the Government of India that Sir George Buchanan was appointed?

A.—I do not know what that is based on—I can only think Sir Claude Hill suggested it.

Mr. Billimoria.—There is a telegram from the Secretary of State to the Government of Bombay in which it is stated "with the approval of the Government of India Sir George Buchanan has been appointed." It is stated also in Mr. Cowasji's evidence.

Sir M. Visvesvaraya.—Did the Government of India accept the four-crore scheme as a final one—as a detailed estimate, or was it put forward as an approximate one?

A.—You could not call it a final estimate, because there was not any very great detail to go on; but it was an estimate which they were perfectly justified in accepting.

Q.—It was also stated by the Government that the cost at the outside would go up to four crores?

A.—At that time.

Q.—You accepted that statement at that time?

A.—Yes, at that time.

Q.—Did the Government of Bombay report to the Government of India when the estimate was raised to 702 lakhs in 1922?

A.—I am afraid my memory does not serve me sufficiently well to give you any information on that subject. As a matter of fact, at that period it had gone out of the hands of the Public Works Department.

Q.—The Public Works Department was abolished?

A.—Well, the work was a reserved subject under the Government of Bombay, The Government of India had practically nothing to do with it.

Q.— But you did not expect any report from the Government of Bombay that the estimate had been considerably exceeded?

A.—I consider that if the Government of Bombay saw that the work was not proceeding satisfactorily, or that the estimate was likely to be exceeded, it was their business to inform the Government of India immediately.

Q.—They do not seem to have done this?

A.—No. Of course they were not obliged to do it under the constitution.

Sir Frederick Hopkinson.—I think they were, because the Government of India had to find the money. I had a long discussion in Bombay on this very point. The Government of India was finding the money for this, and therefore they must be in control.

A.—But they were not.

Q.—They must be, otherwise they would not find the money. They would not go on finding the money *ad libitum*?

A.—No; but anyway I was not in control, otherwise I should very soon have found out the state of affairs.

Q.—I am speaking of the Government of India?

A.—Yes.

Sir M. Visvesvaraya.—Was it right that the Government of Bombay should have relied upon one expert for an opinion on this scheme before they recommended it? Was it safe?

A.—In a case like this, the practice would be that you would appoint your consulting engineers to the work, and thereafter you must accept their technical responsibility.

Q.—Come what may?

A.—It is very difficult to introduce any overhead technical examination or supervision, unless you did what I consider should have been done in this case, namely, that an Advisory Committee should have been put over the directorate, which would have had the right to examine the work.

Q.—Before a huge scheme of this magnitude was sanctioned, would it not have been proper to consult a committee of engineers?

A.—That is what I myself recommended.

Q.—You recommended it at the time?

A.—Yes. In that note of mine I made it quite clear that I would not be prepared to accept——

Q.—Was your idea not accepted by the Government of India or by the Government of Bombay?

A.—It was not accepted by the Government of India. It did not go to the Government of Bombay.

Q.—The despatch was addressed to the Secretary of State by the Government of India on the 15th April, 1920. That was the despatch recommending the scheme?

A.—That is the 400-lakh scheme, yes.

Q.—I suppose you subscribe to the opinions expressed in that despatch as a whole?

A.—In that despatch do you mean? I wrote most of it myself.

Q.—But even if you wrote it, it had to carry the opinion of the Member?

A.—Yes. It had to go to the Member, and all round the Executive Council.

Q.—You say, " We are convinced that not only is the project one that presents no serious engineering difficulties, but that it can be effected at a cost which will be more than recovered by the amount received by the local Government from the sale of land not required by them for the erection of Government buildings, the provision of roads, paths, etc., which will be necessary in connection with the town plan lay-out of the area." " These estimates "—that is, Sir George Buchanan's estimates—" may, we consider, be accepted as a reliable forecast of the probable expenditure." Finally, " The work is one which, in our opinion, should be carried out with the least possible delay. It is essential for the development of the City of Bombay, and we are fully satisfied that it is a highly remunerative undertaking." You were apparently satisfied with the technical details?

A.—Absolutely.

Q.—And you were the Technical Adviser of the Government of India at the time?

A.—Yes, I was.

Q.—You were also satisfied with the financial aspect of the scheme as it presented itself to you?

A.—As far as I was concerned.

Q.—You stated that you did not know whether there was suitable material in the harbour or not, and that you accepted the opinion of the engineers on that?

A.—I accepted the report furnished by Messrs. Lowther & Kidd.

Q.—In such cases is it usual to accept the views of a single firm of engineers?

A.—I thought I was justified in accepting them. They apparently went to a lot of trouble to find out themselves.

Q.—With regard to the guarantee for the proper working of the dredger, you consider that the dredger builders should have been asked to give tests on the site?

A.—That point had nothing to do with me, of course, but I can only say that had I been the engineer-in-charge I should have insisted on a guarantee of the efficiency of the dredger to perform the task which was required in that particular locality.

Q.—Particularly as a previous dredger of the same size had been ordered on such conditions?

A.—I do not think it was as big as this one.

Q.—It was also giving 2,000 cubic yards?

A.—It was not such a big lift, was it?

Q.—About 30 feet or so. This is a bigger proposition, no doubt, but the quantity to be pumped was about the same in both cases?

A.—Yes.

Q.—It was a mistake not to have asked for a guarantee to test the dredger at site?

A.—I can only give my own view as an engineer, and that is that I would not have ordered it without such a guarantee.

Chairman.—Do you mean a guarantee that they would bring it out and do the work in Bombay?

A.—Yes. To take a parallel case, I have occasion now, as Chief Engineer of the Southern Command, to place orders for big electrical installations and I always insist that the firms shall instal them *in situ* and work them to my satisfaction.

Sir M. Visvesvaraya.—Do you think it was safe that the Public Works Department should have been excluded in the supervision of the scheme? The Government have created a new department. You approved of it I dare say?

A.—No; I had nothing to do with that.

Q—They created a new department, and all the traditions and practices of the P.W.D. were rejected?

A.—That was against my recommendation.

Q.—Do you not think the engineers of the P.W.D. could have assisted in working out this project?

A.—They would not have been capable of taking charge of it.

Q.—No, they would have wanted an expert to guide them.

A.—I recommended that an expert should be put in charge.

Q.—You want an expert who has had experience of reclamation work; that is all. Under the guidance of such an expert the engineers of the P.W.D. could have carried out the work?

A.—Either by contract or by departmental labour—preferably by contract.

Q.—As a matter of fact, you will be surprised to learn that many of the engineers appointed—almost all of them—were outsiders?

A.—One of them was the man who took my place at Delhi when I went to the war —Mr. Lewis.

Q.—They were all from outside the regular Public Works Department?

A.—They did not belong to the Bombay Public Works Department.

Sir Frederick Hopkinson.—Mr. Lewis was a Public Works Department man.

A.—He was a Burma P.W.D. man.

Sir M. Visvesvaraya.—Have you any suggestions to make for the future for improveing the works in the present condition of the scheme?

Chairman.—Do you know enough about it?

A.—I do not know enough about it. It all depends what organisation is going to carry it to completion. I could not make any statement which would be of any value.

Sir M. Visvesvaraya.—I only wanted your general opinion.

Chairman.—I do not know that we really want that. Unless this gentleman knows enough about it to give us some valuable technical advice, we had better not take rough general ideas. It is our business to pronounce on that.

Sir M. Visvesvaraya.—True, but we have not had many professional witnesses. This gentleman is a professional man, and I would like to put the question: "These are the facts. Judging from these facts what is your general opinion as to the future conduct of the works, if you have any opinion"? Of course if he has none to give he will say so.

Sir Frederick Hopkinson.—We want facts.

Sir M. Visvesvaraya.—Many engineers could give a general opinion on the facts laid before them.

Chairman (To the Witness).—Do you wish to risk giving a general opinion on the information which you have?

A.—I am afraid my information is not up-to-date, and therefore my opinion would not be of value.

Sir Frederick Hopkinson.—May I take it that your position at Simla was that of technical watch-dog for the Government of India on all technical matters connected with such schemes as this?

A.—Yes. They went through my hands as the Technical Secretary to the Government of India.

Q.—They would not have been accepted by the Government until they had passed your scrutiny?

A.—No. If I had reported adversely on any project it would have been referred back to the Provincial Government.

Q.—So that you are in a sense responsible for Sir George Buchanan's estimate, in as much as you accepted it?

A.—Yes.

Q.—And you advised the Government of India that it was accepted by you?

A.—Yes.

Q.—You said just now that you went through Sir George Buchanan's figures, especially those of dredging. He showed you details of how he arrived at his price, and you were satisfied?

A.—Yes, I was.

Q.—Do you remember what the price was? You will see it in the report. It is eight annas a cubic yard.

A.—Yes. He had talked about six annas a cubic yard, but I talked it out with him, and we came to the conclusion that six annas was not enough.

Q.—He suggested six annas for the dredging, did he? That is the total cost, including plant. You will see it on Page 29 of his report. He has got eight annas there?

A.—Yes, that is it.

Q.—Do you remember what proportion of that was the cost of the plant?

A.—No, I cannot say at this late date.

Q.—I suppose at that interview he did not tell you that the plant was going to cost eight annas a cubic yard?

A.—The plant?

Q.—Yes, the plant alone?

A.—No, certainly not.

Q.—That is what it has cost?

A.—Well, apparently the cost of the plant was hideous.

Q.—Therefore, according to his estimate, you would have to do the dredging for nothing to bring it within his estimate?

A.—Yes. That is news to me.

Q.—It is, however, the fact. You said that you considered Mr. Kidd's estimate a reliable one in 1912?

A.—His scheme generally. I thought it was an extremely good one.

Q.—And the estimate?

A.—Yes.

Q.—And you thought that possibly prices may have doubled between then and 1919?

A.—The prices of plant. I am speaking entirely from memory. I was not aware that the prices of coolie labour had doubled, but I gather from you that they had.

Q.—I will not say exactly by 1919, but at the present time they are about double what they were in 1912. If the prices of plant had doubled, and Sir George Buchanan's estimate of the total cost of the work was 2¾ millions, the cost of the dredging plant and the other plant has been 1¼ millions?

A.—Yes.

Q.—Therefore, the cost of his plant has been nearly 50 per cent. of his total estimate?

A.—Yes.

Q.—From your experience would not you say that a contractor's ordinary charges for plant, profit and superintendence would be in the neighbourhood of 25 per cent.?

A.—His overhead charges?

Q.—Yes, including profit?

A.—I should say that was a low estimate. I should think it was nearer 30—well, 25 per cent., we will say.

Q.—25 to 30 per cent.?

A.—Yes.

Q.—Here, you see, the plant alone comes to 50 per cent. Really it is nearly 100 per cent. on the cost, is it not?

A.—Yes.

Q.—Therefore, I suggest that somebody ought to have seen that the estimate was most unreliable?

A.—At that time?

Q.—At that time.

A.—I did not consider it was unreliable at that time. It subsequently proved to be.

Q.—Shall we go into the details of the cost of the rise in values or cost of machinery from 1912 to 1919? These are things that would be used generally throughout the works, and would, of course, influence the total cost. Coal, for instance, was 12*s*. 6*d*. a ton in 1912, and it was 47*s*. 3*d*. a ton in 1919; that is, four times as much. Cement was £1·58 per ton in 1912, and it was £5·32 in 1919. Iron bars, which we may take as an idea of the price of material put into machinery, were £8·75 a ton in 1912, and £22·43 a ton in 1919. Ship and boiler plates were £8·46 a ton in 1912, and £18·34 in 1919. Locomotives were practically double—£54 as against £96. From that, I suggest to you that the 1912 prices ought to have been very nearly trebled?

A.—According to those detailed figures, probably yes.

Q.—Surely the Government of India knows the prices of ordinary commercial goods, and the Government of India should know these prices when they pass an estimate like Sir George Buchanan's.

A.—I was perfectly well aware of the general increase of costs of engineering materials and plant, but I went into this project with Sir George Buchanan, and we discussed it. My deputy also discussed it, and we came to the conclusion that the estimate of his of 400 lakhs, as I made it out——

Q.—His estimate was 367 lakhs?

A.—Yes, 367 lakhs, and that that, combined with what I added, would be sufficient to carry out the work.

Q.—If your plant is going to cost you the total sum which you have in for dredging, it seems ridiculous.

A.—Yes. How was I to know the plant was going to cost that.

Q.—Surely you would inquire. £600,000 would come to about six annas a cubic yard?

A.—Yes, but I do not remember the whole facts of the case. I do not think £600,000 was the original estimate for the dredger.

Chairman.—You get the figures in Sir George Buchanan's report. If you look at the beginning of Page 17 you will see how they work out. It is over £600,000, I think.

Sir Frederick Hopkinson.— His estimate given on Page 17 is £499,000.

Chairman.—Then at Page 19 you get £549,000 under certain conditions.

Witness.—Whereas, actually it cost £600,000.

Sir Frederick Hopkinson.—No, the dredging plant altogether cost £855,000.

A.—The dredger cost £600,000, did it not?

Q.—Not one dredger. The whole dredging plant cost £855,000, and during the construction of the work there was a proposal to buy yet another dredger costing £192,000. I still cannot understand how you, in the position in which you were at Simla, could possibly have passed an estimate of 367 lakhs which had been estimated to cost 325 lakhs in 1912.

A.—I am speaking from memory, but I think the reason was that Messrs. Kidd estimated somewhere about 9½ annas. Sir George Buchanan got it down to about eight annas, and I considered it ought to be eight annas.

Q.—Your price for the dredging was less in 1919 than Mr. Kidd's was in 1912; and, as we know, the prices of all machinery and things necessary for carrying on such work had trebled in the meantime?

A.—Well, Sir George Buchanan queried that rate of nine annas three pice, and worked it down to six annas.

Q.—You induced him to put it up to eight annas?

A.—Then he put it up to eight annas. As a matter of fact, the first estimate was only 312 lakhs, was it not?

Q.—No. He made an estimate based on 1919 as a comparison with 1912, and you said that was no good?

A.—I said it was no good talking about it at that time, but he said that Mr. Kidd had overestimated.

Q.—But you did not think so. You thought that Mr. Kidd's estimate was a proper estimate?

A.—I considered that, by comparison with his estimate and Kidd's estimate, that *this* estimate was a suitable estimate on which we could proceed.

Sir Frederick Hopkinson.—But you say of Mr. Kidd's estimate: "I consider this to have been a very carefully and ably prepared project." Project, of course, includes the estimate, does it not?

Chairman.—You told me, Sir Sydney—and I put the question very carefully to you—that you approved of Mr. Kidd's price of 325 lakhs.

Sir Frederick Hopkinson.—That is what I am going on.

Witness.—I approved of the project entirely, but I naturally listened to what Buchanan had to say about this rate of nine annas three pice, which he said was excessive. On that I considered that the rate given here of eight annas, eventually working it up to 400 lakhs, was suitable, and as such I recommended it to the Government of India.

Q.—Had you known that the prices of everything to be used in connection with this work would have been trebled, I presume you would not have agreed to the 367 lakhs?

A.—I am not altogether prepared to say so at all.

Q.—What? Knowing that the prices had been trebled?

A.—I knew they had been doubled.

Q.—Even knowing they were doubled, having approved of Mr. Kidd's estimate, would not you have thought it must be at least 650 lakhs?

A.—No, because I went into Mr. Kidd's estimate with Sir George Buchanan's 1919 estimate, and as a result of that examination I came to the conclusion that *this*, plus what I added, was correct. I cannot possibly go back on that, because I did it with a perfectly good intent, and I went into it very carefully and put it forward as an official recommendation.

Q.—What I am suggesting is that Sir George Buchanan's estimate was quite unreliable and that you, in your official capacity, assented to it?

A.—After going into it, yes. I was not prepared to consider at that time that it was unreliable. Subsequent events have certainly proved it is.

Q.—Having regard to the fact that you had previously thought Mr. Kidd's estimate of 325 lakhs in 1912 was a very proper one, you surely must have thought that 367 lakhs, when prices had trebled, could not possibly be a proper one?

A.—I cannot say anything further, except, as I say, I went into the thing, and that is the opinion I gave, and I stick to it.

Chairman.—May I ask one question on that. *This* is the document from which Sir Frederick was speaking, giving the figures for 1912 and 1919. If you had had that document alone before you, would you have believed that the work could have been done for anything under 650 lakhs?

A.—You mean with all that detail of every description.

Q.—All the details of the prices for the years between 1912 and 1919. Would not this document alone have shown you that if Mr. Kidd's estimate for 325 lakhs was a good estimate, Sir George Buchanan could not possibly have done it under 700 lakhs?

A.—I must say, on the fact of it, that it seems perfectly correct, but I admit I did not go into it in detail to the extent which is referred to there.

Sir Frederick Hopkinson.—We had a statement made to us in India that the work of the dredger which was done in December of one year could not be known to the Government until the following August. Do you think that is a reasonable way to watch the progress of such a work as this?

A.—I should say it was wholly wrong myself.

Q.—It has been given in evidence that the work done by the dredger was taken daily, and yet the Government of Bombay were informed that they could not get the

results until August of the following year, and they apparently acquiesced in that. Presumably Sir George Buchanan would have the same information. How could the Government of Bombay have any possible idea as to how the work was going on under those conditions?

A.—It could not, naturally. It all depends on what organisation is set up to supervise the work.

Q.—You said just now that preferably you would have liked to have seen this work carried out by contract?

A.—I would.

Q.—Do you think a contractor would put off until August the knowledge of what his staff were doing the previous December?

A.—I am quite certain he would not. If he did he would be bound to fail.

Q.—I think so, too. With regard to Mr. Kidd's phrase about the borings, did it ever occur to you that all those borings ought to be checked, or were you quite satisfied with them?

A.—I took those borings to be sufficiently good to work upon.

Q.—Have you ever heard of the term "wash" borings before?

A.—No.

Q.—You do not know anything about it?

A.—No. I do not pretend to.

Q.—Do you think there was sufficient information in Sir George Buchanan's 1919 report to put before a contractor to make a tender on?

A.—Yes. I cannot say to make a tender on; to make investigations on.

Q.—With regard to the dredging, you discriminate between the dredger and the dredging. In your report you said that the whole project really hinges on the efficiency of the dredger, and the Chairman also said that it hinged a great deal upon the material being there to dredge?

A.—Yes.

Q.—Would it not largely depend upon whether the dredger was designed and built to deal with the particular material which existed in Bombay?

A.—Naturally.

Q.—If you designed the dredger to work on soft clay, and you actually found hard clay, it would not be possible for the dredger to give an efficient output?

A.—You could not expect it to.

Q.—Therefore, it was all important that the person who designed the dredger should see for himself samples of the clay which was to be dredged?

A.—As I said before, I would go further and say that whoever designed the dredger ought actually to have sent a representative out to Bombay to find out for himself what he had to do.

Q.—As a matter of fact, the dredger is designed equally to do soft mud and soft clay. Actually, the clay is hard. I will be glad to have your opinion, as an engineer of experience, about *that* piece of clay. Would you call that soft clay? Test the weight of it to start with.

A.—It is very much stiffer than that got out of the tubes in London.

Q.—Tell by the weight of it.

A.—It is extraordinarily heavy clay.

Q.—Unusually heavy, and, therefore, hard?

A.—Very hard, indeed.

Q.—That is called soft clay in the contract for the dredger.

A.—It must have been very misleading to the firm.

Q.—But you will notice that in 1919, when you read through Sir George Buchanan's report, he calls it hard clay.

A.—He refers to two clays, does he not?

Q.—He refers to hard clay three times, I think.

A.—I think, in filling the compartments, he refers to lighter clay and then to heavier clay afterwards.

Q.—I do not know if there is any distinction between any of the clays there; I should say not, but *that* is a sample actually picked up on the reclamation and brought home by us. Having that fact before you—that the dredger was designed to dredge soft clay—and *that* being the actual clay to be dredged, is it any wonder to you that the dredger has failed to do it?

A.—None at all. I am surprised it has done what it has.

Q.—It is only fair to say that the bulk of the dredging done up to the present time has been mud.

A.—Of course, *that* sample is rather a different thing to what it is when you actually take it out of the sea.

Q.—Of course. That has been out of the water for a month, but you can tell the character of the clay from that?

A.—Yes.

Mr. Billimoria.—I take it that, besides being a Secretary to the Government of India, you were by profession an engineer, and as such were in a position to advise the Government about embarking on a scheme of this description?

A.—I am not a specialist, in this particular line of engineering. My experience consists of 32 years in the Indian Public Works Department, during which time I have done railways, bridges, roads, buildings, inundations, and all sorts of works, but I am not in any way a specialist in this particular branch of engineering. That is why I specifically stated in my note that I should like to have opinions from the leading specialists in England.

Q.—You are a civil engineer by profession?

A.—No. I am a Royal Engineer, but I happen to be an Associate of the Institution of Civil Engineers.

Q.—In the general branches of engineering, you have considerable experience?

A.—Yes; you might almost say an unusual experience.

Q.—May I ask how long you had known Sir George Buchanan?

A.—I had never met him before he came up to Simla at that time.

Q.—You had had no connection whatsoever with him before he came over there?

A.—None whatever. I had never even seen him.

Q.—Did you know his antecedents?—I knew of the work he had done in Rangoon, and I had heard about the advice he had given in Busra, but other than that I did not know anything about him.

Q.—In answer to a previous question, you suggested that the Government of India did not recommend Sir George Buchanan. I interposed and said that the Honourable Member for Bombay had produced a telegram, copy of which I am going to read to you. The telegram is dated the 8th April, 1919, and runs as follows. It is from the Governor to the Secretary of State: "I have consulted Sir Claude Hill who agrees with me in pressing you should send expert out at once who should arrive Bombay not later than the third week of May. Failing your ability to find expert in short time available, my Government would agree to using Sir George Buchanan, whose services would probably be available and whom the Government of India recommend. My telegram has been drafted in consultation with the Government of India, and is being communicated to them."

A.—As I said before, I think the Government of India referred to there was represented by Sir Claude Hill.

Q.—You had no knowledge of this telegram?

A.—I was in France at the time.

Q.—In 1919?

A.—In that month, yes.

Q.—You were closely associated with the scheme, or discussed it generally with Sir George Buchanan when he came over to Simla and Delhi for the purpose?

A.—Yes.

Q.—As an engineer of repute and with considerable experience of the Public Works Department, you considered that his report was a sound report?

A.—His report was mainly based on Mr. Kidd's report, and as such I considered there was nothing against it.

Q.—Since you make reference to Mr. Kidd's report, that takes us back to the period of 1911 to 1913—pre-war?

A.—Yes.

Q.—You know that the conditions existing in India pre-war were normal?

A.—Yes.

Q.—After the war prices went up considerably?

A.—Yes.

Q.—Having regard to that circumstance, did you think it prudent to accept a figure less than Mr. Kidd had anticipated in 1911 as the proper figure which Sir George Buchanan had taken for his estimate?

A.—I did not. I did not agree with Sir George Buchanan's figure, and therefore I put it up to 400 lakhs.

Q.—Did you consider 400 lakhs as sufficient?

A.—I did, most certainly, at the time.

Q.—Did you go carefully through his estimate?

A.—As far as it was possible to do so, but, as I said, I did not go into the details of every item.

Q.—May I ask you to turn your attention to page 19 of that report, where the estimate of 367 lakhs has been given. Do you find any item for "contingencies" provided for there?

A.—No, but I added that myself.

Q.—You added that to make it 400 lakhs?

A.—Yes.

Q.—I am talking of this 367 lakhs estimate.

A.—But I did not accept that estimate.

Q.—It is not unusual, with engineers of repute, when they submit estimates, to make a provision for "contingencies," usually of 5 to 10 per cent?

A.—It is allowed for here. There is 5 per cent. put in.

Q.—That 5 per cent. is engineering charges, which includes possibly remuneration, and so on. It is not for contingencies.

A.—It is, to a certain extent. At any rate, I did not accept that figure, and I put it up to 400 lakhs. That is my point.

Q.—Do you find any item with regard to storm-water drains included in that estimate, which is an item which we have now discovered is going to cost the Government of Bombay something like 70 to 80 lakhs of rupees? Is that item of storm-water drains included there?

A.—No.

Mr. Billimoria.—So that, on that basis, the estimate goes to the rocks; it is absolutely hopelessly wrong.

Chairman.—Let us get the figure; I have worked it out. The question that Mr Billimoria is putting to you is whether you noticed that there was no provision in the estimates for storm-water drains?

A.—No, there is no specific provision.

Chairman.—The exact figure is £482,000.

Mr. Billimoria.—An item of such a vast magnitude as that, not having been included in the estimate, you cannot say that the estimate is reliable, can you?

A.—I do not quite know what that figure for storm-water drains refers to. I know nothing about it. That particular item has arisen since I had any connection with it.

Q.—It is an item which is primarily important. Without storm-water drains the whole of Bombay would have been flooded. We would not have existed on that land had not storm-water drains been provided.

A.—I do not think you can say that at all.

Q.—That is what the expert engineers have stated.

A.—The point is this. You must also include the sewerage and the electric light mains, and various other engineering services.

Mr. Billimoria.—They are mentioned in the estimate.

Chairman.—There was an absolute necessity to put in storm-water drains in order to carry off, say, the eight inches of rainfall which you get from time to time in eight hours. All the witnesses have agreed that they were absolutely essential. They were in existence as part of the scheme by which Bombay was kept free from flooding. When this enclosure was decided upon, unless provision had been made for that storm water to be carried out to sea, the whole of Bombay would have been flooded?

A.—Yes, quite true.

Q.—That work was to cost, and will cost if the scheme goes through, £482,000, and it is omitted from Sir George Buchanan's estimate, and was not apparently noticed by you?

A.—It was not taken into account by me, no.

Mr. Billimoria.—There is another item to which I would like to invite your attention. In this estimate no provision has been made with regard to railway rolling stock and quarrying machinery. Was not that an important item? It has cost a lot of money to the Government to acquire land for quarries and other machinery.

Sir Frederick Hopkinson.—That would be included in the prices.

Mr. Billimoria.—It is not given in the detailed prices.

Sir Frederick Hopkinson.—But the prices would include plant, just as much as the dredging plant includes the plant.

Mr. Billimoria.—If you look at the tables you do not find it there.

Sir Frederick Hopkinson.—But it is included in the prices. The prices for work done include the provision of plant in all cases.

Mr. Billimoria.—If that be the case then I say the estimate is hopelessly wrong, even then.

Sir Frederick Hopkinson.—The dredging plant alone would cost as much as Sir George Buchanan estimated it would cost, including plant and all the labour of doing the work. The plant alone has cost as much as his estimate.

Mr. Billimoria.—That is what I want to bring out.

Sir Frederick Hopkinson.—That is clear.

Chairman.—We are all agreed about that.

Mr. Billimoria (to the Witness).—If you were to include the cost of quarries, railway rolling stock, and machinery, this estimate would be hopelessly wrong. That is not all provided for here.

A.—It is supposed to be included in the rates.

Mr. Billimoria.—It is supposed to be.

Sir Frederick Hopkinson.—The rates in Sir George Buchanan's estimate include all plant.

Mr. Billimoria.—I will take it from you that it is so.

Sir Frederick Hopkinson.—That is understood.

Mr. Billimoria.—Were you acquainted with the reports made by other experts like Messrs. Jacobs & Davis, well-known engineers, who were employed by the house of Tata, those reports being made just about the time when Mr. Kidd was employed on the borings? Did you ever come across those reports?

A.—Not that I can remember.

Q.—Were you ever told anything about them?

A.—I have no recollection.

Q.—In those reports it has been clearly pointed out by Jacobs & Davis that the figures of Mr. Kidd were very optimistic and that the Government cost figures were impossible. If Mr. Kidd's figures were impossible, Sir George Buchanan's figures were much more so?

A.—Yes.

Q.—In their report to Mr. Tata, Messrs. Jacobs & Davis called this a mad scheme and stated that Mr. Tata would have cause to congratulate himself on having been dissuaded from going into the thing, if it ever came off. Are you aware of all this.

A.—I do not remember being aware of it. In any case, people held various views.

Q.—This is an official document, Sir Sydney. It is a report of the Bombay Development Committee, published in 1914. Was it not ever brought to your notice as one of the chief officials of Government advising the Government about embarking on a scheme of this description?

A.—It very probably was; but I cannot say what value is to be attached to every statement which is made in a report like this.

Q.—If it was brought to your notice, it would be interesting for me to go through several pages and paragraphs which might convince you.

A.—That would be quite hopeless, because I do not remember a single word of it.

Q.—But before you recommended Sir George Buchanan's scheme, did you not give any consideration to the fact that engineers who had been employed prior to that had run down the scheme and had called it a mad scheme? Were you justified then, in spite of that note of warning, to go and pass the scheme and recommend it, just because Sir George Buchanan happened to talk it over with you?

A.—I do not see that I should be bound in any way to be influenced by any particular opinion expressed. I went into the project as a project, quite apart from what anybody else had said about it.

Q.—Did you consider that project financially sound?

A.—As a 400 lakh project, I considered it was perfectly sound.

Q.—Did you consider the other aspect of the situation—how long it would take for the disposal of the land that would be reclaimed?

A.—That is another matter altogether.

Q.—That is where the financial point comes in very particularly.

A.—That is also where the point of the efficiency of the dredger comes in, on which I was always sceptical.

Q.—Did you consider that part of the question—as to how long it would take for the disposal of the reclaimed area?

A.—I say that that is entirely dependent on the efficiency of the dredger.

Q.—You had official documents and reports before you from the Public Works Department in which they estimated that the reclaimed area of 973 acres would take from 43 to 58 years for disposal. That was in 1911—a report by Mr. Cameron. That is in the official papers on the Government of India file.

A.—I was not in any way concerned with the financial success of the venture. I was concerned with the engineering aspects.

Q.—If you are recommending an engineering proposition, surely finance is very closely allied to engineering, just to show whether the scheme is going to be a success or otherwise?

A.—It is dealt with in a different department of the Government of India.

Sir Frederick Hopkinson.—Is not the point this—that a scheme which looks sound to you as an experienced man at 400 lakhs, might be utterly unsound at 1,000 lakhs? You only considered the scheme as a 400 lakh scheme?

A.—Absolutely.

Q.—Had it been suggested to you that it was going to cost 1,000 lakhs, you would have gone much more critically into it?

A.—I should not have looked at it in quite the same light.

Mr. Billimoria.—Do you think if the scheme as it stands had been estimated at a figure of 702 lakhs you would have recommended the Government of India to embark upon it?

A.—I should have looked at it primarily from its engineering aspects, and given my opinion on that. If, on the face of it, it had been going to cost 700 lakhs of rupees, I should probably have said that it was not worth the candle.

Q.—That would have been your opinion?

A.—That is probably what I should have said.

Q.—So the Government of India were induced to recommend, and to approve of the scheme on the basis of the figure of 367 lakhs, increased to 400 lakhs at your suggestion owing to these contingencies being taken into account?

A.—At that price it was a reasonable proposition.

Q.—Anything over that, you would not have considered to have been a sound engineering or financial proposition?

A.—I cannot say that, but it alters the aspect so completely that it is not much good arguing about it.

Q.—You were the responsible head of Government who recommended the Government of India, and who advised the Government of India, as to whether they should accept any proposal of the Government of Bombay?

A.—I did so, and I recommended the 400-lakh project as a reasonable proposition.

Q.—I ask you whether, if the figure had been in excess of 400 lakhs, you would have equally recommended the Government of India to have approved of the scheme?

A.—I cannot give you a direct reply to a question like that, because it was not put to me at the time. I had to consider the case as it was presented to me, and, as such, I made my report and gave my opinion. If it had been a 700-lakh job, it would have been looked at from a totally different standpoint, and I do not think myself that I should have recommended it for a moment.

Q.—How long had you been connected with the Government of India after you recommended this scheme? How long were you with the Government of India?

A.—I had only recently gone out from the war, and had gone up to join my appointment at that time.

Q.—But since 1919 you were continuously with the Government of India, were you?

A.—I have been with the Government of India since 1891.

Q.—I am talking of the period subsequent to 1919; I am coming to another point. How long were you with the Government of India after 1919?

A.—Until 1923.

Q—After this 1919 estimate, within a very short time, the figure went up to 702 lakhs. Was that reported to the Government of India? Had the Government of India any knowledge of it?

A.—I do not remember that myself. As a matter of fact I do not think at that period the Government of India had any say in the matter under the Constitution.

Chairman.—No, it had passed away by reason of the Reforms.

Mr. Billimoria.—What is the Constitution? Will you kindly explain, because it has been suggested in certain quarters that the matter was not worked constitutionally by the Bombay Government.

A.—The Constitution, as far as the Public Works Department is concerned, is thoroughly unsatisfactory, if you want to know my opinion.

Sir Frederick Hopkinson.—May I have that again. The Constitution——

A.—In so far as engineering activities and undertakings are concerned is, in my opinion, thoroughly unsatisfactory.

Q.—That is the general Public Works Department?

A.—Yes.

Sir M. Visvesvaraya.—Not in Bombay, but generally?

A.—I mean in the Government of India.

Sir Frederick Hopkinson.—And the Government of Bombay?

A.—No, because there they have their own Public Works Department, the same as elsewhere.

Mr. Billimoria.—I should like to know something more about this Constitution. You have been with the Government of India. Why should not the Government of Bombay have consulted the Government of India, who were responsible originally for sanctioning and approving the scheme, when the figure had doubled? Why were they not consulted?

A.—Why should they be?

Q.—They were the superior Government. They had the reins in their control. They had the supervision and control?

A.—Who?

Q.—The Government of India?

A.—No, they had not.

Q.—They always had. It is in view of that that this Committee has been appointed. It is in view of their supervision and control that we are here to-day.

A.—Surely, in 1921, the Government of India divested themselves of their responsibility for engineering activities and undertakings, and delegated all the supervision to provincial governments?

Q.—What about financial control?

A.—I am not concerned with that. I am only concerned with the engineering point of view.

Q.—It is in view of this circumstance that you say it was not necessary that the Government of India should have been approached or informed of the estimates having doubled within a very short time of the Government of India having sanctioned the scheme?

A.—Apparently it was not necessary since the Constitution had changed in the meanwhile. I do not say I consider it satisfactory, but those appear to be the facts.

Q—In the course of evidence you mentioned something about the guarantees to be given by the makers. Do makers give any such guarantee?

A.—I should imagine they certainly would.

Q.—Was there any attempt made to obtain such a guarantee in this particular instance?

A.—I know nothing whatever about the placing of the order for the dredger, and I refuse to have anything whatever to do with it.

Q.—Does it come to this—that you did not consider this as a dredging proposition at all?

A.—Oh, no; I do not say that, but the actual design and construction and the ordering of the dredger was no concern of mine, and apparently was not carried out under conditions which I myself would have observed.

Q.—So you are not in a position to say why Messrs. Simons in particular were preferred for the building of the dredgers?

A.—I understand there were only three firms in the market. One of them tendered in excess of the £600,000 and the other one did not tender at all, so that it came down to one firm.

Sir Frederick Hopkinson.—That is not quite true.

Mr. Billimoria.—You have remarked that you disassociated yourself from the purchase of the dredger. What did you actually do? How did you disassociate yourself?

A.—I disassociated myself by noting on the file that I had no concern with this. It was ordered, I presume, through the Secretary of State.

Q.—Was any other engineer consulted besides Sir George Buchanan? Was anybody's advice solicited by the Government of India before the scheme was launched?

A.—Not that I know of.

Q.—What were the reasons that led the Government of India to accept the report and recommendation of only one solitary engineer on a scheme of this magnitude?

A.—I really cannot say. It was done against my advice, so I am not in a position to make any remarks about it.

Q.—How long did the interview between you and Sir George Buchanan last in connection with the scheme?

A.—I think he called in to my office about four or five times, and that sort of thing and we talked it over together; but I really cannot remember at this interval of time.

Q.—Was it four or five hours at the most?

A.—I should think quite that, but I am not in a position to say.

Q.—How long did you take to consider carefully the report of Sir George Buchanan?

A.—It was gone into by my deputy first of all. Then it was separately gone into by myself, and then it was discussed by all three of us. That was the procedure.

Q.—How long does it usually take to consider such a report before any recommendations are officially put forward before the Government?

A.—I do not think any very great length of time.

Q.—You would superficially look at the proposition?

A.—I did not go into it in the detail in which the figures were given to me just now, I candidly admit; but I went into it as far as I considered necessary at the time from the general point of view. I was not in any way responsible for the actual details—cement, and everything else.

Q.—If the details had been closely studied, perhaps you would have detected that the estimates were very defective in material particulars?

A.—I think if we had gone into every single item in detail probably we should not have put up the figures which are put up here, but I am not in a position to say exactly what would have happened.

Q.—Do you not think, as a responsible official of the Government, that you should have given it more careful consideration than a merely superficial one?

A.—No, I do not. I should have done it if I had thought so. I was dealing with the project as a whole, and not with the details in particular, and I consider I did all I was required to do.

Q.—Even taking the project as a whole, if there were material defects which were apparent on the face of the estimate, should you not have brought them to the notice of the Government rather than accept any statement which Sir George Buchanan came and made to you?

A.—The only fact which I admit is new to me is this matter of the storm-water drains. I did not calculate that as part of the project, and I do not see personally why it should be part of the project.

Sir Frederick Hopkinson.—The project could not be carried on without them.

A.—Why should not the roads, and so on, come in?

Q.—You could not carry out the project without putting in the storm-water drains?

A.—Admittedly, but there was a great deal more work to be done besides the actual filling up of the compartments.

Q.—That is all in the estimates. All the roads and lighting and so on are in Sir George Buchanan's estimates—(all but the storm-water drains)—and they are based on an estimate given to him by the Public Works Department?

A.—There I admit I am at fault.

Q.—When Sir George Buchanan came to Simla did he bring with him the details and explain to you how he had arrived at these various prices in his estimate?

A.—Rough details, yes, but we did not go into details like those which you refer to there.

Q.—Did he say how much was for plant, how much was for material and how much was for labour?

A.—Yes.

Q.—So those papers are in existence, or they were in existence at that time?

A.—Yes.

Q.—He showed you those actual detailed prices?

A.—Yes, we talked over those details, but I did not go into details of cement and so on.

Q.—Those are the detailed prices on which the 367 lakhs estimate was founded?

A.—Yes.

Mr. Billimoria.—What we come to eventually is this—that your department took this matter very light-heartedly without going into the details before they recommended the scheme to the Government of India?

A.—There I am afraid I cannot agree with you. I took this case just as carefully as I took—what shall I say—the Sukker Barrage of 16 crores, the Imperial City or the Sutlej Valley, and various other large projects which I had pass through my hands one after the other.

Q.—Devoting a few hours' thought to a project of this magnitude?

A.—It was given all the attention which it was possible for me to give at the time. I have said already that I did not go into it in the great detail such as is referred to here—the cost of cement, the cost of iron bars and so on. It was incidental to my other duties and it would not have been possible for me to do it.

Sir Frederick Hopkinson.—They were all essential details?
A.—Admittedly.

Chairman.—But why impossible? It must have been known perfectly well in India that the figures of these materials in 1919 had appreciated three times over the prices of 1912. Why impossibe?

A.—I made allowances for a certain appreciation, but I did not make allowances for the details.

Q.—You have told us that you regarded this as an engineering project. Will you tell us how Blocks 1 and 2 were going to be filled in? *This* is plan No. 1 attached to Sir George Buchanan's estimate. How are Blocks 1 and 2 going to be filled in?
A.—Do I not refer to that in my note?

Q.—I think not. I can tell you what the point is quite shortly. Blocks 1 and 2 cannot possibly be filled in from the harbour, because, if you scale it off, it is more than 10,000 feet. That was rather an important consideration, was it not?
A.—Most, but I understood it was going to be filled in by rubble brought in by train.

Sir Frederick Hopkinson.—No, all pumped.
A.—Dry filling is what they started on, and went on with, when I last saw it.

Chairman.—On Sir George Buchanan's report it was a dredging proposition, and Blocks 1 and 2 were going to be filled by pumping from the " Sir George Lloyd " with the " Colaba " as the intermediate pumping station delivering into Blocks 1 and 2 from the harbour—more than 10,000 feet?
A.—Yes.

Q. That escaped the attention of your deputy. He did not notice it?
A.—No.

Q.—You did not notice it?
A.—I did not notice it, no. Personally, I was under the impression that this end was going to be filled up by rubble.

Q.—Can you show us anything in the report which states that?
A.—No.

Q.—With regard to the position as it existed in 1919, if a local government such as the Bombay Presidency had desired to embark on a scheme of this character, they had to obtain the sanction, did they not, of the Government of India? I am now speaking before the Reforms?
A.—Yes. This project went through the Government of India.

Q.—I used the phrase, " They had to obtain the sanction of the Government of India."
A.—Was it the Government of India or the Secretary of State? I am not quite sure which it was. I think it was the Secretary of State.

Q.—At all events it went to the Government of India?
A.—Yes.

Q.—And from the Government of India it went to the Secretary of State here?
A.—Yes.

Q.—The Government of India would, of course, communicate with the Secretary of State here representing their views on any particular project?
A.—Yes.

Q.—Therefore, it was essential that the Government of India should be carefully advised by its specialists?
A.—Yes.

Q.—Because it would be on the opinion of the specialists that the Government of India would communicate with the Secretary of State?
A.—Do not call them specialists, because they have not got any specialists.

Q.—I am speaking of you for the moment as a specialist, as head of the Public Works Department, the Chief Engineer. The Secretary of State would have no representative there, and he must rely upon the information conveyed to him by the Government of India?
A.—Not in all these projects by any manner of means. He sometimes called together a committee of experts and examined the projects separately.

Q.—You mean here in England?
A.—Yes.

Q.—You mean that the Secretary of State could bring to the notice of experts here such information as was conveyed to him by the Government of India?
A.—He would receive a project like this (and there were many of them going through my hands) and, either he would examine it or not, as he thought fit at the time.

In some instances—irrigation projects, for example—individuals or small committees were put on to examine the project.

Q.—In England?

A.—In England.

Q.—But the technical advice of the man on the spot in India would naturally weigh very much with the Secretary of State and his advisers?

A.—Yes, to the extent of recommending it or not recommending it. It might have been sent forward with the statement that the Government of India did not agree at all to the project.

Q.—This was a scheme of very great magnitude?

A.—I do not think it was anything out of the way. Schemes very much bigger than this have gone through my hands during the time I was at Simla. The schemes I have already mentioned were much larger.

Q.—Is it not the largest reclamation scheme which has ever been attempted on an open sea front?

A.—Yes, very probably it is, or as large as any.

Q.—Did you regard it as a matter in which it was your duty to give it a very high degree of care and consideration?

A.—I gave it all the consideration which was possible, with my knowledge and time, and then I asked for those three engineers to be consulted separately as experts, because I did not consider that my knowledge in this particular line of engineering was sufficiently good.

Supplementary Statement by Sir Sydney Crookshank.

In connection with my examination by the Committee may I emphasise the following points :—

(*a*) My connection with the project was incidental to my other duties as the then (1919) Secretary to the Government of India in the P.W.D., and in giving my evidence I had to draw on imperfect recollections dating back nearly 7 years.

(*b*) The project was carefully examined by me on the conditions which obtained at the time taken as a whole, and I was satisfied that the 400-lakh estimate which I recommended to the Government of India was a sound proposition. I was not responsible for subsequent events.

(*c*) Not being an expert in reclamation work myself, I made a specific recommendation to the Government of India to obtain specialist consulting advice on the project, and gave the names of experts whose opinions could be relied upon. No notice was taken of this proposal by higher authority.

(*d*) As regards the execution of the work I again made a specific recommendation to the Government of India, which again was disregarded.

(*e*) I gave it as my opinion that the success of the undertaking hinged on the efficiency, i.e. the output, of the dredging and pumping plant. In the circumstances of the work this vital consideration would ordinarily be assured.

(*f*) In writing I disassociated myself with any connection with the purchase of the dredging plant.

44th Witness, Sir Maurice Henry Weston Hayward, K.C.S.I., I.C.S.

WRITTEN STATEMENT.

I am sorry not to have been able to send a summary beforehand of my evidence as I have only recently returned home and have no official papers with me on the subject. I can, in any case, however, give no evidence as to the details mentioned in the questions prepared by the Committee, but can only, relying on my memory, offer some general remarks on the Back Bay scheme and the necessity of proceeding with it in the general interests of the City of Bombay and the Presidency.

The congestion in the City was brought prominently to notice so far back as the plague of 1897. The conditions of the chawls occupied by the working classes was wretched, and it was with the object of building new chawls of an improved type and opening out ventilating thoroughfares through the congested parts of the City that the Improvement Trust Act was passed in 1898 under Lord Sandhurst. Considerable improvements were effected under this Act, but progress was slow and its financial provisions had to be strengthened in 1905 or thereabouts under Lord Lamington or Lord Sydenham. But it was soon found that more energetic measures were necessary to remedy the existing state of things, particularly in view of the increase of nearly 50 per cent. in the population from 800,000 to nearly 1,200,000. A general scheme including

the more rapid provision of chawls and the reclamation of Back Bay was therefore sanctioned in 1919 under Lord Lloyd, and the working of it was placed under a special department named the Development Department. The object was to provide healthy residences for the working classes in place of the miserable overcrowding they were subjected to in the old and insanitary structures and to provide open spaces for healthy recreation, and spaces for improved residences for other classes and for the development of the trade of the City of Bombay. The urgent necessity for some provision for the latter was plain from the exorbitant rents levied for flats, whether for residences or offices in the neighbourhood of the Fort and the prohibitive rates and overcrowding on Cumballa and Malabar Hills. The chawls were recognised as a necessity which had to be financed out of the proceeds of a special cotton cess, but it was hoped that the Back Bay reclamation, as then estimated, would eventually result in a substantial profit to the general revenues of the Bombay Presidency.

The commercial point of view was no doubt of great importance in regard to the Back Bay reclamation but it was not the essential one. The essential point was the relief of congestion throughout the City of Bombay. It was not solely and merely a business proposition, any more than famine relief works for the Presidency. The urgent need for relief of overcrowding, particularly for the working classes, must not be overlooked, many of whom were yearly immigrants to the City from other parts of the Presidency. It was not to be expected that opposition would not be met with from landed vested interests nor that these would not be exploited for political party purposes. But they must not be permitted to overshadow the urgent requirements of the working and other classes. The repeated misstatements and irresponsible insinuations made from time to time were publicly refuted in the debates in the Legislative Council. The commercial success of the Back Bay reclamation depended on the speed with which the dredging operations progressed. They began towards the end of 1923 and gave satisfactory results to the best of my recollection for the working season 1923-24. It was not until the working season 1924-25 that less satisfactory reports were received nor till the season 1925-26 that the revised estimates indicated the probability not only of no substantial profit, but of a substantial loss. The Committee has under inquiry the technical and other reasons which have led to this result and recrimination will not modify it. The Back Bay reclamation will as now estimated, probably cost money instead of making it, and it is necessary to face the fact. The scheme will have now to be regarded from the same point of view as numerous other municipal improvements in the City of Bombay and elsewhere in the Presidency.

The congestion in the City of Bombay was undoubtedly in urgent need of remedy, and in estimating from this point of view the value of the Back Bay reclamation, it must be remembered that it will provide an extended sea face and valuable open spaces for healthy recreation as well as the many broad roads, none of which have been taken into account in the commercial valuation of the scheme. It will in fact vest, after all lands to be sold have been sold, an important and valuable property in the City of Bombay. It must also be remembered that if the original estimates were over sanguine, the revised estimates will possibly prove unduly pessimistic. They were made during the slump in land values and the depression due to the unexpectedly slow recovery of trade, while improved reports were subsequently received of the progress of the work. But even if the scheme should result in the estimated net expenditure of 3 crores, it would surely be worth the money for the immense improvement to the City of Bombay. It would anyway seem to be an entirely false economy to stop the work now and entirely throw away the 5 crores already expended. It would be far more prudent to secure the valuable property in progress of being made by expending the further 6 crores required. It was decided on this view of the matter to provide a sinking fund of 20 lakhs a year to meet the estimated net expenditure of 3 crores and to proceed with blocks 1, 2 and 8 while reserving the progress of the remaining blocks for further investigation. It was thought that the expense of securing a permanent property of so great value might suitably be spread over several generations of residents of the City of Bombay. The necessary provision was therefore made in the provincial budget for 1926-27, and a Bill imposing a stamp duty on conveyances of property to a like amount, which would chiefly fall on the City of Bombay, was recently passed by the Legislative Council. It has at the same time to be remembered that this is not merely a question of the City of Bombay, the Deccan and up-country districts rely largely on the market and port of Bombay. It is necessary therefore in my opinion to proceed to execute the whole scheme even at the present estimate of expenditure for the welfare of the whole Presidency of Bombay.

Oral Evidence.

Chairman.—You have furnished us with a memorandum, and you begin by saying: "I am sorry not to have been able to send a summary beforehand of my evidence, as I have only recently returned home and have no official papers with me on the subject. I can, in any case, however, give no evidence as to the details mentioned in

the questions prepared by the Committee, but can only, relying on my memory, offer some general remarks on the Back Bay scheme and the necessity of proceeding with it in the general interests of the City of Bombay and the Presidency." What position did you occupy in the year 1919?

A.—I was Judge of the High Court.

Q.—In 1920?

A.—A Judge of the High Court.

Q.—And for how long did you continue in that capacity?

A.—Until I joined the Bombay Government in 1921.

Q.—In what capacity?

A.—I was in charge of the Home Department.

Q.—By January, 1921, the scheme had already been set on foot?

A.—Yes.

Q.—It was announced on 3rd August, 1920, by Lord Lloyd in the Legislative Council as a scheme which had been decided upon?

A.—I was not present then.

Q.—You may take it safely from me that that is so.

A.—I will take it from you.

Q.—On that same date he announced the creation of the Special Department, the Development Directorate. Had the housing problem of Bombay been a matter of great anxiety to the Government for many years before 1919?

A.—I can say from my own personal knowledge that it was a matter of very great anxiety from the years of the plague, 1897.

Q.—You say in your statement: "The congestion in the city was brought prominently to notice so far back as the plague of 1897. The conditions of the chawls occupied by the working classes was wretched, and it was with the object of building new chawls of an improved type and opening out ventilating thoroughfares through the congested parts of the city that the Improvement Trust Act was passed in 1898 under Lord Sandhurst."

A.—Yes.

Q.—"Chawl" is the name given to workmen's dwellings in Bombay?

A.—Yes; if the word "dwellings" can be properly applied to such a place.

Q.—How do you mean?

A.—If the word "dwellings" is properly applicable to chawls of the old type. I merely say that to accentuate the wretched and insanitary condition of the old type of chawl.

Q.—"Considerable improvements were effected under this Act, but progress was slow and its financial provisions had to be strengthened in 1905 or thereabouts under Lord Lamington and Lord Sydenham. But it was soon found that more energetic measures were necessary to remedy the existing state of things, particularly in view of the increase of nearly 50 per cent. in the population from 800,000 to nearly 1,200,000." Was that congestion the result of the boom in trade during the War? Is that the period to which you are referring, or was it prior to that?

A.—It was prior to that. It began prior to that.

Q.—Do you think by 1916—that is a year and a half after the War had begun—that the population of Bombay was about 1,200,000?

A.—I could not say without the papers, but I think it was approaching that figure.

Q.—Am I right in thinking that from 1916 there was a still greater influx continuing down to 1919 or 1920?

A.—I rather think so; but, again, I am speaking without the book.

Q.—We have had some evidence about it.

A.—I believe the population now is over 1,200,000. I was told it was even up to 1,400,000.

Q.—"A general scheme, including the more rapid provision of chawls and the reclamation of Back Bay, was therefore sanctioned in 1919 under Lord Lloyd." You say in 1918, but I have corrected it to 1919?

A.—Yes.

Q.—Lord Lloyd came out in December, 1918?

A.—That must be so.

Q.—"And the working of it was placed under a special Department, now the Development Department." Should not that be the Development Directorate?

A.—Well, the Development Department was the Department which superintended it.

Q.—"The object was to provide healthy residences for the working classes in place of the miserable overcrowding they were subjected to in the old and insanitary structures,

and to provide open spaces for healthy recreation, and spaces for improving the residences for other classes, and for the development of the trade of the City of Bombay." The Development Directorate had many other activities beyond the reclamation of Back Bay?

A.—Yes.

Q.—As you point out, some of the activities were directed to ameliorating the condition of the poorer classes?

A.—Yes.

Q.—" The urgent necessity for some provision for the latter was plain from the exorbitant rents levied for flats, whether for residences or offices, in the neighbourhood of the Fort, and the prohibitive rates and overcrowding on Cumballa and Malabar Hills. The chawls were recognised as a necessity which had to be financed out of the profits of a special cotton cess, but it was hoped that the Back Bay reclamation as then estimated would eventually result in a substantial profit to the general revenues of the Bombay Presidency." I suppose you saw the report of Sir George Buchanan?

A.—Which report?

Q.—He only made one report, the report of September, 1919, which was in the hands of the Government in October, 1919. Is that a document with which you are familiar? (*Report handed.*)

A.—I am not familiar with it, but I have no doubt that it was available to me officially.

Q.—The scheme on paper, that is to say if the work could have been done for 367.61 lakhs, was an extraordinarily good one, was it not?

A.—Yes.

Q.—On almost any showing there was a certainty of profit at that price if the work could be done within the stipulated time?

A.—Time was of the essence of the contract.

Q.—You continue: " The commercial point of view was no doubt of great importance in regard to the Back Bay reclamation, but it was not the essential one. The essential point was the relief of congestion throughout the City of Bombay. It was not solely or merely a business proposition, any more than famine relief works for the Presidency. The urgent need for relief of overcrowding, particularly for the working classes, must not be overlooked, many of whom were yearly immigrants to the city from other parts of the Presidency." Do you mean seasonal immigrants when you say " yearly immigrants "?

A.—A great number of mill hands come from the Ratnagari district and stay in Bombay for a season and then return home.

Q.—" It was not to be expected that opposition would not be met with from landed vested interests, nor that these would not be exploited for political party purposes. But they must not be permitted to overshadow the urgent requirement of the working and other classes. The repeated misstatements and irresponsible insinuations made from time to time were publicly refuted in the debates of the Legislative Council. The commercial success of the Back Bay reclamation depended on the speed with which the dredging operations progressed." That was indeed the crux of the whole position, was it not?

A.—Yes.

Q.—The first essential was to obtain the permission of the Port Trust and the Royal Indian Marine to allow the dredging; the second essential was to be quite sure that there was the material to dredge, and the third essential was that the dredger could do its work. Is that right?

A.—I am not aware about the question of obtaining the consent of the Port Trust.

Q.—Have not you heard about that?

A.—I have heard about it but I am not myself familiar with it.

Q.—Under Section 28 of the Port Trust Act the whole of the bed of the sea is vested in the Port Trust absolutely. They are the owners of it. It never occurred to anyone to ask their permission?

A.—It may be, but that is not a subject with which I am personally familiar.

Q.—At all events, two great essentials were to know with certainty that there was material of the quantity and quality necessary, and to get a dredger that could pump that material at the specified rate?

A.—Quite so.

Q.—You continue: " They began towards the end of 1923 and gave satisfactory results to the best of my recollection for the working season 1923-24." I think I can show you in a moment that that is not quite correct, but you may have got that impression from the report of the Development Directorate. The dredger was supposed to be able to deliver on the reclamation site 5,000,000 cubic yards in one year, pumping

2,000 cubic yards per hour for 15 hours a day for 170 working days of the year. The actual fact is this. She commenced pumping on the 8th December, 1923. Were you present?

A.—I inspected the works soon after the pumping had been begun.

Q.—Sir George Lloyd himself left on 9th December, 1923, I think?

A.—Yes.

Q.—The dredger started to work on the 8th December?

A.—Just before he left.

Q.—One day before he left?

A.—Yes.

Q.—Have you noticed that instead of 2,550 pumping hours she did in fact 843, which is about one-third; and instead of pumping 2,000 cubic yards an hour she pumped 1,020, roughly 50 per cent.; and owing to possibly the porousness of the sea wall, the actual amount of cubic yards which was supposed to have passed through her pipe-line being 859,858 cubic yards, there was found to be deposited in the Back Bay only 528,000; that is 528,000 as distinguished from 5,000,000, so that that was not a good result?

A.—I cannot speak to those figures.

Q.—It was only just to correct this statement that I mentioned them.

A.—When the dredger began the results appeared at first satisfactory, and the material which they were pumping was very good. At that time, when the dredger first began, my recollection is that the engineers were satisfied with the work.

Q.—When did you leave India?

A.—I gave over charge of my duties in January of this year. I actually left India some months later. Of course these figures were not available until the end of the season or a good deal later.

Q.—In view of those figures that I have shown you I suppose you would like to qualify this statement: "They began towards the end of 1923 and gave satisfactory results to the best of my recollection for the working season 1923-24." Having seen those figures, they do not show a satisfactory result, do they?

A.—I should be bound to admit that when those figures were known the result would not have seemed so satisfactory.

Q.—" It was not till the working season 1924-25 that less satisfactory reports were received, nor till the season 1925-26 that the revised estimates indicated the probability not only of no substantial profit but of a substantial loss."

A.—I should like to add here that the figures of 1923-24 would not have been available for our consideration until late in 1924-25. I have written what was my recollection, that it was not until 1924-25 that we became aware that the dredging was not as satisfactory as had been hoped.

Q.—The fact that she had only pumped for 843 hours instead of 2,550 hours would have been available to you?

A.—What is the date of this report?

Q.—This is quite recent. It is Sir Lawless Hepper's preliminary statement to us.

A.—You cannot tell me at what date those figures were available to the Government.

Q.—Certainly, by August of 1924.

A.—That is exactly my point. Personally they would not have come to my notice until the season of 1924-25.

Q.—" The Committee has under inquiry the technical and other reasons which have led to this result, and recrimination will not modify it. The Back Bay Reclamation will, as now estimated, probably cost money, instead of making it, and it is necessary to face the fact. The scheme will now have to be regarded from the same point of view as numerous other municipal improvements in the City of Bombay and elsewhere in the Presidency." You mean, I suppose, as a permanent work of permanent advantage to the community?

A.—Yes.

Q.—Which must not necessarily be judged on the basis of immediate profit or loss?

A.—Quite so.

Q.—" The congestion in the City of Bombay was undoubtedly in urgent need of remedy, and in estimating from this point of view the value of the Back Bay Reclamation, it must be remembered that it will provide an extended sea-face and valuable open spaces for healthy recreation as well as the many broad roads, none of which have been taken into account in the commercial valuation of the scheme." That was the original plan, was it not, that apart from the Military area and block 8, which was going to be sold, some 239 acres, nearly a half of the reclamation, were going to be taken up with recreation grounds and broad roads?

A.—I cannot say whether it was nearly a half, but a large part was.

Q.—" It will, in fact, vest, after all lands to be sold have been sold, an important and valuable property in the City of Bombay. It must also be remembered that if the original estimates were over sanguine, the revised estimates will possibly prove unduly pessimistic." On that point it has been stated that the ultimate cost would be 11 crores?

A.—Yes.

Q.—Lately there has been a revision, and it is believed that, even if the whole of the work is completed, it will be done for 10 crores, which is £7,500,000. Assuming it to be the fact that the whole of the work will be completed at a cost of £7,500,000, would you, in view of all the circumstances, proceed with the work, and carry it through?

A.—Certainly. I explain that later.

Q.—Then speaking of the estimates, you continue : " They were made during the slump in land values, and the depression due to the unexpected slow recovery of trade, while improved reports were subsequently received of the progress of the work. But even if the scheme should result in the estimated net expenditure of "—you have put three crores?

A.—Yes, that is the net expenditure.

Q.—By " expenditure " you mean net loss?

A.—The net loss.

Q.—" But even if the scheme should result in," may I say an ultimate net loss of three crores?

A.—No, not " net loss " ; I used the word " expenditure." It means that for the expenditure of three crores the inhabitants of Bombay City will have a very valuable property added to the City. The cost to the City will be three crores.

Q.—You mean that the excess of cost over receipts will be three crores?

A.—Yes.

Q.—" But even if the scheme should result in the estimated net expenditure of three crores, it would surely be worth the money for the immense improvement to the City of Bombay. It would anyway be an entirely false economy to stop the work now, and entirely throw away the five crores already expended. It would be far more prudent to secure the valuable property in progress of being made by expending the further six crores required. It was decided, on this view of the matter, to provide a sinking fund of 20 lakhs a year to meet the estimated net expenditure of three crores, and to proceed with blocks 1, 2 and 8, while reserving the progress of the remaining blocks for further investigation. It was thought that the expense of securing a permanent property of so great a value might suitably be spread over several generations of the residents of the City of Bombay. The necessary provision was, therefore, made in the Provincial Budget for 1926-27, and a Bill imposing a Stamp Duty on conveyances of property to a like amount, which would chiefly fall on the City of Bombay, was recently passed by the Legislative Council. It has at the same time to be remembered that this is not merely a question of the City of Bombay. The Deccan and Upcountry districts rely largely on the market and Port of Bombay. It is necessary, therefore, in my opinion, to proceed to execute the whole scheme, even at the present expenditure for the welfare of the whole Presidency of Bombay." Do you know of any expert, except Sir George Buchanan, whom the Governor of Bombay consulted before the 3rd August, 1920?

A.—I cannot speak to anything before January, 1921.

Q.—In January, 1921, you became a Member of the Government?

A.—Yes.

Q.—A matter that must have been causing the Government a great amount of consideration was this Back Bay Reclamation?

A —The scheme was then already settled.

Q.—True it was settled, but it was regarded as a matter of vital importance to Bombay, was it not?

A.—It was regarded as important.

Q.—And would be a matter of conversation amongst officials in the Government?

A.—Undoubtedly.

Q.—Did you ever have any conversation with Lord Lloyd about the matter?

A.—I should like to get quite clear as to the trend of that question. As a Member of Council, it would not be proper for me to speak to any considerations or conversations in the Council. I think you understand that? We all take an oath not to speak of matters which are concerned in Council. That is a necessary provision for all Executive Councils.

Q.—I do not know that I quite understand you. Let us take 1921. In 1921, did you and Lord Lloyd ever have a talk about this Back Bay Reclamation?

A.—My point is this : that it would not be proper for me to disclose any discussions in the Executive Council. In fact, I am prohibited from so doing by my oath of office. When I took office I was bound by oath not to disclose the confidential discussions in

Council. I should like to be quite sure of my position before pursuing this. I hope you understand me? It is not with any desire not to answer any question that I possibly can that I say this : but I should like to make my position quite clear to you.

Q.—As regards any discussions that took place in the Council, you take the point that you are bound not to disclose what they were?

A.—Yes, I do not think I should be justified in doing it one way or the other.

Q.—If it should become necessary after Lord Lloyd has given evidence, I have no doubt one could make arrangements by which release could be given, and then we could ask you the question?

A.—I dare say you are aware that release can be given by His Excellency the Governor.

Q.—No doubt that can be done, if it is required. But discussions after dinner hardly come within that category. Did you have any?

A.—Of course the Back Bay Reclamation scheme was discussed freely in public.

Q.—And on social occasions?

A.—On public and on social occasions, undoubtedly.

Q.—At any social occasion, when you and Lord Lloyd were discussing the Back Bay scheme, did he ever tell you that he had ever taken the advice of anybody except Sir George Buchanan?

A.—I could not recollect; that is a good many years ago.

Q.—Have you ever heard the name of any man mentioned as having tendered advice to Lord Lloyd, except Sir George Buchanan?

A.—I cannot say.

Q.—You mean you have no recollection of ever having heard of one?

A.—There must have been local engineers who must have given opinions.

Q.—Did they? Have you any knowledge that they did?

A.—I cannot speak of my own knowledge.

Q.—We have tried hard to find out, and up to now we can find no one.

A—I have no doubt that that question can be answered by Lord Lloyd.

Sir M. Visvesvaraya.—The original estimate was about 400 lakhs for the scheme—367 lakhs.

A.—I think it was 367 lakhs. I have seen it so stated in the papers.

Q.—It was a boom time when the work was started and the prices of land were very high.

A.—At which time?

Q.—At the time of sanctioning of the project.

A.—In 1919?

Q.—In 1919 and 1920.

A.—I think prices were then rising.

Q.—When after two or three years' experience the estimates were doubled and the land prices fell, did the Government take any steps to review the position and to adjust their expenditure and policies accordingly, or did they continue irrespective of change of circumstances?

A.—That is rather a general question.

Q.—You can only answer general questions because you have not had time to acquaint yourself with the details?

A.—The question of the Development Department was continually under the consideration of the Government, and was also continually under the consideration of the Legislative Council. The full accounts were laid every year at the time of the Budget before the Legislative Council.

Q.—But there was no change of policy, notwithstanding the change of circumstances?

A.—There were changes of policy in the working of the Development Department.

Q.—In the policy with reference to the reclamation scheme were there any changes? I suggest to you there were none.

A.—There was no change in the general policy of carrying out the reclamation scheme. Whether there were changes in the detailed methods of carrying it out or not I am not in a position to say; but there was no change in the general plan of carrying out the Back Bay reclamation scheme.

Q.—Although the estimate was doubled, and although the prospects of selling the land were dissipated, the Government continued to follow their policy?

A.—The prospects of selling the land were not dissipated.

Q.—But the prices have gone down very considerably?

A.—But prices, on the other hand, may rise considerably in the future.

Q.—There is a very large area of vacant land now available which cannot be sold. You are aware of that?

A.—No; not a very great deal.

Mr. Billimoria.—It is as big an area as this reclamation can produce, or even bigger.

A.—Where is that area?

Q.—In the town of Bombay. It is more than 30 lakhs of square yards.

A.—Not in the town of Bombay.

Sir M. Visvesvaraya.—We have got the report of the Advisory Committee to that effect?

A.—Possibly it is in the island of Bombay.

Mr. Billimoria.—It is in the town and island of Bombay—some of it in the northern part.

A.—There is a large area in the north of the island of Bombay, but I doubt very much whether there is a large area of land available for the town in the south part of the island of Bombay.

Mr. Billimoria.—There is a statement which has been recently submitted in which it is stated there are 30 lakhs of square yards.

Chairman: The witness says as regards the Fort district he questions whether there is any substantial area of land available.

Mr. Billimoria.—In the Fort district there are 370 lakhs of square yards. This is what the report says about land which is available: B.B. and C.I. railway land at Colaba, 34,525 square yards. G.I.P. railway land at Colaba, 105,577 square yards. Military lands in Fort and Colaba, 171,427 square yards. Colaba Land and Mill Company, Colaba, 55,822 square yards.

Sir M. Visvesvaraya.—That will show you that there is a lot of land available which can be sold, and they cannot sell it fast enough.

A.—I ask where is this land—in what particular vicinity?

Q.—It is given in that report.

A.—No; the vicinity is not given.

Q.—It says: "Vicinity of military land for reclamation area."

A.—The military land in the Fort and Colaba is only the Colaba Land and Mill Company's area. These are all smaller items; for the bigger items the locality is not given.

Q.—I quite agree with you that vacant land is required on the south also, but for purposes of sale there is a large area of vacant land which cannot be disposed of at reasonable rates at the present time?

A.—There is some land.

Q.—The prices of 80 to 100 rupees a square yard on which you estimated originally cannot be had if you throw open a large area of land for sale?

A.—No doubt that is the present position. My own opinion is in the future there is every probability of the value of the land rising.

Q.—That is quite right, but in the meantime the interest charges will be growing?

A.—That is true.

Q.—And the cost will be trebled or quadrupled?

A.—The interest charges will grow.

Q.—That is the real problem. I want to know whether the Government changed its policy in any way in view of the changed circumstances?— Will you kindly say yes or no to that?

A.—Which policy?

Q.—The policy of the Government with respect to the scheme. Did they change their policy or did they consider a change of policy necessary at any time in view of the change in the circumstances?

A.—The conclusion last reached before I left was to proceed with blocks 1, 2 and 8 and to decide about the remaining blocks thereafter.

Q.—You have seen the Advisory Committee's Report, I suppose?

A.—No, the Advisory Committee's Report was not in the hands of the Government before I left the Government.

Q.—They had decided to restrict operations, I think?

A.—Certain of the figures had been roughly presented and that was the conclusion.

Q.—When the estimate went up to 702 lakhs, was the scheme placed before the Legislative Council for their opinion or for their approval?

A.—What would be the date of that?

Q.—It would be about September, 1922.

Chairman.—We know it was not.

Sir M. Visvesvaraya.—It was not. The revised estimate was not placed before the Legislative Council?

A.—The Advisory Committee I imagine——

Q.—The Advisory Committee had nothing to do with it. This was not a concern for the Advisory Committee. I am putting to you the question of the sanction of the revised estimate of 702 lakhs. The first estimate was 367 lakhs?

A.—Yes.

Q.—That estimate was revised to 702 lakhs in the course of a couple of years, but that revised estimate was not placed before the Legislative Council and was not submitted to the Government of India. The Government themselves sanctioned it in their executive capacity as the records show?

A.—I cannot say of my own knowledge.

Q.—Is not the sanction of the local Legislature necessary to obtain funds for such a large project as this?

A.—I have already said that the Development Department's budget was submitted every year to the Legislative Council.

Q.—Is Budget sanction sufficient, and do you not want individual sanction for a large scheme like this?

A.—I think Budget sanction is sufficient.

Q.—The Government might sanction any large scheme and then merely place it at the time of the Budget before the Legislative Council? Would that be in order?

A.—We had the practice more recently of placing all large projects before the Legislative Council. I do not think it is required by the Act or the Rules under the Government of India Act.

Q.—You have had a discussion in the Council?

A.—I do not think it is required by the Government of India Act, but I know the practice later was to place all large schemes before the Legislative Council.

Q.—This was not placed before the Legislative Council, we know.

A.—You know that—you mean the revised estimate?

Q.—Yes.

A.—I have already said I cannot say without the papers or without reference to the debates in the Legislative Council.

Q.—How many Members of the Council dealt with this scheme? Have you any objection to telling me that? Was it the Governor and one other Member?

A.—I can tell you that an Indian Member of the Executive Council was in charge of the Development Department throughout the whole of the time that I was a Member of the Government. The Finance Member, of course, had to deal with the finances of the Development Department and His Excellency the Governor, of course, would deal with anything so important as the Development Department.

Q.—I suppose only the most important questions came before you as a Member of the Council and not the details?

A.—That is the general practice of Executive Governments. The more important questions only are referred to the General Council.

Q.—Were the Ministers kept informed of the progress of the work?

A.—The Ministers were present at almost all the meetings of the Executive Council and they must have heard the discussions upon all subjects of general importance which were brought before the Executive Council.

Q.—Are you aware that they were present when this subject of the Reclamation Scheme was discussed?

A.—They must have been. They must have been present at any important matters of that nature.

Q.—Our information was that they were not kept informed. Do you deny or accept that statement?

A.—I think that information must be incorrect.

Chairman.—I would like to fix the date because Sir Maurice Hayward did not become a Member of the Government till 1921. What is important to ascertain is what was taking place before August 3rd, 1920, as to which Sir Maurice Hayward can tell us little or nothing.

A.—I am only speaking of events after January, 1921.

Sir M. Visvesvaraya.—I am also referring to the conduct of the works after you became a Member. Was it the practice to keep the Ministers informed of the progress of this work or of the more important developments connected with the work?

A.—Are you referring to the period before 1921?

Q.—No, after 1921, during the construction of this work?

A.—I think I have already replied to that question, that all matters of general importance were brought before the Executive Council at which the Ministers were present.

Q.—Another late Member of the Government told us that the Ministers got their information when the subject was discussed before the Legislative Council and he did not say that the Executive Council gave any information to them.

A.—But was he asked that question?

Q.—We asked that question, and our information is that the Ministers had no information. I want to know from you what the real practice was?

A.—I think your information is incorrect.

Q.—Then we will learn that probably from other sources.

A.—I had occasion to look into the question of the number of meetings of the Executive Council at which reserved subjects were discussed in the presence of the Ministers, and I found that at almost all the meetings of the Executive Council at which Executive matters were discussed the Ministers were also present and heard the discussions. I had occasion to publish that in the Press in reply to certain misapprehensions of a learned colleague of mine who had also been a Member of the Council.

Q.—Why was not a correct statement of affairs published from time to time concerning this work, and why was not the public taken into confidence? I only ask for information. I am not criticising anyone.

A.—I do not admit that a correct statement was not published or that the public were not taken into confidence. I do not quite know what you are referring to.

Q.—A great many statements only came to light when Members of the Legislative Council put questions. As a result an Advisory Committee was asked to submit a report. It was only when the Advisory Committee made a report that a great many things came to light and a great many startling disclosures were made?

A.—The Advisory Committee were in existence to the best of my recollection from the earliest days of the Development Department.

Q.—But it is said they were not kept fully informed of what was going on?

A.—I am not aware of that. I imagine that the Advisory Committee had every information that they required.

Q.—Several witnesses deposed before us to that effect.

A.—I cannot speak of my own knowledge. The obvious way of ascertaining information is by questions in Council. Many questions were asked and were fully answered in the Legislative Council.

Q.—When the dredger did not give a satisfactory output what steps did the Government take to rectify matters? That was an important event in the history of the scheme. The failure or partial failure of the dredegrs was an important factor.

A.—At what date do you say it was known that the dredger had failed?

Q.—About 1924.

A.—I am not sure that the dredger had failed.

Q.—You are still in doubt?

A.—I should like to be more definite about that. Did the dredger fail or did the supply of mud fail?

Q.—The dredger was expected to give 5,000,000 cubic yards annually and it has only given about 1,800,000?

A.—I cannot speak to any question of technical detail, but I imagine there are two questions—whether the dredger failed or whether the supply of mud to be dredged did not fail.

Sir Frederick Hopkinson.—No, it did not.

A.—You say the mud did not.

Sir Frederick Hopkinson.—No.

Sir M. Visvesvaraya.—The mud is still there?

A.—Those are technical points on which I have no information.

Q.—Only a fraction of the mud has been handled till now. The whole of the mud is there. Did the Government make any systematic inquiry to find out why the dredger did not give the promised output. For two years they have been sitting over it?

A.—I believe not.

Q.—They have taken no action?

A.—They have not been sleeping over it.

Q.—They have taken no action?

A.—Inquiries were I believe made, but I have no personal knowledge of the particular inquiries. That was done in the Development Department.

Q.—But there is no continuous correspondence on the subject. We did not see that any systematic inquiries were made in that respect?

A.—I am afraid I cannot help you on that point.

Q.—Did the Government consider what the financial results of the scheme from time to time or from year to year would be, when they prepared the Budget and discussed these questions?

A.—The Development Department's budget was considered every year at the time of framing the Budget for the next year.

Q.—Only on the expenditure side?

A.—And the receipt side.

Q.—But no financial review was made? The financial prospects of the work were not reviewed from year to year?

A.—The Budget statement contained a capital statement as well as a Revenue Account. The Budget contained both a Capital Account and a Revenue Account.

Q.—That is usual, but was this work treated in the same way?

A.—It must have been included in the Capital Account.

Q.—Were the financial results examined from year to year or reviewed as compared with the original forecast?

A.—They must have been or they could not have been included in the Capital Account Budget.

Q.—There are no accounts of that character. There are none published?

A.—I can only suggest your examining carefully the Budget statement for each year of the Bombay Government and you will find there the Capital Accounts of all the major works, and certainly of all the works of the Development Department.

Q.—But not a review of the financial results?

A.—The capital account each year had to show what money was required and what capital was required to carry on the work.

Q.—The expenditure went on all right, but on the receipt side there was no review of the changes which had come about?

A.—The capital required had to be reviewed every year. The progress of the work had to be considered. The capital to be provided in the ensuing year had to be considered and had to be entered in the Budget. It was the most important item in the Budget.

Q.—I am not talking of capital at all.

A.—The whole of the expenditure on the Back Bay reclamation was capital account.

Q.—Without money the work cannot go on, and the expenditure side was all right; but the revenue side was not considered. That is what I am putting to you. I suggest the revenue side of the work was not considered from year to year in the Budget.

A.—I do not think there was any revenue side at that time.

Chairman.—There was no revenue; it was all expenditure?

A.—It was all expenditure.

Sir M. Visvesvaraya.—That is all I want on that. You suggest even though there may be a loss of three crores on this project, it is worth while to complete the scheme?

A.—Yes.

Q.—But three crores will be the loss even if you complete blocks 1, 2, and 8. There will be a net loss of three crores.

A.—The three crores will not be a loss at all. It will be the purchase price of a most valuable addition to the property of the city of Bombay.

Q.—But the money comes from the provincial taxpayer. It may be an addition to the amenities of Bombay, but why should the provincial taxpayer be required to pay for it?

A.—Because it is a most valuable addition to the headquarters and port of the Bombay Presidency.

Chairman.—And of a very beautiful city.

A.—And of a very beautiful city.

Sir M. Visvesvaraya.—Even if the loss is very much more than three crores you would proceed with the work, I take it? The three crores you have lost irrevocably.

A.—I should prefer not to involve myself in hypothetical questions.

Q.—But three crores have been lost; that is not hypothetical.

A.—I do not admit that the three crores will be lost. I say you have to remember it is merely the purchase price of a very important addition to a valuable property of the city of Bombay.

Mr. Billimoria.—If I may interrupt, it is not. After taking into account the value that will be realised by the disposal of the land, the balance really unaccounted for will be three crores, which sum the Government of Bombay have now decided to write off in a number of years from their annual revenues; so that it is a distinct loss.

A.—I think, if I may be permitted to say so, you overlook the fact that a very great portion of the land will not be sold at all, but will vest in the city of Bombay.

Q.—That is a very small area, comparatively.

A.—That is a matter of opinion; but I think it is a very valuable property that any municipality would be proud of.

Q.—There is a sum of 18 lakhs by way of interest to be paid every year by the citizens of Bombay for amenities which are hardly amenities at all.

A.—I think it is wrong to restrict it to amenities. It will very largely improve the trade possibilities of Bombay.

Mr. Billimoria.—That is a matter which is hypothetical.

Sir Frederick Hopkinson.—Being in charge of the Home Department you would, of course, take a keen interest in the progress of the Back Bay reclamation?

A.—I would take a keen interest in all important works of that nature in the Bombay Presidency.

Q.—Particularly in the progress of the Back Bay reclamation, because you see it pretty well every day, do you not, from the Secretariat?

A.—That alone would not be sufficient, because I tour all over the Bombay Presidency, and I see all the works of importance.

Q.—The answer to my first question is Yes?

A.—Yes; I did take an interest.

Q.—You say you did not know until August, 1924, that is the end of the season, what the dredger had been doing. The results were not given to you till August?

A.—That is my recollection without consulting the papers.

Q.—That would be when the Development Directorate report was published?

A.—I think so.

Q.—We have been told by one of the witnesses who was on the dredger that soundings were taken every day, and that it was possible for you to know each day what amount of work the dredger had done?

A.—Well, I cannot answer that. That is a technical question, but I should have thought you would have had to have waited until the end of the season before you ascertained it.

Q.—Oh, no!

A.—I am not an expert, and I am not in a position to answer.

Q.—As I put it to another witness, the dredger digs a hole and you can measure it at once, and you can do it as often as you like, morning and afternoon, day by day if you like, and tell exactly, or very nearly exactly, what has been done. Therefore, I want to know why the Bombay Government should wait until August to know how the dredger was getting on.

A.—Well, I am not an expert, but I imagine the tides play a good part in it.

Q.—They have nothing whatever to do with it.

A.—I can only say that it seems to me, as a non-expert, that it would have been wiser to wait till the end of the season before judging exactly what had happened.

Q.—Why should you wait a precious seven or eight months to know whether a dredger which cost nearly a million was fulfilling your expectations? You could have told at the end of the first week or at the end of the second week.

A.—I cannot say. That is a question for experts.

Q.—It is not a question for experts. I want to know why the Government of Bombay did not insist upon knowing what had been done.

A.—Well, I must repeat that that appears to me to be a question for experts; but I understand from you that it could have been ascertained.

Q.—Every day, if you like.

A.—On the other hand, I have been given to understand that a great deal of the dredging was eventually washed away.

Q.—That does not affect the question at all. The dredger was built to do certain work, not to retain it somewhere else. You could have known exactly what the dredger was doing. The fact that some of it was lost afterwards did not affect the efficiency of the dredger. If the dredger had dredged the material it was no fault of the dredger if the material was afterwards lost?

A.—No; I presume not.

Q.—Therefore, I wanted to know if you could tell me why no one in the Government, including yourself, who was responsible for this department——

A.—I was not responsible for this particular department.

Q.—I thought you were. You said the Home Department?

A.—Yes.

Q.—Is not that the Back Bay reclamation?
A.—No.

Q.—I beg your pardon. I thought it came under your department?
A.—It was not in my department at all.

Chairman.—It comes under the General Member?

A.—It comes under the General Department.

Q.—The General Member?
A.—Yes.

Sir Frederick Hopkinson.—Still, as a member of the Legislative Council and a member of the Government, I want to know why you did not ask a question as to what the dredger was doing, because it has been generally recognised in the original report, and in every document since, that the dredging is the crux of the whole scheme. If the dredging was all right the other things did not matter very much. What I want to know is why no one in the Government was sufficiently curious to insist upon knowing what the dredger was doing?

A.—I cannot say in the first instance that no one in the Government did ask that question.

Q.—I have asked every other witness who has come before us that question, and no one has answered it?

A.—The members of the Government in charge of the Development Department were Sir Chimanlal Setalvad and Mr. Cowasji Jehangir. I cannot say what questions they asked, or what inquiries they made. It would not have been within the scope of my duties to interfere in that matter as Member in Charge of the Home Department.

Q.—I should have thought you would have said to the Member who was responsible: "How is your dredger getting on?" Do not you think that you might have said that, being keenly interested in this very important work in Bombay?

A.—If the Member in Charge of the Department was satisfied with the work it would hardly be my place——

Q.—But he did not know; he could not be satisfied?

A.—I think it was hardly the business of the member in charge of the Home Department.

Q.—It all depends. I think if I had been in your position I should have said to the General Member: "I hope your dredger has been doing well this last week or this last month." Do you not think that would have been a reasonable question to put to a colleague?

A.—I think you hardly appreciate the working of the Bombay Government?

Q.—I do not know anything about the working of the Bombay Government, but you and the General Member are colleagues. I suggest to you that it would have been a reasonable thing for you to have said: "How is your dredger getting on." The heart of this scheme, which is going to be of such importance for the City of Bombay, is the dredger; but no one seems to have expressed a wish to know what the dredger was doing?

A.—I think you are under a misapprehension.

Q.—I am not.

A.—We most of us did inspect these works from time to time, and did see what was going on.

Q.—But you cannot say what was going on?

A.—And did generally inquire how the work was going on.

Q.—What answer did you get?

A.—The Director of Development took us on several occasions round the works to show us what was going on.

Q.—Did he ever say to you that the dredger was only doing half its estimated quantity?

A.—Undoubtedly I must have heard that later on. What particular time I cannot say.

Q.—I am speaking now at any time from January to July, 1924. Did not he know himself that the dredger was only doing half its estimated quantity per hour, and only one-fifth of its estimated quantity per year?

A.—I think you have examined him.

Q.—We have.

A.—Then I imagine he has informed you whether he knew or whether he did not know.

Q.—I am not sure whether I put that question to him?

A.—I could not answer for him; but I think that information must be got from the Director.

Q.—Did he ever tell you that the dredger was doing so badly that they were only getting half the estimated quantity?

A.—I cannot answer definitely a question of that kind; but certainly we must have heard later on in the work that the dredger was not doing satisfactorily. I cannot tell you the exact date.

Q.—You cannot tell me anywhere near, from January to July, 1924?

A.—No; I could not.

Q.—The first season this dredger only did about one-fifth of its estimated quantity per annum. That, surely, would be a matter of very great concern to the Government of which you were a member?

A.—Yes.

Q.—Was anything done, do you know?

A.—I cannot say. I was not in charge of the Department.

Q.—We will leave it at that. You said just now that time was the essence of the contract?

A.—Yes.

Q.—That would have a very important bearing on cost because of the question of interest and compound interest?

A.—Yes.

Q.—The estimated time for completion was 1926?

A.—I cannot say.

Q.—You do not know?

A.—No.

Q.—You have not read Sir George Buchanan's report?

A.—I have not studied it.

Chairman.—You may take it it was 1926?

A.—I will take it from you.

Sir Frederick Hopkinson.—In July, 1924, when the dredger had done approximately 1,000,000 yards of dredging out of 25,000,000 yards, you must have seen that the cost was going to be enormously increased over the 702 lakhs estimate by reason of this interest charge and compound interest?

A.—I think that must have been realised in the Department.

Q.—That is as far as you can say. You spoke just now of a programme for chawls. Can you tell me how many it was intended to build?

A.—50,000.

Q. Do you know how many have been built?

A.—I am speaking without papers, but I think about 20,000; or have you the figures?

Q.—I was told it was 17,000?

A.—I am not far out in saying in round figures 20,000.

Q.—Has the progress of construction of these chawls been entirely stopped?

A.—I cannot say whether it has been entirely stopped.

Q.—How far?

A.—It has been reduced.

Q.—Has it not been stopped? Was it not stopped last year?

A.—You have not been able to obtain that information from any other witness?

Q.—I am asking you?

A.—Well, I was not in charge of the Department. I am merely speaking from memory. If you want really to know the facts, the best person to ask would be somebody in the Development Department.

Q.—Do you not know as a general fact that the construction of chawls has been stopped?

A.—I remember it was very materially reduced.

Q.—After completing 16,000 or 17,000?

A.—It was very materially reduced. Whether it has been finally stopped or not, I am not in a position to say. I think very likely you are right.

Q.—Does not that point to a very large over-estimate of the necessities of the case in 1919?

A.—Not necessarily.

Q.—Why not?

A.—There is the question of being able to let chawls at a rate which will cover the cost less the cotton cess.

Q.—Is it not the fact that a very large number of the chawls already built remain unoccupied?

A.—I cannot say at the present moment. A good many were when I left.

Chairman.—When we left they were unoccupied, too?

A.—There is this other problem, that you may build a very nice chawl, but you have next to get the people to live in it. Some of the people at present prefer to herd four or five families in one room. You may build them four or five nice rooms and say: "There they are; please occupy them," but they will not go into them. Therefore, you must take that into consideration when you are judging whether the estimate was an over-estimate in 1919.

Q.—You would take that into consideration before you decided on building 50,000, would you not?

A.—No, not necessarily.

Q.—Why not?

A.—Not necessarily before providing the necessary space for that number of chawls.

Q.—Never mind the space?

A.—You have to have the space for your chawls.

Q.—You decided to build 50,000 chawls?

A.—In the hope that the people would move out of their congested slums and live in them.

Q.—But the character and nature of the people have not changed since 1919?

A.—It was hoped that the provision of nice chawls would change their nature.

Q.—Please answer my question: Do you think the nature of the people has changed since 1919?

A.—I think the standard of living is steadily, if imperceptibly, rising.

Q.—Therefore, they would be more likely to want new chawls?

A.—Yes.

Q.—Do you not think the character of the people requiring somewhat better accommodation should have been considered by the Government before they decided to build 50,000 chawls? Having decided to build 50,000 chawls, finding it not necessary to build any more after they have built 16,000 or 17,000, a large number of those being unoccupied, do you not think it points to a great want of estimating power on the part of those people who decided to build the 50,000 chawls?

A.—I do not think it indicates any want of estimating power in regard to the Back Bay Reclamation.

Q.—We are not speaking of the Back Bay Reclamation; we are speaking of the chawls for the moment?

A.—I understood that the subject of this Inquiry was the Back Bay Reclamation?

Q.—I am trying to connect the two, by suggesting to you that the same people who made the estimate for the one made the estimate for the other?

A.—I do not think the same people did make the estimate.

Q.—Well, the same Government. They had the same optimistic views, shall I say, and having gone wrong in one case they were just as likely to have gone wrong in the other?

A.—I do not think that logically follows.

Q.—50,000 chawls mean 50,000 tenements. When I asked the meaning of chawl, which I did not know, I was told it was a one-roomed tenement?

A.—A chawl generally is a large building containing a great number of tenements. When you speak of building 50,000 chawls, you mean 50,000 tenements. I understood you perfectly.

Q.—I was very much struck with the statement you made just now to the effect that the dredger gave satisfactory results in 1923 and 1924. The satisfactory result given was that it did one-fifth of its estimated quantity?

A.—I think I have already explained my meaning, in answer to a question put by the Chairman.

Q.—Would you mind telling me it again?

A.—When the dredger began it appeared that the dredging was satisfactory. We actually saw the work. We saw it at work. At that time the engineers seemed pleased with what it was doing. It was not until late in 1924 that the results of the dredging were known.

Q.—Therefore you did not know this until they had spent six or seven months in working?

A.—I did not.

Q.—Sir Mokshagundam said something about taking the public into their confidence. So far as I know, the principal reports made by the Government to the public were the Annual Development Reports. I suppose you have seen those?

A.—Yes. I got copies.

Q.—Do you think there is anything in there which goes any distance towards taking the public into the confidence of the Government about the progress of the work?

A.—I cannot say I have studied them sufficiently to answer that question.

Q.—In one year, when the dredger was doing one-fifth of its output, I think they said: "The works are proceeding satisfactorily." You would not call that taking the public into their confidence, would you?

A.—I cannot say. I have not really studied those reports sufficiently.

Q.—But what would you say if that is the case?

A.—That is hypothetical.

Q.—No, not hypothetical. It is concrete. The Government say: "The works are proceeding satisfactorily." At that time one-fifth of the proper output had been done. Would you call that a correct description?

A.—I could not give you an opinion on the report without studying it carefully.

Q.—I do not ask you to do that. I ask you to give me your opinion on a particular paragraph which I mention to you?

A.—It would hardly be fair to give an opinion on a particular paragraph.

Q.—It has nothing to do with the rest of the report. They say: "The works are proceeding satisfactorily." At that time the dredger was doing one-fifth of its proper quantity. Would you call that a proper description?

A.—I can only say that I am not prepared to answer a question of that nature on a single paragraph without having had the opportunity of considering the whole report.

Sir Frederick Hopkinson.—If I was not addressing a Judge of the High Court, I should say that you were fencing with the question.

Chairman.—We have got from Sir Lawless Hepper that the Development Directorate Reports were not candid and that there were material omissions. I think Sir Lawless Hepper has been very fair in his answers?

A. I cannot say anything about that; I have no personal knowledge.

Q.—We have it from Sir Lawless Hepper. I do not think we really need ask you about it. He is the author of the document, and he admits it is not true?

A.—You understand my natural caution in not giving an opinion on a single paragraph without being aware of the whole report. I should only like to add this—that in addition to those reports the Development Department was very fully discussed from time to time in the Legislative Council, and I think it would be well to examine the Debates to see whether full information was not given in those Debates in the Legislative Council.

Mr. Billimoria.—I may mention that all we want is the whole truth, and I may point out the danger which would exist, in connection with one of your answers to our Chairman, if you were not to disclose the discussions which took place in the Executive Council. There would be the danger of an impression being left that there is something which somebody is attempting to keep back. All we want is nothing but the truth. There may be misapprehensions about certain points and certain matters, and if you were candidly to tell us everything you know about it, it would clear the atmosphere. We are not here to make insinuations against anyone; we only want facts. As home member I take it you were not concerned with the Development Department directly or indirectly, or with its activities?

A.—Not directly.

Q.—Were all matters of any importance concerning the Development Department discussed with the members of the Executive Council?

A.—Matters of prime importance must have been discussed.

Q.—On how many occasions; can you tell us?

A.—I could not tell you the number, but at the time of the Budget, the Development Department was considerably discussed—every year before preparing the Budget for the next year.

Q.—Is the impression left on your mind that the Department gave you candidly all the information which they had in their possession and that the Government were in the confidence of the Department?

A.—I have no reason to suppose that the Department did not give all the information required by the Government. By Department, do you mean the Directorate?

Q.—Yes.

A.—I have no reason to suppose that the Directorate did not give all the information required by the Government.

Q.—Did you see any of the reports published by the Development Directorate?
A.—The annual reports.

Q.—Did they give the correct information? Sir Lawless Hepper has admitted, in answer to my questions, that much more information could have been given which has not been given in those reports.
A.—I cannot say.

Q.—In answer to one of the questions with regard to the memorandum you were good enough to submit this afternoon, you spoke of some congested area. Did you ever expect that people living in that congested area would transport themselves to the reclaimed area? Were they the class of people who were going to live in that area, paying 400 to 600 rupees monthly rent, when their income for the year did not amount to that?

A.—The better classes have been steadily moving out of the city to the better quarters of Bombay. No doubt those classes would move out to the reclaimed area, just as the still richer classes have moved out to Cumballa and Malabar Hills. They would, to that extent, afford more room in the congested areas.

Q.—How was this scheme, therefore, going to help the poorer classes—in what direction?
A.—The more people who moved out of the congested area, the better.

Q.—But how was it going to help the poorer classes?
A.—By leaving vacancies for them.

Q.—Do you mean to say that a man living in a 10 foot by 10 foot room would go and occupy the whole of a flat in a building? No doubt if he could afford to pay the rent he would, but if his income remains stationary, how is he going to shift into these palatial buildings? How is a man, at present living in a chawl, going to occupy a flat? Is that the idea?
A.—It is not my idea, no; but you understand there is a gradual movement. The richer classes move out into the better areas, the middle classes move into theirs, and the middle classes vacate buildings which are occupied by the other classes.

Q.—That all happened because Bombay was prosperous after the war. A lot of money flooded into the country, and people did not know what to do with it?
A.—Not at all. I remember Bombay over 35 years ago, when there was hardly a single house on the sea face. Now along the whole of the Chaupati sea face there are most palatial residences, all occupied by well-to-do Indians. It began very much before the war.

Q.—How many such people do you expect would spring up year after year to occupy an area which would be reclaimed consisting of 1,145 acres, the reclaimed building area being 2,200,000 square yards of land? How many people would come and take that area? Would it not take years?
A.—I could not give you any estimate, but I know that building is going on very rapidly still in Bombay, and every year numbers of people move out into better buildings and better residences.

Q.—But that is a gradual and slow process?
A.—Not slow. It has been going on very quickly.

Q.—The reports of the Improvement Trust are far more disappointing. The last report indicates that they had to cancel several of the land contracts because people would not take up land and would not build?
A.—That is very likely at present owing to the depression of trade.

Q.—You spoke of vested interests. Who are those vested interests in the political parties which agitated about this?
A.—The vested interests are those of the landlords who own land and own chawls. They naturally do not want to see the value of their land and the value of their chawls for letting purposes go down.

Q.—How was it ever calculated that the value of land would go down? If there was a demand the supply was there and the prices must remain stationary. If there was no demand prices would never fall. Therefore where was the question of vested interests?
A.—If there is more land available and the demand is the same, the value of the land will go down.

Q.—But is there a demand for land?
A.—There was a very heavy demand.

Q.—Yes, because of the speculation, but ignore that boom period of speculation and come to normal times and tell me whether there was any demand, or if there is likely to be any demand in the near future.
A.—I think so. I think there was a normal demand, quite apart from the heavy speculation.

Q.—Which would have swallowed up the 1,145 acres of land?

A.—There is every reasonable probability of the land being sold gradually.

Q.—Gradually I quite agree, but there is no immediate prospect of a sale. It has been suggested by several people in Bombay that, with flourishes of trumpets the scheme was announced as yielding, at a very moderate estimate, a profit of 30 to 50 crores. Now the situation has changed, members of Government come forward and say that there is a large area that will be available which is an addition to the site of Bombay and beautifies the city. Is that the right view of the situation? You go and tell the public you are going to make a profit hand over fist of from 30 to 50 crores. Now, then you are faced with a tremendous loss, and you know that you are absolutely wrong in your forecast, you come forward and announce to the public that they must bear a little burden of taxation for the benefit of future generations?

A.—I am sorry I cannot admit the truth of your picture.

Chairman.—But did you tell them that the profit would be 30 crores?

A.—No; that is what I say. I cannot admit the truth of the picture.

Mr. Billimoria.—The statement I have made is not my own. It is a statement that was made openly on the floor of the House by the Member responsible and in charge of the Government. I am sure you are aware of that fact. It was a statement which was made and repeated with emphasis, that this scheme was going to be a very profitable venture and was going to yield a very handsome profit?

A.—I have already stated that it was hoped it would be profitable.

Q.—Now that it has proved otherwise, is it right for Members of Government to come forward and tell the public generally that they should bear the taxation and still carry on with the work? Is it prudent? Supposing you were a business firm, would you have gone to your clients and made that suggestion?

A.—I have already explained that it was not a commercial project in its essence. That was not the essence of the scheme.

Q.—That was the basis of the whole scheme?

A.—No.

Q.—The figures that were submitted to the Government of India were absolutely incorrect figures. That has been proved up to the very hilt. The Government of India were induced to embark on the scheme on the basis of 367 lakhs?

A.—The essence of the scheme was the relief of the congestion in the City of Bombay.

Q.—Based on what? Based on certain calculations. You know very well that the Secretary of State declined to sanction the scheme until the finances were provided for, and it was on the basis of 367 lakhs that the Government of India were induced to embark on the scheme. But for that they would never have sanctioned it. We had it this morning from a responsible Member of Government that if the figures had been otherwise they would have thought twice before sanctioning the scheme. I ask you, therefore, is it prudent now, as you have suggested in the course of your evidence, to still complete the scheme?

A.—I certainly think the scheme ought to be completed.

Q.—No matter what it costs? No matter what the subsequent results are?

A.—As results are now estimated, I think the scheme ought to be completed.

Q.—If it is going to cost you ten crores, and if the prospects of sale of land are far remote (it may take 50 years according to the evidence of the people who are concerned with it), with compound interest running into a loss of several crores, would you still recommend that the scheme should be completed?

A.—I do not admit your statements, but I have already said on existing facts I think the scheme ought to be completed.

Q.—On what facts?

A.—On those facts which I have already entered in my written statement.

Q.—It sounds very well on paper, but if you look at the figures, if you calculate the interest, and when you see that the prospective result is a tremendous loss, would you still persist in holding the opinion that the scheme should be completed?

A.—The figures I have entered in my statement have not been questioned.

Q.—To which figures are you referring?

A.—To the figures in my statement.

Q.—The figures given before us at present show that the scheme, if completed, is going to cost 11 crores, irrespective of interest and depreciation. If the land reclaimed is not sold, or is not likely to be sold, within the next 25 or 50 years, that figure will be more than doubled or trebled. Do you still suggest that the scheme should be completed?

A.—I cannot say any more than I have said in my general statement.

Sir M. Visvesvaraya.—There is one more point. Some of the leading citizens of Bombay, such as the President of the Corporation and the President of the Chamber of Commerce, were asked by Government to make a report as to how much of the work should be completed. They have recently reported that only three blocks out of eight should be completed and that the rest should not be taken in hand. In spite of that statement, do you still persist in stating that the work should be completed?

A.—Yes, certainly—gradually completed.

Q.—And not that it should be pushed through and completed?

A.—No.

Mr. Billimoria : That is what I wanted. That makes it perfectly clear.

A.—I am sorry I did not understand the trend of your question.

Sir Frederick Hopkinson.—One point which has come up is this. Here was a thing amounting to 1,145 acres. The average annual demand for land was 60,000 square yards. The question will arise whether it was wise to go and spend 702 lakhs and to pay 6¼ per cent. interest on that with such a limited anticipated requirement of land for the future, and whether it would not have been wiser to have done it piecemeal; as you finished a certain portion, to develop that and let it, and then, as you found you sold that land, to get on to the next piece. If you complete your scheme for 702 lakhs, you have that interest accruing year after year at compound interest. The question arises as to whether that was not one of the grave faults of the whole scheme?

A.—I cannot say. I am not personally aware of those details, but I have said that I think it ought to be gradually completed.

Sir M. Visvesvaraya : It will eventually be completed no doubt. Having spent so much money it must at some time or other be completed.

A.—In the circumstances as they now are I think it ought to be gradually completed.

Q.—But we are to proceed with caution at present?

A.—Yes.

Mr. Billimoria : It has been very bitterly complained of in Bombay that the public were not taken into confidence. Honourable Members of Council, including the representative of the European Chamber, have complained about it. Have you any remarks to offer as to why they were not taken into confidence?

A.—I have already said that the Development Department was very freely discussed from time to time in the Legislative Council.

Q.—If you make that statement, I might point out that several members who have given evidence here have stated that the Budget discussion on this particular item was left over to the last and that only five or ten minutes were allotted by Government to it. They say that they had hardly any opportunity to discuss such a vital issue, and that they were not given, as a matter of fact, any opportunity, except on the last occasion, when half an hour was given to them. If you like I will read out the passages.

A.—I can explain that entirely. A certain number of days only were allotted to Budget discussion, and at first a good deal of time was wasted over petty items such as five rupees and ten rupees. The Council had not realised the importance of concentrating on the large items. Hence at the first Budget meeting of the Legislative Council it did happen that the time was mostly wasted over small items which really did not matter much, and there was no time for the very much more important items, such as the Development Department. The consequence was that in later Budget meetings we decided to reverse the order in which the items of the Budget were discussed, and we purposely put the Development Department first; we began from that end of the Budget in order that there should be full opportunity for the matter being fully discussed in the Legislative Council.

Q.—That was when you saw the grave situation. That is when you were faced with a terrible loss and with the failure of the scheme?

A.—No, that was on general principles—that the Council ought to be encouraged to discuss the important parts of the Budget in the Legislative Council.

Q.—The suggestion of some of the witnesses has been that when Government was faced with a difficulty they gave the opportunity of discussing it, and even then only half an hour was allotted?

A.—That is quite wrong. The reason was to give the Council full opportunity of discussion, and without regard to any particular situation. I can say that because I personally am aware of it. Being Leader of the House I had a personal hand in saying that the House should have full opportunity of discussing every part of the Budget.

Q.—That is very satisfactory. Was that announced in the House?

A.—Yes.

Q.—It was so stated?

A.—Yes.

Q.—Then how does the belief still remain otherwise?

A.—I can only refer you to the Debates of the Legislative Council. I think I am correct in saying that as Leader of the House I got up and explained particularly why we arranged on that particular occasion to discuss the Budget upside down, beginning at the bottom, so that important matters might be discussed at all events by the Legislative Council.

Q.—Therefore I need not trouble you with the various remarks made by Members of Council who have given evidence, suggesting that no opportunity was afforded to them?

A.—I do not think so.

Q.—When did Government for the first time realise that this was going to be a financial loss?

A.—I cannot say the exact date.

Q.—When did they first become aware of the failure of the dredgers?

A.—You mean that the dredgers were not producing as much mud as was expected?

Q.—Yes.

A.—I cannot give you the exact date when that was known in the Development Department.

Q.—Is it your impression that directly it came to the notice of the Department the Government were told all about it, or were the Government kept in the dark?

A.—The Development Department is a Department of the Government.

Q.—Not of the whole Executive Council?

A.—It is a part of the Government. I think as soon as it was proved that the dredger was not working up to what had been expected of it, the matter was known to all Members of Government.

Q.—What action did the Members of Government then take on that?

A.—The matter was under observation. Enquiries were being made, to the best of my recollection, in the Development Department as to the reasons why the dredger was not giving satisfactory work. To the best of my recollection, enquiries were being conducted in the Development Department.

(The Witness withdrew).

The Committee Assembled at 11 a.m. on the 1st October, 1926, all the Members being present.

45th Witness, Sir Chimanlal Harilal Setalvad, K.C.I.E.

WRITTEN STATEMENT.

At the outset I must make it clear that the Back Bay Reclamation Scheme was finally sanctioned by the Government of India, and the Secretary of State, as part of a Comprehensive Scheme for the development of Bombay and its suburbs, the Development Department had been organised, Messrs. Meik and Buchanan had been appointed engineers, and the dredger had been ordered, long before I assumed office on 3rd January, 1921, as a Member of the Executive Council of the Governor of Bombay. When I joined the Government, Sir George Curtis was in charge of the Department, and continued to be so for some time longer, till, in the redistribution of work in the Reformed Constitution, by the Governor, I was put in charge of the Department. I resigned office on June 16th, 1923. The Dredger "Sir George Lloyd," had then just arrived, but began working several months after I left office. Till then the construction of the retaining wall and other work had proceeded quite within the estimates as to time and expenditure. I cannot, therefore, throw much light on questions one and two, formulated by the Chairman, at the first meeting of the Committee in Bombay. But I think I can place before the Committee certain facts and circumstances concerning the undertaking of the scheme of which I have knowledge.

It must be remembered that the reclamation of part of the Back Bay is a very old idea. It was first undertaken in 1864 by a private company, which came to grief, but which added a considerable area to the island of Bombay, the land comprising the Chowapite frontage and the Charni Road. As the trade and industries of Bombay expanded, the desirability of reclaiming a portion of the Back Bay came up from time to time for consideration. The question was seriously considered during the administration of Lord Sydenham in 1911. Then, if I remember rightly, even a more ambitious scheme than the present one was proposed. The idea was further considered under the administration of Lord Willingdon. The report of the Development Committee of 1915 shows that the position as regards accommodation for offices and housing was even then felt to be acute. When the present scheme was proposed by the Government of Bombay and was

sanctioned by the Government of India and the Secretary of State in 1919, it was therefore not a new scheme, but the carrying into effect of an old project.

Further, the action of the Government of Bombay in 1919 must be judged by the conditions then existing in Bombay, and not by present conditions. There was a great hue and cry in those days about want of accommodation both for residential as well as business purposes. It was impossible to get decent residential bungalows except at ruinous and prohibitive rents, and it was even more difficult to obtain offices and business premises, for which fabulous rents had to be paid. I have known of a premium of a lakh of rupees having been paid on the sub-letting of shop accommodation. In those days land on Hornby Row was being sold in the vicinity of Rs. 1,000 per square yard, and in one or two instances as much as 1,200 and 1,400 rupees per square yard was paid. For the Worli foreshore estate of the City Improvement Trust, at the north end of the city, an offer was made by the European Association to take up part of the area at an all over rate of 50 rupees per square yard. This offer was at the time considered very inadequate, and the Municipal Corporation of Bombay recommended that the offer should be rejected. I believe another offer for taking over the whole area at Rs.70 per square yard was also rejected.

It was urged that the Trade and Commerce of the City was being strangled by the lack of accommodation, and the cry was insistent for provision for sanitary housing for the industrial and working classes as well as for areas for factories. It was under these circumstances that the Government of Bombay decided to embark on the Back Bay Reclamation scheme, the development of the suburbs, the creation of industrial areas for factories, and the erection on a large scale of tenements for the working classes. This comprehensive scheme was examined and approved by the Government of India and the Secretary of State, who must share with the Government of Bombay the responsibility for the same. It was not a scheme undertaken for making money by land speculation, but was, undertaken as a necessity for providing the necessary accommodation for the expanding trade and industries of Bombay, and for securing sufficient residential accommodation for its increasing population. The scheme, I believe, received general support at the time and was approved by the legislative Council.

While it is true that the estimates have gone wrong as regards the dredging part of the scheme, it is not right to judge of the necessity or the desirability of the scheme when it was decided upon by the very exceptional circumstances now existing in Bombay. The trade and industries of Bombay are at present at a very low ebb, and the depression following an unprecedented boom has been so deep and has continued so long, that the people in Bombay have become very pessimistic. In addition to this general pessimism, an influential body of persons who themselves acquired land at high prices during the boom, and who have lost heavily by the depression in the property market, are apprehensive of further diminution in the value of their land holdings if more land is made available by the reclamation. With them are allied certain politicians who want to make the most of an opportunity to abuse the Government, and who do not hesitate to make wild statements and charges without any foundation for the same. These causes have combined to make the outcry against the Back Bay scheme so loud and so insistent. The campaign of attack has further been stimulated by a personal element, viz., the unpopularity that Sir George Lloyd had incurred, during his administration, with certain sections of the people.

I think the above combinations of circumstances is responsible for such outcry as there is against the project. Comparatively little, if anything at all, has been said about schemes in India and elsewhere where the original estimates have been very much exceeded. It is true that the original estimate of 4 crores, for the reclamation, had to be raised to 7 crores It is, I understand, now considered that the scheme would cost 11 crores and more. It must be remembered that although the land produced by the reclamation may not be immediately sold, it will be available for Bombay, as it is bound to expand in the coming 15, 20 or 25 years; and I anticipate that Government would get back all the money spent on it. According to the original estimates the reclaimed land was expected to be produced at the cost of 10 rupees per square yard. On the revised estimates, I believe, the cost went up to 18 rupees or more. But taking the most pessimistic view, and allowing a long term of years for interest and sinking fund, the cost of the reclaimed land may go up to say, 60 or even 70 rupees per square yard. I venture to think that that land would fetch at least that price and possibly more. Even with the present very depressed state of the land market in Bombay, a few months ago land on Hornby Row was sold at a forced sale under a mortgage for over 500 rupees per square yard. For the Military lands at Marine Lines that are in the market, I know an offer was made for the whole area at 100 rupees per square yard. It is not too much to expect that the Back Bay Reclamation land, so near the business quarter, will fetch anything from 70 to 100 rupees per square yard.

The requirements of Bombay in the near future and the beneficial use to which the reclamation land can be put, must not be ignored. Under the new organising of the Navy,

the Director of the Royal Marine and his Staff will disappear, to be replaced by R.I.N. Officers of comparatively junior rank, who can be accommodated in two blocks of flats in block number 8. With the removal of the R.I. Naval Staff to Colaba, the whole of Campbell Park and the Director's bungalow and compound will be available. Bombay can then have at once the much-needed site for a Council Hall and other requirements. Similarly the Mint can be located at Colaba and the present valuable site occupied by the Mint made available.

Further, the Government of India will require space for other establishments. Bombay has no Quarantine Station, and in all probability in a few years you will have yellow fever knocking at your doors. The only possible site for a Quarantine Station is Butcher Island, at present tenanted by the wireless. The wireless can be located at Colaba, and Butcher Island thus made available for a Quarantine Station. It must not be forgotten that mainly because of the great shortage of building sites in Bombay, Indian Chiefs are debarred from purchasing real estate in the city. If more residential land is made available this prohibition which, at present, is resented and causes considerable heartburning, can be removed. I think that there cannot be much doubt that there is sure to be a growing demand for houses as favourably situated as those on the reclamation will be. It is not right to treat the reclamation merely as a commercial speculation. It was never intended as such, but was launched as part of a large scheme for the development and sanitisation of a very big and growing city like Bombay.

On a proper appreciation of the considerations set forth above will depend in a measure the decision as to what is the best thing to do about the scheme. The Colaba end block, part of which has been sold to the military authorities, must be completed, so must, I think, be the Marine Lines end blocks. The work on the middle blocks may be delayed, but things should be so arranged that the work may be undertaken as and when suitable opportunities may arise. I consider that, whatever view may be taken as to the desirability of the inception of the scheme, the only sensible course is to finish it. The cry that the whole scheme should be scrapped and the money spent on it till now be lost, is absurd. Any private individual or Company who had sunk in such a scheme the amount of money that the Government of Bombay have spent, would, if they could afford it, complete the scheme, and wait for better times for recoupment. In the case of the Government of Bombay, with its annual revenue of about 14 crores, it is much the wisest course to complete the work. As regards the portion of the Colaba end block, agreed to be sold to the Military authorities, I believe at about 20 rupees per square yard, an irrevocable loss would be made on that area, as the cost has now gone up. But I suggest that an effort should be made to readjust the terms of the agreement, as the purchaser in this case is not a private individual, but the Government of India. The agreement was entered into on the footing that the land would be produced for about 17 rupees per square yard, and I believe in the negotiations the Government of India had urged that as the land was required for Government purposes it should be given almost at cost price. It is equitable that the Government of India should, under the altered circumstances, not hold the Government of Bombay strictly to the bargain, but pay the actual cost of the reclamation. It is not unreasonable to ask the Government of India to agree to this, because they will be satisfying all military requirements in Bombay, and securing efficiency and better health of the troops, by concentration on the reclamation land, and thereby be able to sell their Marine Lines Estate, originally acquired at a very low value, for considerable profit, even in the present depressed land market in Bombay.

I see from the reports of the proceedings of the Committee that reference has been made to what I stated in the Legislative Council in February, 1921, as regards the expected financial results of the Back Bay Reclamation Scheme. As I have said, in January, 1921, when I joined the Government of Bombay, Sir George Curtis was in charge of the Development Department, and continued to be so for some time further. The Legislative Council Meeting was held in February, and the Statement that I then made was taken entirely from figures given to me by Sir George Curtis. But there is no mistake or ambiguity about the figures I gave. The estimated cost per square yard was then 10.15 rupees; 1,100 acres was the area of the land to be reclaimed, out of which 400 acres was to be absorbed in roads and open spaces, leaving a balance of 700 acres available for residential purposes. An acre roughly comprises 5,000 square yards, so the area available was 35 lakhs square yards. Taking the then prevailing values of land in the vicinity, the expectation that this land might fetch at least about 110 rupees per square yard, if not more, was, under the circumstances, not extravagant. If so, the profit on the reclamation land, if sold as soon as produced—and that was what the then demand indicated—would have been, as stated, 30 crore rupees.

In this connexion it may be mentioned that one or two private syndicates and companies had offered on certain terms to take the concession for reclaiming the Back Bay before the Government took up the undertaking. Later, when the scheme was being

carried out by the Government, I remember, in 1922, when I was in charge of the Department, a leading financier in Bombay approached the Government with a proposal to hand over the reclamation to a syndicate he was prepared to form, such syndicate paying at book value all the money spent by Government till then, and taking over all liabilities incurred, including the price of the dredger, for which the order had been placed, and in addition paying a sum of 2 crores as profit to the Government. I am mentioning this to show how, even at that time, the reclamation was considered a good business proposition. An offer of Rs.25 lakhs for what is called the Battery Site, comprising roughly 5,000 square yards, was rejected by the military authorities in 1922 as very inadequate.

The scheme was not undertaken or attempted to be justified on the ground of the anticipated profits. It was considered necessary and desirable to produce the land in order to meet the large and growing demand for residential and business accommodation, and the anticipated profits were incidentally mentioned as a feature of the soundness of the scheme. Circumstances have so terribly altered that all anticipations have been upset; but, as already observed, I fully expect a great expansion and prosperity for Bombay in the future, when the Back Bay Scheme and those who inaugurated it, will receive some recognition and appreciation.

London, 28th September, 1926. C. H. SETALVAD.

ORAL EVIDENCE.

Chairman.—You have been good enough to furnish us with a written statement and that will form part of the record in the Appendix. You point out at the outset that the Back Bay Reclamation Scheme was merely part of a comprehensive scheme for the development of Bombay and its suburbs?

A.—That is so.

Q.—Indeed the Development Directorate had a large number of other matters to attend to other than and beyond the Back Bay Reclamation Scheme?

A.—That is so.

Q.—The Back Bay Reclamation Scheme, if carried out successfully would have given 400 or 500 acres of land available for business or high-class residential premises?

A.—I think more than that—about 600 or 700 acres.

Q.—Had the estimate of profit been realised that money would have been available for the amelioration of the poorer classes or for any purposes that the Government thought would benefit the city and Presidency?

A.—That is so.

Q.—On 3rd August, 1920, which was the date of the announcement of the creation of the Development Directorate, what position were you occupying?

A.—I had then nothing to do with the Government. I was then, as I am now, a practitioner in the High Court.

Q.—You did not become a Member of the Government until the 3rd January, 1921?

A.—That is so.

Q.—What position had you in the Government then?

A.—I was called the General Member, but the expression General Member does not really correctly signify the duties that I had to perform. I was called the General Member and I do not know why that designation was adopted, but I was in charge of specific departments. For instance, I was in charge of the Legal Department, I was in charge of the Irrigation Department, the Marine Department, the Development Department, and so on.

Q.—Were you in charge of the Development Department from 3rd January, 1921?

A.—No, as I have said in my statement, Sir George Curtis was then in charge of the Department. I cannot tell you exactly the date at which I took over, but it must have been somewhere in February that I took over.

Sir Frederick Hopkinson.—Which year?

A.—February, 1921.

Chairman.—Had you before that date studied the report of Mr. Kidd?

A.—No, I do not think I had seen it before that.

Q.—Had you before that date studied the report of Sir George Buchanan?

A.—I do not think I had.

Q.—Naturally you had a certain amount of general information about the matter?

A.—As a citizen of Bombay, yes.

Q.—In February, 1921, or immediately thereafter, I suppose you did read the report of Sir George Buchanan with care?

A.—Yes, I did look into the papers after I took over.

Q.—At that date was there anything which caused you uneasiness?

A.—I do not think it did. It must be remembered that when I took over and then read the papers it was merely with a view to enabling me to carry on what had already been decided upon. I was not then called upon and never considered it my business to decide for myself whether this scheme should or should not have been inaugurated. That was not for me.

Q.—The position was that the scheme had been already definitely decided upon?

A.—Yes, and the work started already before I had taken over.

Q.—The work was in progress?

A.—Yes.

Q.—If, however, there had been some matters which caused you uneasiness you would have brought them to the attention of the Director of Development Directorate and your colleagues?

A.—I would certainly have done so, but you see at that stage there was nothing to create suspicion in my mind about the scheme, because so far as the engineering part of it was concerned I was bound to accept what the experts had done; and even now as I conceive the position to be, all that has failed really is the dredging operation part of it. The construction of the wall and the rest of it, as I have said in my statement, was done quite within the time and the money estimated when I took over.

Q.—The estimate, as we know, was for 367.61 lakhs?

A.—Yes.

Q.—Shortly after the creation of the Development Directorate Mr. Lewis began to prepare a revised estimate?

A.—That is so?

Q.—Which came to 702 lakhs?

A.—Yes.

Q.—In the interval between the 367 lakhs estimate and the 702 lakhs estimate the Reform Constitution came into being?

A.—That is so.

Q.—In fact and according to the legal view that was taken, the increased estimate of 702 lakhs was not officially brought to the attention of the Government of India?

A.—I am not sure about it but very likely that is so. It was brought before the Legislative Council who had to sanction the budget under the new Constitution.

Q.—That is true.

A.—In that way, of course, having been brought before the Legislative Council, the proceedings of which were sent up to the Government of India in ordinary course, it cannot be said that they were not cognisant of it.

Q.—That is true.

A.—I quite agree that it was not officially sent up to them.

Q.—For sanction and approval?

A.—Quite so.

Q.—That was because of the circumstance that by the time the 702 lakhs estimate came into existence the Reform Constitution was working?

A.—Yes, and I may say that that was the view, if I remember rightly, that was taken of the Constitution, both by the Secretary of State and the Government of India; because with regard to another scheme, the Sukkur Barrage Scheme, the scheme had been sanctioned by the Secretary of State and the Government of India, but after the Reform Constitution the Government of Bombay were told: "Now although we have sanctioned it you must place it before your Legislative Council and obtain their assent." That was the view taken by all the authorities, that it was the business of the Legislative Council to look into and sanction the moneys wanted for the progress of the schemes.

Q.—I do not think that there is any doubt as to the propriety of the action taken. I merely want to get it on the record quite simply?

A.—Quite so.

Mr. Billimoria.—Merely because the Secretary of State suggested that the Sukkur Barrage Scheme should be carried on by the Government of Bombay, without reference to him, did that mean his approval and sanction were not necessary—that may have been an additional check?

A.—They had, of course, approved the Sukkur Barrage Scheme. There was no question of his approving it again, but he said: "Now you have superimposed the new Constitution and therefore you must go to the Legislative Council."

Q.—Did the reforms preclude the Secretary of State and the Government of India from taking any part in any question of local government?

A.—No, not in the least. The legal control of the Secretary of State and the Government of India was still there and is still there.

Q.—It is still there, you say?

A.—It is still there in law but the convention always has been understood to be, after the new Constitution, that as far as possible the Secretary of State, with regard to his functions, will not exercise control in exactly the same manner in which he used to do it before the Reform Constitution, and again similarly in the case of the Government of India with regard to the local Governments. That was part of the convention under the Constitution—the Joint Parliamentary Committee put this on record—which the authorities were expected to establish.

Q.—You will agree with me that under the reforms the powers of the Governor were curtailed rather than enhanced. He had not greater powers than what he actually exercised before the reforms came into being?

A.—I do not follow your question.

Q.—What were the powers of the Governor under the reforms? Were they the same as before the reforms?

A.—You cannot answer that in a general manner because under the new Constitution you had the powers of the Government in the reserved subjects and transferred subjects. With regard to the transferred subjects the effective power was supposed to be vested in the Ministers taken from the elected members of the Council. With regard to the reserved subjects the Constitution still remained the same, that is the Governor in Council was responsible for the administration of those departments.

Q.—Without reference or supervision or control by the Government of India?

A.—No, as I say, with regard to the Government of India and the Secretary of State, the legal control was the same with regard to all, even for transferred subjects, but the understanding was, the convention was, that with regard to those subjects that were transferred neither the Government of India nor the Secretary of State would continue to exercise the same amount of control, though it had it still in law, as they did before. That was the only way in which you could work the transition period of this Constitution.

Q.—I am raising this point because it has been suggested that the Government of Bombay did not act constitutionally in this matter?

A.—I would like to know what the suggestion is. How is it suggested that they acted unconstitutionally?

Q.—That they did not go to the Government of India or the Secretary of State to have the revised estimate approved and sanctioned.

A.—I do not think it was necessary.

Q.—Under the Government of India Act you think it is not necessary?

A.—No; under the new Constitution which was established and the conventions which were suggested under it, if you went to the Legislative Council and they approved of the expenditure to be incurred on revised estimates, it was thought that was enough.

Mr. Billimoria.—I am sorry, Mr. Chairman, if I have interfered, but that was a point which was suggested in your absence, namely, that it was not constitutional. As a Member of the Government Sir Chimanlal Setalvad would know about that and as an eminent lawyer he would understand the position.

Chairman.—Quite so. How long have you been resident in Bombay?

A.—I have been resident in Bombay more than 30 years.

Q.—We have been told that there was a growing immigration into Bombay and that the population rose in a few years from something like 800,000 to 1,200,000?

A.—And further, to 1,500,000, I think.

Q.—During the war to something in the neighbourhood of 1,500,000 people?

A.—Yes.

Q.—What was the condition of the housing of the poorer classes?

A.—The condition of the housing of the poorer classes was deplorable.

Q.—Were there many places in which more than one family were living in one room?

A.—That was so, and that is so even now with regard to certain tenements.

Q.—Was the overcrowding of the poorer population one of the most pressing social problems of Bombay?

A.—It was.

Q.—A matter which excited everyone's gravest concern?

A.—Gravest concern, and if I remember rightly the Secretary of State had rather pulled up the Governmnt of Bombay about it, and required that they should take measures to grapple with that problem immediately.

Q.—In the report of the Bombay Development Committee of 1914, page 58, Mr. Kissan, in his statement, speaks of the census of 1911, and even then according to the

official figures, out of the population of 929,082 people, 743,247, about 80 per cent. of the total population, were living in 166,337 one-roomed tenements?

A.—That is so.

Q.—That was as far back as 1911?

A.—Yes.

Q.—Between 1911 and 1918 had there been any increase in building sufficient to accommodate the other 500,000 or 600,000 who came into Bombay?

A.—No, the situation got much more accentuated as time progressed.

Q.—You could hardly have a worse situation than existed in 1918?

A.—That is so.

Q.—How do you describe it in 1918?

A.—I think it was worse than in 1911.

Q.—Far worse?

A.—Far worse.

Q.—One of the functions of the Development Directorate was to build some 50,000 chawls?

A.—Yes.

Q.—Which is the local name for a single tenement?

A.—Yes.

Q.—We know for reasons into which we need not enter here, which are not within the scope of our inquiry, about 16,000 tenements have been built and a very large number of them are not inhabited?

A.—There are very obvious reasons for it; may I state them very shortly?

Q.—Just tell us about it?

A.—One difficulty is the Rent Act, by the operation of which in the old insanitary chawls where the workmen live two or three families in a room, they pay only 5 or 6 rupees for a room. As long as they can remain there at those rents, which will not be the rents even at this time of these insanitary places if the ordinary law of demand and supply operated, they will never move into better sanitary places at a higher rent. That is one difficulty. The other difficulty is this. To my mind, if the destruction of some of those slums had been undertaken along with the construction of the new chawls, as it was at one time intended, then these people would have been obliged to move into better places. That has not been undertaken on the scale on which it was intended at one time.

Sir Frederick Hopkinson.—Could they have afforded to pay the new rent of the new chawls?

A.—Easily, looking to the great increase in the wages of the working classes, who really have fared much better during and after the war than any other classes. It is the middle class that has suffered the most. They could easily afford to pay the increased rent. They spend much more in drink, they spend much more in other useless luxuries, and they could certainly afford to pay increased rent to live in sanitary places, but they do not realise the importance of sanitation and they have really, in a sense, to be forced to do it.

Chairman.—I think you took the view that Bombay might be visited by such a thing, for instance, as yellow fever?

A.—We have been dreading that for some time with the increased communication between the countries where you have it and Bombay. When I was in Government I remember the Government of India were rather insistent about our creating a quarantine station.

Q.—Returning to Back Bay, you have made it perfectly clear that you had nothing whatever to do with the inception of the scheme?

A.—Nothing whatever.

Q.—But you came into office at a time when the work was commencing?

A.—Yes.

Q.—In your statement you mention that the reclamation of Back Bay has been a project considered since the year—you mention 1864 but it is really 1863?

A.—I may be wrong there.

Q.—I think as a matter of fact the date was 1863?

A.—Yes.

Q.—Are you sufficiently acquainted with the general history since 1863 to be able to say that the attitude of the Government of India was always one of caution?

A.—That is what I generally know. I cannot go further than that.

Q.—I ask you generally?

A.—Yes.

Q.—That the attitude of the Government of Bombay was always optimistic and eager for reclamation?

A.—I believe that is so.

Q.—It was not unnatural, because it was the Government of Bombay who felt the pressure of the existing conditions?

A.—Yes, and they were more acquainted than the Government of India with the local conditions and difficulties.

Q.—In 1919 was there a great difficulty in getting residential and business premises in the neighbourhood of the Fort?

A.—Absolutely. As I have said in my statement, I know a case where a premium of a lakh of rupees was paid for obtaining business premises.

Q.—That is somebody was prepared to put down £7,500?

A.—Yes.

Mr. Billimoria.—You have not mentioned any name. Can we have the name of the party?

A.—Yes, if you want the names. I cannot remember the name of the person who paid that or who offered to pay it, but the premises were then occupied by the Central Bank. If I remember rightly it was Macropolo, the tobacconist, who was being turned out from his place. He wanted a shop and he offered to pay or did pay—I am not sure—a lakh of rupees as a premium if he could get these premises, besides agreeing to pay the rent that the landlord was to get.

Q.—Do you say a tobacconist like Macropolo agreed to pay a lakh of rupees?

A.—I do not know what your question suggests. Do you doubt the fact? I know it is a fact.

Q.—That Macropolo was offering to pay a lakh of rupees?

A.—I am not sure whether it was Macropolo or somebody else, possibly it was somebody else. There is no doubt about the fact, however, because I saw the papers about it at the time. You need not merely rely on that instance, it is a well known fact in Bombay that people could not get premises at all.

Q.—Was it not because of the Rent Act? People could not get premises because the Rent Act was in existence. If the Rent Act had not been there the accommodation was available for people shifting from one place to another?

A.—Yes; but then the accommodation would have been available at rents which it would never have paid any business man to pay. You start with a shortage of premises which made it possible for the rents to be increased. Why were the rents increased? Because there was much more demand than the supply.

Sir Frederick Hopkinson.—We have been told that the rent of a flat in Bombay is as high or higher than it is in the West End of London?

A.—Yes; I find that you can live in London, as far as accommodation is concerned, cheaper than you can do in Bombay.

Mr. Billimoria.—That has been so for years. It was not a circumstance in 1919 alone. That has been so for the past several years?

A.—No; it got very much more accentuated about that time. The rents increased by leaps and bounds.

Q.—The comparison of rent between London and Bombay is not only then. Bombay and Calcutta have always been higher than rents in London?

A.—I do not think that was so before the War—no.

Chairman.—You say in your statement: "In those days land on Hornby Row was being sold in the vicinity Rs. 1,000 per square yard, and in one or two instances as much as Rs. 1,200 and Rs. 1,400 per square yard was paid for it."

A.—That is correct.

Sir M. Visvesvaraya.—That is quite true.

Mr. Billimoria.—That is only one instance?

A.—That shows how the market stood at the time.

Chairman.—The scheme, as you mention at the top of page 2 of your statement, was examined and approved by the Government of India and the Secretary of State?

A.—Yes.

Q.—You say: "Who must share with the Government of Bombay the responsibility for the same."

A.—That is so.

Q.—The Government of Bombay and the Government of India would naturally be very largely in the hands of Sir George Buchanan?

A.—Do you mean the Government of Bombay?

Q.—Let us take first the Government of Bombay. The Government of Bombay, who had invited Sir George Buchanan to make a report, would be very largely in his hands?

A.—Certainly, because he, or rather his firm, were to be the engineers in charge, and they were being paid a very handsome commission on the whole scheme.

Q.—Was there anybody in the Government of Bombay, any man in the Public Works Department, who had sufficient experience of reclamation on an open sea front?

A.—No; none had. That was the reason why Sir George Buchanan's services had to be engaged.

Q.—Similarly, when Sir George Buchanan went to Simla or Delhi and saw Sir Sydney Crookshank, Sir Sydney Crookshank would equally be in the hands of Sir George Buchanan?

A.—So he would be.

Q.—Do you know if Lord Lloyd ever consulted any expert other than Sir George Buchanan?

A.—That is more than I can say, because all that was done before I joined the Government.

Q.—My question is: Do you know? And the answer is No?

A.—No.

Q.—Do you know whether the Government of Bombay ever called into consultation any expert other than Sir George Buchanan?—

A.—No.

Q.—Do you know if in fact the members of the Government of Bombay ever had Sir George Buchanan in consultation with them?

A.—I cannot say anything about that because all that must have happened before I joined the Government.

Q.—At page 2, in the third paragraph, you are expressing the view that the project should be carried through, in effect?

A.—Yes.

Q.—While it is true that in 1919 and 1920 there was a great boom in Bombay, that time has been succeeded by the slump?

A.—Yes.

Q.—Which unfortunately has held on for a very long time?

A.—Yes.

Q.—Is it your view that that slump is always going to continue?

A.—No; I do not expect so. It never has been so before. It could not be in the ordinary nature of things.

Q.—Assuming that the whole of the land were reclaimed, you anticipate in your statement that you would get on an average from 70 to 100 rupees per square yard if you held on to it for a sufficiently long time?

A.—That is what I believe.

Q.—Of course, one matter that would have to be considered by a business Government would be the accumulation of interest?

A.—That is quite true; but what I say is, taking all that into account, if the land costs you 70 to 100 rupees to produce—I do not think it would cost as much as that, but supposing it does—you will get back all your money.

Q.—You think that even on the basis of reclamation plus interest and all proper working charges, working it out at 70 rupees——

A.—At the time of disposal finally.

Q.—Do you think there will come a time when it can be disposed of at that amount?

A.—I should think so.

Q.—You say the Colaba portion—part of which has been sold to the military authorities—must be completed?

A.—Yes.

Q.—And you make the suggestion that, in the altered circumstances, the Government of India should treat the Government of Bombay generously in the matter of payment?

A.—Yes.

Q.—I should just like to deal with that. The agreement between the Government of India and the Government of Bombay was that the Government of India should pay 20 rupees per square yard?

A.—That was then estimated to be roughly the cost of production.

Q.—Just say Yes to that question?

A.—Yes.

Q.—Was the estimate of cost at that time taken to be 17 rupees a yard?
A.—Yes.

Q.—So that would show a small profit of 3 rupees a square yard to the Government of Bombay?
A.—That is so.

Q.—So the argument is in your view, I suppose, that as the Government of India must to some extent share the responsibility for the undertaking, that it would be only fair of the Government of India to pay for that land what turns out to be its proved cost?
A.—The actual cost of production; that is so.

Q.—Now you say (I am reading on page 3): "The work on the middle blocks may be delayed, but things should be so arranged that the work may be undertaken as and when suitable opportunities may arise." By the middle blocks, do you mean blocks 3, 4 and 5?
A.—I do not know exactly how they are numbered. The Colaba end is 8?

Q.—Yes; there are eight of them and the Colaba end is 8.
A.—The marine line end is blocks 1 and 2?

Q.—Yes.
A.—They should be completed.

Q.—1, 2, 7 and 8 have been discussed a good deal?
A.—Yes.

Q.—Would you leave out 3, 4, 5 and 6—is that what you mean by the middle blocks?
A.—That is what I mean.

Q.—If the work on those is to be held up indefinitely, it rather raises the question as to what is to be done with the £850,000 worth of dredging plant?
A.—That would be lying idle.

Q.—Not only lying idle, but machinery of that kind, and the pipe lines especially, would deteriorate?
A.—Yes.

Q.—It would deteriorate very rapidly, and the pipe lines especially?
A.—Yes. My own personal view is that I would complete the whole scheme if it were possible to do so. I only suggest the slowing down in view of the exceptional circumstances.

Q.—You would complete the whole scheme, and I suppose you would complete it partly by dredging and partly by murum filling?
A.—Yes; that is a matter on which I am not competent to speak. Those who have studied the materials will be able to say.

Q.—At all events, if you are going to delay it you have got to decide what is to be done with that very expensive dredging plant?
A.—That is so.

Q.—If you are going ahead, then you use your dredging plant?
A.—That is so.

Q.—If you delay and dispose of your dredging plant, then ultimately 3, 4, 5 and 6 must be filled in by murum?
A.—Yes; if you get rid of your dredging plant, as possibly you may have to.

Q.—Then you say: "I consider that whatever view may be taken as to the desirability of the inception of the scheme, the only sensible course is to finish it. The cry that the whole scheme should be scrapped and the money spent on it till now be lost is absurd. Any private individual or company who had sunk in such a scheme the amount of money that the Government of Bombay have spent, would, if they could afford it, complete the scheme and wait for better times for recoupment. In the case of the Government of Bombay, with its annual revenue of about 14 crores, It is much the wisest course to complete the work." Are 14 crores £10,500,000?
A.—Yes.

Q.—The Government of Bombay has a great many calls on it?
A.—I agree.

Q.—I do not know of any Provincial Government in India that does not feel the pinch at the present day. Is not that so?
A.—Yes; in Bombay we want money for many purposes, I quite agree.

Q.—But still you are of opinion that taking the scheme at the stage which it has reached, and having regard to matters other than money, such as sentiment and the desire to beautify Bombay——
A.—And also its future utility.

Q.—And also the future utilities, when in the ordinary course of things you say the slump will give way to better times?

A.—Yes.

Q.—For all those reasons you are of opinion that the scheme should be completed cautiously?

A.—Yes.

Q.—Within a reasonable time?

A.—Yes.

Q.—Apparently, on the 28th February, in the Legislative Council, Rao Bahadur Chitale, criticising the scheme, said: "It is not for the benefit of the masses. The Back Bay reclamation is primarily for the classes." You, being then the Minister in charge, said: "I am quite prepared to answer the question put by Rao Bahadur Chitale, namely, whether the Back Bay Reclamation Scheme will be for the masses or for the classes. The land produced by the Back Bay Reclamation Scheme will certainly be for people who will pay for it, but Rao Bahadur Chitale will remember the 30 or 40 crores of rupees, the profit which will be realised out of that land that will be reclaimed, will be available for ameliorating the condition of the poorer classes. That money will be available to Government. That money will be available to this Council, and you can do anything you like with it for the benefit of the poor and the working classes." Thirty crores of rupees is £22,500,000?

A.—Yes.

Q.—The view you took then, I think, is set out in your statement, and I would like to read it?

A.—Yes.

Q.—You say: "I see from the reports of the proceedings of the Committee that reference has been made to what I stated in the Legislative Council in February, 1921, as regards the expected financial results of the Back Bay Reclamation Scheme. As I have said, in January, 1921, when I joined the Government of Bombay, Sir George Curtis was in charge of the Development Department, and continued to be so for some time further. The Legislative Council meeting was held in February, and the statement that I then made was taken entirely from figures given to me by Sir George Curtis." At that time, had you been in office for a few weeks only?

A.—Yes; in charge of the Development Department for a few days.

Q.—"But there is no mistake or ambiguity about the figures I gave. The estimated cost (per acre) was then 10.15 rupees."

A.—It should be "per square yard."

Q.—"The estimated cost was then 10.15 rupees per square yard; 1,100 acres was the area of the land to be reclaimed, out of which 400 acres was to be absorbed in roads and open spaces, leaving a balance of 700 acres available for residential purposes." Is that quite right? Were you not going to take out of that 700 acres a considerable portion for a recreation ground?

A.—That is all included in the 400.

Q.—So be it. Is the Military land included in the 700 acres?

A.—Yes; they were getting about 200 acres.

Q.—239 acres, we have been told?

A.—Yes. At that date the agreement with the Military to give them 200 odd acres had not been completed.

Q.—That is most important. In February, 1921, when you were speaking, you were speaking as a man able to deal with 700 acres?

A.—That is so.

Q.—You go on to say: "Leaving a balance of 700 acres available for residential purposes. An acre roughly comprises 5,000 square yards. Taking the then prevailing values of the land in the vicinity, the expectation that this land might fetch at least about 110 rupees per square yard, if not more, was, under the circumsances, not extravagant. If so, the profit on the reclamation land, if sold as soon as produced—and that was what the then demand indicated—would have been as stated, 30 crore rupees."

Q.—That is £22,500,000?

A.—That is so.

Q.—That was the calculation on which you made the statement?

A.—Yes.

Q.—And which at that time, and in those conditions, given the smooth working through of the Reclamation scheme, was in your opinion not unreasonable?

A.—It was absolutely correct, I think.

Chairman.—I am much obliged to you.

Sir M. Visvesvaraya.—The scheme for 367 lakhs was sanctioned before you took charge of your office?

A.—That is so.

Q.—When the estimate came to your notice, did you regard it as an approximate estimate, or as a final estimate?

A.—I think as an approximate estimate.

Q.—I may remind you that in the correspondence on the subject it was treated practically as a final or satisfactory estimate?

A.—For all practical purposes no doubt it was taken as final; but it was liable to some variations. I am not disputing that.

Q.—The first estimate you considered fit to be accepted as a reliable forecast of the probable expenditure?

A.—There were letters about it.

Q.—The Government of India stated : " We agree with the Local Government that it is desirable to add 10 per cent." The added 10 per cent., making it 400 crores?

A.—Yes.

Q.—With the addition of 10 per cent., the estimate came to 4 crores; and they added : " We think it can be carried out for this sum." They thought at the time it could be carried out for that sum?

A.—No doubt that was then what was considered to be the sum required.

Q.—When you entered office had they begun to revise the estimates, and prepare another detailed estimate?

A.—I think so, though the revised estimates came to me later—Lewis was asked to prepare revised estimates.

Q.—I want to know whether when they started the work, they thought that the details were all complete, or that a lot of work had to be done and the estimates might be exceeded?

A.—That is more than I can say.

Q.—You were not in charge at the time?

A.—No.

Q.—You know that the estimate has gone up to 702 lakhs?

A.—Yes.

Q.—That was sanctioned a few months after you came?

A.—That was put before the Legislative Council.

Q.—Again you probably know that the present cost is estimated at about 10 crores?

A.—10 to 11 crores, as I understand.

Q.—10 crores is the latest estimate. We understand things are more favourable than they were last year?

A.—Yes, I understand that the dredging operations are working more satisfactorily than when they began.

Q.—The estimate of the Chief Engineer is about 1,000 lakhs now?

A.—Yes.

Q.—Was it ever brought to your notice that there was an alternative method of completing the reclamation, by dry filling?

A.—No, I do not think so.

Q.—Recent investigations have shown that for about 5 crores you could have completed the work by dry filling?

A.—I do not know that, but I know that the dredging scheme was preferred to the dry filling, because of various reasons : one of them being that in the dry filling it would have been necessary to run a very large number of trains every day, to bring in the material, which it was considered, I think, the B.B.C.I. would not have been able to do.

Q.—There is no correspondence on that subject?

A.—No, but that is what I know from discussions I had at one time.

Sir M. Visvesvaraya.—Our personal inquiries from the agents of the Companies shows that they were willing to give facilities.

Sir Frederick Hopkinson.—That is for the future and not the past?

A.—That is for the future. At that time it would have taxed all their resources to run all the trains necessary. Further, it is not merely their capacity to run trains. It would have dislocated the whole foreshore there, causing great public inconvenience. Even with the restricted operations in the dredging scheme all the playing grounds, all the gymkhanas that you have on the main line front were affected—part of them had to be cut down, even with these dredging operations. If the numerous trains necessary for dry filling had to be run, many more lines would have had to be laid

on the sea-shore, and thereby great public inconvenience would have been caused. I believe that was one of the reasons why the alternative method of dredging was adopted.

Q.—We do not see any record to that effect in the papers?

A.—No.

Chairman.—It was not considered. It was a dredging proposition, and that is how they dealt with it.

Sir M. Visvesvaraya.—You are in favour of completing the scheme as soon as possible?

A.—As soon as possible.

Q.—As soon as circumstances permit?

A.—Yes.

Q.—You are aware that the Kay Committee in Bombay have recommended that the completion of the scheme was not a practical financial proposition, at least for the present?

A.—But that all depends upon how you look at it. True it is not a financial proposition for the present in the sense that if you produce all the land now you cannot sell it, and cannot get rid of it under present circumstances; but that is quite different from taking a larger view of it, which is that looking to what has been done it is desirable to finish the whole thing and to wait for better times, which waiting the Government of Bombay can afford.

Q.—But will not the interest charges mount up in the meantime?

A.—I take all that into account.

Q.—Have you made any calculation?

A.—No, I have not made any calculation, but taking all that, what do you estimate would be the cost of production per square yard—taking it at the most?

Q.—Have you made any calculation?

A.—No, I have not; but I take it that it might work out to 70 to 100 rupees per square yard.

Q.—Do you know that the critics in the report of the Advisory Committee say that they have made a calculation on which they find it would be very high, and would be prohibitive?

A.—What do you mean by "prohibitive"? That is what I want to get at if I can. Have they given any figures? If they say the land would cost 70 to 100 rupees per square yard, shall I say hypothetically, then I consider it a sound business proposition. You are sure to get 70 to 100 rupees for it.

Q.—What will happen if you throw open a large area of land is that prices will go down. A few people may take it at 100 or 120 rupees, but there will not be many to purchase large areas, and the rates generally will go down?

A.—To my mind that area will be snapped up at those rates when times improve.

Q.—You are aware that there are difficulties about the Ballard estate. There is land unoccupied there?

A.—There the trouble is this. The price at which the Ballard estate land was given was something like 800 rupees a square yard. Well, I am here putting down 100 rupees for this. At 800 certainly the Ballard estate land would not pay anyone. It was a mistake for the people to have taken it at those fancy prices.

Q.—At that time those people thought it would pay them?

A.—At that time, I agree. But I am not basing my expectation on this fancy value of 700 or 800 rupees. I would be content if you get 100 rupees a square yard, which I think you ought to do at any time.

Q.—There are lands there like the area vacated by the Cotton Trust, which are available, which cannot be sold?

A.—I do not know about that. But look to the military lands, bungalows and estates on Queen's Road which are to be sold, they had an offer for the whole lot at 100 rupees a square yard.

Q.—How long ago was that?

A.—That was last year; and they refused it as being much too little. Surely, then, this land, when the proper time comes, can fetch 100 rupees easily.

Mr. Billimoria.—But the cost would be 200 rupees. We have got an official document prepared by the Sub-Committee which was appointed to report on this matter, which says that.

A.—That may be so. I have not seen it.

Q.—The Report was published the beginning of this year—on the 21st January, 1926.

A.—I have not seen that; but if it is going to cost you 200 rupees, I quite agree there will be a financial loss.

Sir M. Visvesvaraya.—At any rate, a committee of business men have stated that the completion of the scheme was not a practical financial proposition. You seem to think the contrary.

A.—No, I will not say that confidently, if an expert Committee has gone into details and calculated figures, which I have not done. I am not prepared to put my opinion against people who have gone into the thing thoroughly, which I have not done.

Q.—Your general impression is that it is possible to complete it?

A.—As I have said—I put it hypothetically—if you complete this, and if it is going to cost, say, 70 to 100 rupees per square yard, then you will recoup all your money; if it is going to cost more, then it will be a different proposition.

Q.—We want the truth about these matters. We want to get to the root of the matter.

A.—I entirely agree. That is for you; but I am only putting before you what I know and think.

Q.—What do you think are the causes of the partial failure of the scheme, as you now know?

A.—The whole trouble is about the dredging, I understand—that it does not do the quantity, and you do not find the quality of material which it was anticipated would be there.

Q.—The prospects are very poor now, because land values have gone down. That is another point?

A.—Yes. I have given the reason why the values have gone down now. That is no doubt one of the reasons for the difficulty; and I have already pointed out the reason why the agitation against the scheme is so intense.

Q.—I ask you whether the scheme was considered approximate or final. When this scheme was submitted to the Government of India, was any statement of financial results prepared for the project?

A.—I cannot say. I was not there at the time.

Q.—Did you notice whether the scheme was accompanied by a statement of financial results?

A.—I cannot say.

Q.—When you prepared your scheme for 702 lakhs, what did you do? Did you not prepare a statement of financial results?

A.—At that time Lewis prepared the estimates, and the whole thing was gone into. It was published in a press note by Government, and it was put before the Legislative Council.

Q.—Was any Government communiqué issued on the subject?

A.—A communiqué was issued stating the revised estimates.

Q.—Was any Government resolution issued sanctioning the project? We have not seen any?

A.—I cannot tell you that. That must have been before January, 1921.

Sir M. Visvesvaraya.—I should like to know if Mr. Ewbank has seen any Government resolution sanctioning the project.

Secretary.—No, there is no Government resolution. It was sanctioned by the Secretary of State in Council in that telegram of which we have a copy.

Sir M. Visvesvaraya.—Was not that issued by the Bombay Government in the form of a Government resolution—as they usually do?

Secretary.—I could not say. We have not seen it.

Witness.—That was before my time, and I cannot say anything about it. Are you referring to the 702 lakhs estimate?

Chairman.—The 702 lakh estimate was in your time?

A.—I do not know whether there was a formal resolution, but I remember that a press communiqué was issued by Government officially stating the altered estimates, and so on; and they were put before the Legislative Council.

Sir M. Visvesvaraya.—It is usual, is it not, in the case of an important project like this, to issue a Government order or Government resolution?

A.—I do not see what difference it makes, if you issue an official communiqué and place the matter before the Legislative Council.

Q.—I am only asking what the practice of Government is.

A.—I am unable to speak about the practice. Sometimes it is done in one way and sometimes it is done in another.

Q.—Within your recollection no financial forecast was issued with the sanction?

A.—That is more than I can say. I do not know.

Q.—In other words, you did not take into account whether the project would pay, or to what extent it would pay?

A.—I cannot say that.

Q.—While general statements were made in the Legislative Council, and to the public, in the actual working out of the project and in the issuing of orders you did not say what results would be produced, as it is usual to do?

A.—I do not remember what was stated in the papers. The four crore estimate was going to cost Rs.10.15 per square yard. The revised seven crore estimate in all was going to cost about Rs.18. So it was obvious that if land could be produced at Rs.18 per square yard in that vicinity the financial results would be good.

Q.—It depends on the time you had to sell.

A.—But all that was taken into account. The Rs.18 was calculated taking into account the interest and sinking fund for a particular number of years—the anticipated period of sale.

Q.—Unfortunately we have not come across any calculations of that character by Government.

A.—I think they were made. A particular number of years was taken as the period which it would take to sell the land, and so on. I do not know exactly what number of years was taken.

Q.—Was that treated as confidential, or was it issued?

A.—I do not think there was anything confidential about it at all. It was merely a matter of arithmetical calculation.

Mr. Billimoria.—The period assumed was too small. The anticipation was that the whole of this area would be taken up immediately.

A.—I do not think it was anticipated that it would be taken up immediately. I am only speaking from memory; I may be quite wrong. It was seven or eight years. I think that was the calculation.

Q.—Experts have told us that it will take 50 years to dispose of the whole thing?

A.—Those who say that may be equally wrong. Seven years may be too optimistic, but 50 years is too pessimistic.

Sir M. Visvesvaraya.—Another boom may come after five or six years?

A.—Yes.

Q.—No definite forecasts were prepared and placed either before the Government of India or the Legislative Council?

A.—Forecasts of what?

Q.—Whenever a project for a railway or for an irrigation scheme is sanctioned, it is usual to submit a forecast of what the financial results are likely to be at the end of a definite period. That was not done in this case.

A.—It may not have been, but it was obvious, as I say. It was stated in those papers the cost at which you would be producing the land, and it was obvious then to anyone who knew Bombay what the financial result would be. Though the forecasts may not have been put in in actual terms, it was very simple. If you had, as you did have, put in there the cost at which land per square yard could be produced, it was obvious to anyone who knew the conditions in Bombay what the financial result would be.

Q.—But business men now say that that result is not likely to be satisfactory?

A.—They say that now, but they said the contrary at this time.

Q.—Which of them said the contrary?

A.—All these people who are now crying out against the scheme. They themselves went in for land at very high value. They themselves thought that land was going up. Why did they buy at what I now consider to be ruinous prices? Those are the very people who are now crying out against the scheme.

Q.—When it was found that the land values came down very considerably, did Government take any steps to change their policy either by restricting expenditure or by curtailing the scheme?

A.—I cannot say that, because that time never arrived when I was there. I left in June, 1923, and all this arose after that.

Q.—In your time the trouble had not become accentuated?

A.—No.

Q.—One point about the constitutional position which was referred to in the previous discussion. You stated that this was not a transferred subject and therefore it was not taken before the Legislative Council before it was sanctioned. It was not discussed or explained in the Legislative Council?

A.—The scheme was sanctioned by the Secretary of State before the new Constitution came into operation.

Q.—That was the original scheme of 400 lakhs?

A.—Yes.

Q.—Then you changed it to 702 lakhs?

A.—Yes. It was put before the Legislative Council, and they sanctioned the Budget on that footing.

Q.—The sanctioning of the Budget is one thing, and the passing of the scheme is another. At Budget time so many things come up that you cannot take it that the sanctioning of the Budget meant also sanctioning of the scheme.

A.—But the scheme had been sanctioned already by the Secretary of State before the Constitution came in. Then the costs got increased on the estimates, and the money was voted by the Legislative Council on the increased estimates.

Q.—You did not think it necessary to place the 702 lakh estimate before the Legislative Assembly?

A.—It was placed before them.

Chairman: And they voted on it, and passed it?

A.—In 1922-23 that was so. They were told " It is now going to cost this much, out of which we want to spend so much this year. Will you give us the money," and they gave it.

Sir M. Visvesvaraya: The cost was practically doubled?

A.—It might be anything, but whatever it was, all the figures and estimates were placed before the Legislative Council, and they were told " This scheme is going to cost seven crores. We want this year so much out of that; will you give it to us," and they gave it.

Chairman: It was put forward publicly in the Legislative Council. Sir George Lloyd had made a public speech about it, and the Legislative Council passed the grant?

A.—Yes. In moving the grant I told them what the new estimates were, and what the situation was. I made a full statement, and I asked for the grant for that year out of that amount, and it was sanctioned.

Sir M. Visvesvaraya.—At the time of the Budget there were a large number of allotments and sanctions?

A.—What does that matter? The Legislative Council knows its responsibility in passing grants for any particular department. It was up to them, if they had any doubts about it, to make futher inquiries or even to refuse the grant.

Mr. Billimoria: Some of the witnesses who have been before us have stated that no opportunity was given to them to discuss this important matter on the floor of the House.

A.—Who prevented them from doing it?

Q.—They say that even if they were given the opportunity, only five minutes was allotted to the matter in which they could not adequately discuss such an important question?

A.—If, as they say now, they got no sufficient time, it was entirely their own fault. The system is the same as here and as in all Legislatures. A particular number of days are allotted for the Budget. It is up to the Legislative Council and to the moving members there to concentrate their attention on what they consider to be important items, and to discuss those. If they choose to fritter away their time, as they did, on small unimportant items, spending days on small items of 500 rupees here and Rs. 2,000 there, and then the remaining grants are guillotined at the expiry of the allotted time, it is not the fault of Government.

Sir M. Visvesvaraya: We have been informed of that by Sir Maurice Hayward.

A.—Further, if I remember aright, I did tell them from my seat in the House that time was being wasted on unimportant matters and that the House had still the important grant of the Development Department to deal with, and I asked them to concentrate on that.

Chairman: That statement of yours is in our papers. We have got your actual statement in which you warned them that they were taking up time on unimportant items and that there were these other big items for consideration.

A.—What is the use of their complaining that time was not given to them? If they did not get time, it was their own fault.

Mr. Billimoria.—It is also suggested that honourable members did not know that the figure of 702 lakhs was an enhanced figure from 367 lakhs. It has been suggested that they were never told that the original estimate was 367 lakhs?

A.—They were told all that, both in 1921 and 1922. They were told the original estimated cost was 10 rupees, and they were told that the revised estimate was 7 crores, working out the cost per square yard at 18 or 20 rupees, whatever it was. There was no ambiguity about it at all.

Q.—They have complained about it. I am simply drawing your attention to their statements.

A.—I cannot help that.

Sir M. Visvesvaraya.—If Government want to sanction a project, do they discuss it before the Legislative Council, or do they sanction it themselves nowadays? What is the procedure?

A.—It depends upon whether it belongs to the reserved side or to the transferred side.

Q.—If it is the reserved side?

A.—If it belongs to the reserved side, then I believe Government sanction the project, but the Legislative Council have always a hold on it in this way: they have to sanction the grant of the money. They can refuse to do that if they are not satisfied with the scheme. For instance, take the Sukkur Barrage Irrigation Scheme. That was a reserve department in my charge, but nevertheless we had to go to the Legislative Council for a resolution of the Legislative Council approving of the scheme before we could go to them for a grant.

Q.—If an estimate is doubled, is it not necessary to get a fresh sanction from the Legislative Council? You could not send it up to the Secretary of State, because he has surrendered his authority?

A.—What more could we do? We told them the estimates were exceeded. We explained it to them, and we put before them Lewis's revised estimate.

Q.—At Budget time?

A.—Before Budget time. A communiqué was issued which placed them in possession of all these facts. Therefore they came prepared with the facts. Then they were told in the Council itself what had happened, and the grant was asked for on that footing, which they chose to sanction. What more could we do?

Q.—Just as you did in the Sukkur Barrage scheme?

A.—With regard to the Sukkur Barrage scheme, the project had not been sanctioned before the new Constitution came in. Sanction by the Secretary of State was given afterwards, and then we had to go to the Legislature with a resolution for approval of the scheme. In the other case, the Back Bay project had been sanctioned already before the Constitution came in, so there was no need of any formal resolution by the Council.

Q.—When the costs are doubled, it is practically a new project, is it not?

A.—You may choose to call it so, but we kept nothing back from the Legislative Council. We placed all our cards on the table. We told them exactly what had happened, and we asked for a grant. You may say, if you choose to do so technically, that there was no resolution passed. There was no difference in substance.

Sir M. Visvesvaraya.—This scheme had been turned down several times by the Government of India until 1917, had it not?

Chairman.—Not this scheme.

Sir M. Visvesvaraya.—The proposals for the reclamation had been turned down two or three times before?

A.—Yes.

Q.—And it was in 1919 that it was seriously taken up and an endeavour made to put the work in hand?

A.—Yes.

Q.—This was at a time of boom and prosperity. What the public complain of is that the Government acted at a boom time without calculating the cost.

A.—That is quite wrong. The cost was calculated. You may say that the Government erred with everybody else in Bombay in their anticipations.

Q.—That is what I wanted.

A.—They erred in thinking that land would be absorbed in a particular time and at particular rates but, as I pointed out, the very financiers who are now raising a cry—some of them, anyhow—were themselves the persons who offered to take over the scheme, or asked to be allowed to work the scheme as a private venture, because they then anticipated that they would make large profits out of it.

Q.—You say, "This comprehensive scheme was examined and approved by the Government of India and the Secretary of State, who must share with the Government of Bombay the responsibility for the same." They may share the responsibility for the 400 lakh scheme, but not for a 702 lakh scheme or a 1,000 lakh scheme?

A.—Oh, yes, because they were cognisant of what was happening. If they had thought otherwise they ought to have pulled up the Government of Bombay and said "No"; they could have done it. They had the legal power to do it. All the Legislative Council proceedings were formally sent to the Government of India and to the Secretary of State in the usual course.

Q.—Have not things gone wrong on account of the action of the local Government?
A.—In what manner?

Q.—If the work had been carried out within 400 lakhs, it would have been all right, but it will now go up to 1,000 lakhs, chiefly due to the action of the local Government?
A.—How?

Q.—It is they who took action about the dredgers, and it is they who took action in all matters concerning the scheme?
A.—I do not follow you when you say that you attribute that to the action of the Bombay Government.

Q.—Action or lack of action.
A.—What was the lack of action? They took what they considered to be the best expert advice. They acted on it. They got this scheme examined in such manner as was available to them, and they carried it out. What action or inaction of theirs accounts for the failure, if it is a failure?

Q.—Do you or do you not think that the failure of the scheme is due to the action of the Bombay Government?
A.—I do not understand the question. What do you mean by the action of Government?

Q.—The work was executed under the orders of the Bombay Government?
A.—Yes.

Q.—And it is the Bombay Government who is responsible for the good or bad results of the work. If the thing had gone on well, they would have claimed the credit. If things go wrong, they are to take some portion of the blame. Is not that so?
A.—Nobody wants to disclaim any responsibility at the results not having come up to expectations, but that is quite different from saying that they are to blame for the results. If they took every precaution which it was open to them to take, and if they consulted such experts as were made available to them, and if they then acted, surely you cannot hold them blameworthy if, by some mishap beyond their control, and beyond even the conception of all the people who are now complaining, things have gone wrong.

Q.—Things have gone wrong; you have to admit that?
A.—That is true. Many things go wrong in this world, but that is quite different from saying you are to blame for it.

Q.—Nobody is to blame, you think?
A.—I think so.

Q.—It is not right to treat the reclamation merely as a commercial speculation. Was that so understood when the scheme was originally sanctioned?
A.—Absolutely. The scheme, as I say, was sanctioned as part of a comprehensive scheme for the development and sanitation of Bombay. It was undertaken on that ground absolutely irrespective of its financial results as they were anticipated at the time.

Q.—Since the financial prospects appeared so unfavourable why did not the Government review the position and restrict the works and expenditure?
A.—By whom?

Q.—By the Bombay Government. When the Secretary of State sanctioned it, he sanctioned it because the Government of Bombay said the financial prospects were very favourable?
A.—No. On the contrary, as I have said, the Secretary of State was all the time pressing the Government of Bombay to tackle the housing problem on sanitary grounds. It is quite wrong to suggest that anybody was induced to enter into this scheme because of the brilliant financial results which were put before him.

Mr. Billimoria.—Was not the financial question a matter of consideration by the Secretary of State?
A.—Of course, but to say that he was led to sanction the scheme because of the financial prospects of it (which would mean that it was undertaken as a commercial venture) is not true.

Q.—Had the figures been otherwise, do you suggest that the Government of India and the Secretary of State would have given their approval to the scheme?
A.—I am not prepared to answer that hypothetical question. I do not know what would have happened.

Q.—Because throughout the correspondence we find the basis has been 367 lakhs?
A.—That is true.

Q.—That is the basis on which they were induced to sanction the scheme?
A.—True. If they had been told 7 crores they might not have sanctioned it, or they might have. I do not know.

Sir M. Visvesvaraya.—I am not criticising, but I want to know what you have to say to the oft-made complaint that you have over-stated the profitable character of the undertaking?

A.—When you say "you," whom do you mean—myself or the Government of Bombay?

Q.—Yourself.

A.—I have explained that there is no mistake about my figures. I have stated how I arrived at the figures, which I gave to the Council. I cannot do anything more.

Q.—Will you look at the top of page 4 of *this* report, where there is a quotation from your speech as follows :—

> "On the 28th February, 1921, Sir Chimanlal Setalvad promised that :—
>
> "I can assure the Council that when I come to move for the necessary grants for this Department, I propose to make a full statement to the Council as to the various items in this project . . . . . Taking the estimated expenditure on it, the cost per square yard works out to about 10.15. Now, taking the present valuation of land in the city, on a very modest estimate the result of the reclamation would be a profit of at least 30 crores of rupees to the city. It may be more, in all probability it will be more, and in certain circumstances it may even go to 50 crores."

Have you any explanation to give about that figure? Do you still adhere to it?

A.—I do not know what you mean by asking me if I still adhere to that figure. I certainly cannot say that will be the figure now on the present state of things. I tell you *here* exactly how I gave those figures at that time.

Q.—You do not think any modification is necessary in those figures?

A.—I do not follow the question. What do you mean by modification?

Q.—You have stated these figures here. Do you still adhere to the 50 crores?

A.—That is a very ambiguous question. If it means whether I still think this will be the profit, no; but if it means whether when I made the statement to the Council I had sufficient grounds and materials for saying so, yes.

Q.—You believed then that it would give a profit of 50 crores?

A.—I would not have made the statement if I had not believed it.

Sir M. Visvesvaraya.—Now perhaps you are inclined to change your opinion?

Chairman.—He has said so definitely, if you read the statement. His present view is "I anticipate that Government will get back all the money spent on it."

Sir M. Visvesvaraya.—You adhere to that?

Chairman.—Let me try to make plain a very simple point. In February, 1921, you, on figures given to you by Sir George Curtis, made an estimate of what you thought would be the probable profit to the Presidency if the reclamation scheme went through successfully. Those figures have now turned out to be entirely illusory, and your present view is clearly expressed, towards the middle of page 2 of your statement where you say that you anticipate that in 15, 20 or 25 years the Government will get back all the money spent on it. At present you think that Government may just come out about level?

A.—That is so.

Sir M. Visvesvaraya.—In another place you have stated "Rao Bahadur Chitale will remember that 30 or 40 crores of rupees, the profit which will be realised out of the land that will be reclaimed, will be available for ameliorating the condition of the poorer classes."

A.—That is the same point.

Q.—I do not criticise it. I put the point before you because many people have criticised it before us in Bombay.

A.—I cannot help that. If you tell me what the criticism is I will answer it.

Q.—I wanted your confirmation or your explanation on that point.

A.—It is there. I cannot add to what I have said.

Q.—Can you tell us what progress reports and statements you were receiving monthly, or at periodical intervals from the Department?

A.—I cannot remember that, but the usual returns were being made.

Q.—Did they place before you records of how the work was progressing, what the revenue prospects were, and what were the prospects of income from time to time?

A.—The progress reports were seen by me.

Q.—You may think differently from me, but I just want your opinion. The work was deprived of the technical and account checks of the Public Works Department. Would it not have been safer to have left the work under the control of the Public Works Department, which was an established department, instead of starting a new department?

A.—I do not think so. Here was work to which the Public Works Department was entirely new. It had never had experience of this sort of work at all. Further, when you say that the work was deprived of the ordinary checks of the P.W.D., that is not quite correct, because other checks of a more effective character were devised for the purpose. The Government of India made that one of their conditions of sanction. There was created an audit and account establishment under the orders of the Government of India, not subordinate to the Government of Bombay. They were there from day to day examining matters, and they had what is called a pre-audit system. Therefore, a proper scheme of control financially was devised, which was none the less effective, compared with the ordinary check of the P.W.D.

Q.—And technical checks?

A.—As I say, the P.W.D., with great deference, were not competent to exercise those technical checks, not knowing anything about the project.

Q.—Do you contend that the officers appointed had experience of reclamation work before they went there?

A.—You had engineers in charge who were experts, or who were supposed to be experts, in the matter.

Q.—In large schemes, even if the P.W.D. takes them up, it is usual to have consulting engineers. With the help of technical advice, could not they have carried out the work?

A.—I doubt that. Messrs. Meik and Buchanan were not consulting engineers. They were engineers in charge.

Q.—That is a doubtful point. They were five thousand miles away?

A.—It may be so. The chief engineer in charge of that part of it was to be appointed by them. Sir George Buchanan was to be a certain number of months in Bombay in the cold season, under the contract. They were the responsible engineers in charge.

Sir Frederick Hopkinson: They defined themselves as the actual responsible engineers.

Chairman: And the contract describes them as the undertakers of the work.

Witness: That was the footing on which the Government of Bombay acted.

Chairman: They were the people who had undertaken to carry out the work?

A.—Yes.

Sir M. Visvesvaraya: The Sukkur Barrage scheme was carried out by the P.W.D.?

A.—Yes, because it was quite a different thing from this.

Q.—How and why was it quite different?

A.—The Sukkur Barrage is not a novel project. The P.W.D. is quite competent to put up dams, but even there we had to create practically a separate department for it.

Q.—It was done under the chief engineer of the P.W.D.?

A.—Not the chief engineer in Sindh, no. There was a separate chief engineer created for the project.

Q.—But the Secretariat is the same?

A.—So here the Secretariat is the same.

Q.—No.

A.—Not the P.W.D.

Q.—A separate Secretariat was created?

A.—I hold there is no comparison between the Sukkur Barrage work and this scheme at all. This was work of quite a different character.

Q.—You are aware that technical work like sanitary engineering is also done by the P.W.D.?

A.—Those are matters on which I am not competent to express an opinion.

Q.—You are not competent to give any opinion on that point?

A.—I hold this view anyhow: it was no disadvantage (I will put it at its lowest) in this instance not to entrust this work to the P.W.D.

Q.—Who was the technical man on behalf of Government who took even a general survey of things—who examined the question on behalf of Government?

A.—There was a Director.

Q.—We have not seen one single large minute prepared by the Director, and when we asked him he said it was the business of the consulting engineers?

A.—You have to settle the matter between the Director and Sir George Buchanan, but the Director was there and he was responsible to Government for the working of it.

Q.—What Government seem to have done is to have appointed certain people temporarily and to have handed over the expenditure and the technical supervision to

those people and kept themselves free. Is not that the position in which you landed yourselves?

A.—I do not know what you mean by "handing over." Government created a special department, and appointed a Director of that department—a responsible officer drawing Rs. 6,000 a month.

Q. He was not solely on this work. He was in charge of several works?

A.—This was a part of the whole comprehensive scheme, and the Director was there to look after the whole thing.

Q.—Which technical officer checked these things and controlled the work of the department? There was the consulting engineer and there were his officers, but they were all outsiders temporarily employed, and you handed over all the responsibility to them in this case?

A.—It is no use further discussing this, because I am not responsible in any manner for the creation of that system. Perhaps you do not approve of it, but it is a matter of opinion after all.

Q.—You cannot give a very definite opinion?

A.—I hold such opinion as I have. It may be wrong or right. I think, as I say, putting it at the lowest, not making it part of the P.W.D. did not work to any disadvantage.

Q.—When any large work of this kind has to be carried out, consulting engineers are consulted by the department concerned, and the department carries out all the ordinary operations. The engineering work is not beyond the capacity of an ordinary engineer. All the engineering work which constitutes reclamation work can be done by engineers with general engineering knowledge, provided they have expert advice?

A.—What do you wish to ask me about?

Q.—I want to make it clear to you that as regards the operations of the P.W.D., that the P.W.D. could have done it?

A.—You know better than I do, because you belonged at one time to the P.W.D. I cannot do more than express the opinion which I have expressed.

Sir Frederick Hopkinson.—You have told us that you had definite details for the statement that the profit expected was to be 30 crores. Sir Henry Lawrence who was here last week said you had made a mistake in that—that you had put a nought too many in it. I think he said that he pulled your coat tails to correct you but that you refused to be corrected.

A.—Not to my knowledge.

Q.—Therefore it would appear from your statement that Sir Henry Lawrence was under a misapprehension?

A.—Yes.

Mr. Billimoria.—With regard to these figures and to your statement, that would be quite all right; but may I point out that the basis is not correct as far as these figures go. You say that 1,100 acres was the area of land to be reclaimed, out of which 400 acres was to be absorbed in roads and open spaces, leaving a balance of 700 acres available for building site. According to official documents we have 454 acres available for building site, meaning approximately 22 lakhs of square yards of land?

A.—That is because the plan was to put some public buildings there.

Q.—No, excluding all that. This is a total area. May I hand you this document? (*Document handed to witness*).

A.—They exclude the area for the military. If you include that it makes 700. It is the same point as the Chairman put to me.

Q.—If you take 22 lakhs of square yards instead of 35 lakhs, it will make all the difference in the figures.

A.—It will. If you make it still less it would make a greater difference.

Q.—You also based this estimate on the assumption that the land would be disposed of as soon as produced?

A.—No.

Q.—That was your remarks?

A.—I do not think that is quite accurate, because the cost of 10·15 included therein the interest and sinking fund for a particular number of years, which was the expectation —seven years I think—when the land could be sold.

Q.—You anticipated at that time that the whole area could be disposed of within seven years?

A.—Seven to ten years, if I remember rightly. That was the estimate at the time.

Q.—In your statement you have said that land was sold in the vicinity at 1,000 rupees, and in one or two instances at 1,200 or 1,400 rupees. Those, however, were

peculiar circumstances, were they not? As a rule land was not sold at that fabulous price. Subsequent sales have been at much lower figures?

A.—Land was sold in those days at 700 or 800 rupees.

Q.—You know that business people like to be within a certain area in close proximity to the banks and to the business houses. Therefore prices in the business area are higher for residential quarters. You could not, therefore have expected a very fabulous price in the reclaimed area, which was intended more for residential purposes than for business houses?

A.—You forget that, taking the residential quarter of Malabar Hill, in those days land was sold at considerably over 100 rupees a square yard, and in some parts of that area for 200 rupees a square yard.

Q.—If 1,100 acres were thrown on the market prices would not have remained at that figure?

A.—People would have snapped up that 1,100 acres at 100 rupees per square yard. The Indian chiefs would have taken it if it had been offered to them at 200 rupees a square yard. They would take it even now at reasonable rates. There would have been no difficulty of disposing of residential plots on the reclamation at the value I estimated in 1921.

Q.—Based on the conditions then existing, you may have been justified; but did you expect that those conditions would continue?

A.—I quite agree that at present there is no demand, but it is wrong to say that the value of land has fallen below what I stated then. I quite agree there are no buyers. People through various reasons have money locked up and they cannot produce it, but nobody sells land at a lesser price now. In Hornby Road even now land is being sold at 500 rupees a square yard. Even at Malabar Hill people do not part with their land at lesser values, although there is no demand for it, because they think that intrinsically it is valuable, and will realise proper values when conditions improve.

Q.—But one factor which, as business men, the Government should have considered was that if a large area of land was thrown on the market it would have a depressing effect, and prices would fall.

A.—The whole object of the scheme was to produce land cheaper for the citizens of Bombay.

Q.—Then you could not have expected normal prices but much lower prices?

A.—But those are not normal prices which I have calculated. 100 rupees is nothing for land situated so favourably as the reclamation land would be.

Q.—You suggest that even though the whole area were thrown on the market, the market would not have been depressed and the value of land would have remained the same—about 100 rupees?

A.—Yes. In 1920, 1921 or 1922, if you had this land ready to be disposed of on the reclamation, it would have fetched more than the 100 rupees I anticipated.

Q.—Did you expect that the reclamation would have been completed by 1921 or 1922? It has been stated that it would have taken six years to complete.

A.—But it was not then anticipated that the demand for land would so suddenly subside as it has subsided. Nobody thought the demand for land was going so suddenly to drop in Bombay as it has.

Q.—I quite admit that if you had land ready and available at that time, you might have been in a position to have disposed of it at 100 rupees or more.

A.—I think I could have then sold it for 200 rupees.

Q.—But supposing it took six years to get the land ready and available on the market; conditions would be otherwise, would they not? That aspect of it was not thought of.

A.—It may be otherwise one way or another. The prices may go up or down. Therefore I took 100 rupees and not 200.

Q.—On Page 2 you refer to the unpopularity which Sir George Lloyd incurred during his administration with a certain section of people. May we know what that unpopularity is to which you refer?

A.—I do not think it is advisable to go into politics.

Q.—You have made that statement in your note?

A.—I have.

Q.—If you could clear it up it would be much better.

A.—I am not running away from it but it is not desirable to enter into any political controversy.

Q.—Do you wish to omit it from your statement?

A.—No, I do not want it to be omitted. With certain sections he had incurred unpopularity.

Q.—That is a sort of reflection upon the Governor?

A.—No, not at all. An administrator may make himself unpopular with certain people who want him to do things which it may not be right for him to do. There is no reflection at all. I have not put it as a reflection. I am stating it as a fact.

Chairman.—Every administrator in a great position is sure to be unpopular on some occasions with certain sections is he not?

A.—Every strong administrator is.

Mr. Billimoria.—You say that you would expect an average price of 70 rupees on the reclaimed area? Did you take an average of all the land, some in block 7 and some in block 6?

A.—Yes.

Q.—The Committee which sat in Bombay to consider the question said that even 20 rupees would not be realised for land in block 7. Therefore, on an average, it would not work out to your figure?

A.—I do not agree with them at all. They are much too pessimistic. It seems to me that everybody in Bombay now is too pessimistic, and that no proper view of things is being taken of this matter.

Q.—That was a representative committee, representing the Municipality, the Chamber of Commerce, and business interests?

A.—All these business men are affected by the prevailing conditions. I know what the erstwhile President of the Indian Merchants' Chamber thought at one time about land in Bombay, and what he thinks now.

Q.—With regard to the question of this military area, you now suggest that the Government of India may be approached with a request to give a higher value?

A.—I think that is a very fair request to make.

Q.—Supposing if this land had been reclaimed for 7 or 10 rupees, as was originally intended, would you have come forward and refunded some part of the money to the Government of India? Is it right that, having once entered into a contract, you should try to rescind that contract?

A.—This is not a contract between private parties. Here was the supreme Government who was responsible, as I say it was, for sanctioning the scheme. Soon after the scheme was sanctioned they said "We require for our purposes certain land out of this; you must give it to us, and at cost price; you must not make a profit as between the two Governments." The Government of Bombay acceded to that. Now if it is found that the actual cost to the Government of Bombay is going to be much more, I think it is reasonable to ask the other Government to reconsider the position.

Q.—You consider that equitable, do you?

A.—Quite. I think it would be inequitable to do otherwise.

Q.—Do you hope the Government of India will accede to that request if the Government of Bombay approach them?

A.—That is more for the Government of India to say than myself.

Q.—Then, in your statement, you suggest that a certain financier came forward and agreed to pay the Government a profit of 2 crores if the scheme was transferred to him. You have not mentioned any names. If you do not want to mention the name I do not want to press you, but, as the statement is made, people in Bombay may say——

A.—I am quite willing to mention the name if you so desire. There is no secret about it.

Q.—I think it would be very much better.

A.—Unfortunately the gentleman died only a few days ago—Sir Sassoon J. David.

Q.—In answer to a previous question, you said that if there was a slight variation from 367 to 400 lakhs, you would have no reason to go to the Government of India; but when the figures had practically doubled, did you place all the facts before the members of the Council?

A.—Yes, the fullest information was given.

Q.—With regard to the question of chawls, about which the Chairman asked you some questions, is it not true that the chawls were condemned by the working classes because they were not suitable?

A.—If anybody condemns them they are quite wrong. I have seen them and inspected them. I quite agree that improvements are possible in their construction but, as I said in the Legislative Council on one occasion, they are heaven compared with the hell in which the people are living now.

Q.—The mill hands call them dungeons?

A.—They may say so, because various interests put them up to say so. You go and see them, as I did while the work was in progress and while they were being

tenanted. I maintain very strongly that they are much more sanitary. There are much better amenities there—open land, dispensaries, hospitals and playing grounds for the children. As I say, it is heaven compared with the conditions in which they are living now.

Q.—The Government depended entirely upon expert advice before launching on this scheme, and that was Sir George Buchanan's advice. The Government had no technical knowledge of it. They had to rely upon their experts, and they did so rely?

A.—That would be so, under the circumstances in any scheme of this character.

Q.—If things have gone wrong, therefore, it is not the Government who are to blame, because they had to depend upon whatever expert advice was available to them at the time?

A.—I should think so, but I am not here to apportion the blame between the Government and the engineers.

Chairman.—There is only one other matter to which I ought to have called your attention. In your written statement, at about the tenth line on page 1, you say "I resigned office on the 16th June, 1923. The dredger 'Sir George Lloyd' had then just arrived." The dredger in fact arrived on the 31st March, 1922. Therefore your statement is inaccurate?

A.—My statement is inaccurate. That is my mistake, I quite agree. I can recall now how I made that mistake. The dredger arrived, no doubt, in 1922, but I inspected it a week before I left office. I confused that date with the date of its arrival.

(The Witness withdrew.)

(Adjourned for a short time.)

Mr. Robert Duncan Bell, C.I.E., I.C.S.
Called and Examined.

Chairman.—What are your Christian names?

A.—Robert Duncan.

Q.—Were you one of the Secretaries of the Development Directorate from the 5th July, 1924, to the 1st April, 1926?

A.—Yes.

Q.—Did you at any time act as Director?

A.—Yes.

Q.—That would be during the absence of Sir Lawless Hepper on leave?

A.—Yes.

Q.—Do you happen to recollect what time that was?

A.—The whole of April and half of May this year, 1926.

Q.—Was your appointment on the 5th July, 1924, your first association with the Development Directorate?

A.—Yes.

Q.—In what capacity had you been acting previously?

A.—Immediately before that I had been Director of Industries in Bombay.

Q.—You are a Member of the Indian Civil Service?

A.—Yes.

Q.—You had taken no part whatever in the Reclamation Scheme until the 5th July, 1924?

A.—That is correct.

Q.—By about that date the working of the Season 1923-24 had become known?

A.—It became known about that date; I cannot recollect exactly when.

Q.—The working season of 1923-24 gave disappointing results?

A.—Yes.

Q.—Similarly the working season of 1924-25?

A.—Yes.

Q.—1925-26 gave somewhat better results?

A.—Yes. I am not perfectly certain of the precise results in 1925-26.

Q.—But generally?

A.—Generally, yes.

Q.—What were your actual duties as one of the Secretaries? What was your daily work?

A.—Well, of course I had other duties besides those relating to the Reclamation Scheme.

Q.—Exactly?

A.—As Secretary to Government I was not at the outset very much concerned with the execution of the Scheme as an engineering scheme. The Director and Government consulted together mostly. At least that was so at the outset.

Q.—When you say " at the outset " you are speaking of July, 1924?

A.—Yes.

Q.—That is the outset so far as you are concerned?

A.—Yes, but I was specially concerned with such matters as ways and means—obtaining loans from the Government of India. The Director had not much direct concern with that. I was more especially concerned with the agreements with the staff. Once it was agreed that a man should be appointed the details of the agreement were left in my hands in the first instance. The legal position of Sir George Buchanan when he was unable to come to Bombay was largely in my hands—the papers were. Generally speaking, all matters which required the decision of Government came through my hands.

Q.—As regards ways and means, a loan was floated originally, was it not?

A.—Yes.

Q.—That was taken up quite eagerly by the people of Bombay and of the Presidency generally?

A.—I was not in Bombay at that time. I was away on leave.

Q.—Have you any information on that point?

A.—Just as much as any other man who had been home in that year.

Q.—How much is that?

A.—Certainly that it was well taken up.

Q.—In point of fact there has always been money to finance the expenditure right up to the time when you left?

A.—Yes.

Q.—The expenditure up to the time when you left would be in the neighbourhood of 5 crores?

A.—Yes.

Q.—That is £3,750,000. One at least of the reasons why the Reclamation Scheme was entered upon was the belief that the land could be sold readily at a profit?

A.—Yes.

Q.—Are you able to give us any information as to the view of the Department on that matter or your own personal view?

A.—You mean the view taken in the past?

Q.—Yes.

A.—When I became Secretary the financial procedure was largely based, so far as I can recollect, on this basis, that the whole of the development land might be sold in 11 years at an average rate of 40 to 60 rupees per square yard. That does not mean necessarily that it was contemplated that the land should be sold in 11 years at that rate. Sales might have been spread over a longer period and higher rates realised. That is what I mean by sales policy. There has been strong commercial opposition in Bombay to dumping this large area of land on the land market, but from the financial point of view, if you put the land on more slowly you might realise corresponding higher prices and in the long run obtain the same financial result.

Q.—But as a considered financial scheme was it thought that the land would on an average yield 40 to 60 rupees per square yard and be disposed of in a period of 11 years.

A.—That was the basis, according to my recollection, of the financial policy.

Q.—That would have shown a considerable profit?

A.—Yes.

Q.—Was that opinion maintained until you left in April, 1926, or was it subject to any modification?

A.—When I first became Secretary in July of 1924 Mr. Martin, who had been Secretary before me, was then acting as Director. He to some extent carried some of my responsibilities as I was new, and he and the Financial Adviser at that time gave Government an assurance that the Department's schemes as a whole were solvent. I cannot recollect any details now, or what figures they took for Back Bay; but very shortly afterwards in the following dredging season it became clear that the assumptions for Back Bay had to be abandoned.

Q.—As regards the engineering part of the scheme, you had nothing whatever to do with that?

A.—Not till I acted as Director.

Q.—And that was during the period April and May of this year?

A.—Yes.

Q.—That would be just towards the end of the dredging season?
A.—Yes.

Q.—The " Sir George Lloyd " would go into dock some time in May, I suppose?
A.—Yes.

Q.—How long have you been associated with Bombay?
A.—I was in Bombay for three years, 1909 to 1912, and I have been there since 1919. I have been there continuously since 1919, except for leave.

Q.—It was stated in the Report of the Development Committee of 1914 with regard to the housing conditions in Bombay that in 1911, out of a total population of 929,082 people, 743,247, about 80 per cent. of the population, lived in 166,337 one-room tenements. That was in 1911?
A.—Yes.

Q.—Even in 1911 that was rather a shocking state, was it not?
A.—Yes.

Q.—The conditions of overcrowding and conditions of life in Bombay then were not to the credit of a great city like Bombay?
A.—No.

Q.—Were the conditions in 1919 worse than that?
A.—They were much worse.

Q.—We have been told yesterday and again to-day that the population by 1919 probably went up from 929,000, spoken of in 1911, to 1,500,000?
A.—I should think that is too high.

Q.—You think it is a little high?
A.—I think so.

Q.—At what figure would you put it?
A.—I should not put it higher than 1,250,000.

Q.—Were the housing conditions of the working classes always a source of anxiety to the Government of Bombay?
A.—Yes.

Q.—And had they always a desire by some means or other to ameliorate them?
A.—Yes.

Q.—Was it mainly with that object that under the Development Directorate the Salsette, the building of chawls, and other activities were created?
A.—Yes.

Sir M. Visvesvaraya.—You were also called the Deputy Director?
A.—Yes.

Q.—Secretary to Government and Deputy Director of Development?
A.—Yes.

Q.—In what respects can you help us in this enquiry—I suppose in financial, technical, or administrative aspects?
A.—Yes.

Q.—Do you recollect whether, when the 702 lakhs estimate was sanctioned, a Government resolution was issued on the subject?
A.—I think that was before I joined.

Q.—But have you come across that resolution which is the basis of the whole work sanctioning the 702 lakhs? We have not seen any Government resolution on the subject.
A.—I cannot recollect it. I do not mean to suggest there is not one. I mean I may not have seen the actual orders.

Q.—Who is directing the operations? Is it the Development Director and the consulting engineer, and the chief engineer working under both those officers?
A.—For the Back Bay scheme, yes.

Q.—How were their mutual relations defined? In the course of the evidence given by him, Sir Lawless Hepper has stated that the responsibility for many of the technical operations was that of the consulting engineer.

Chairman: Who was the consulting engineer?
A.—Sir George Buchanan in my time, or his firm, was always regarded as the engineer in charge of the scheme and responsible for designs. The Director was responsible for seeing that there were no impediments to the progress of the work.

Sir M. Visvesvaraya: It was left to the consulting engineers.

Chairman: Who are the consulting engineers? I have not heard of them. I do not know them.

Sir M. Visvesvaraya: Messrs. Meik and Buchanan.

Chairman.—Do you accept it that Messrs. Meik & Buchanan were the consulting engineers?

A.—The Department always took the view that they were the engineers in charge of the scheme.

Sir M. Visvesvaraya: If you read the agreement I think it says " consultant."

A.—That is how the Department interpret the agreement.

Q.—As consulting engineers?

A.—No; engineers in charge.

Q.—I think in the agreement you will find the word " consultant " is used, and I want to know what was the actual understanding between them and the Government.

A.—There is a phrase, as far as I remember, in the agreement that they were to perform all duties which appertained to the engineers of charge of large works.

Chairman: They may be described as consulting engineers in the agreement, only I have not found it. When they were asked to make a report they were consulting engineers, but I think that is what you must mean. (*Agreement consulted.*)

Sir M. Visvesvaraya: Then my statement requires correction. You treated them as the engineers for the Government?

A.—Yes.

Q.—Apparently the Development Director did not give any instructions on technical matters without consulting the engineers?

A.—No.

Q.—If any estimate was exceeded, who sanctioned the excess?

A.—Any excess required the sanction of Government.

Q.—Was any estimate ever considered by the Development Department for completing the reclamation by dry-filling? Was that ever considered by the Development Department in your time, or have you come across it in the course of your study of the records?

A.—I can only speak of my time. There was some consideration given to the question when the Sub-committee of the Special Advisory Committee was constituted. You will find various tables attached to their report.

Q.—I suppose you could not tell me what the opinion of the Department was as to whether it was feasible or not?

A.—No definite conclusion was reached at the time.

Q.—Were the railway authorities ever consulted as to the facilities they would give if you wanted a large quantity of moorum?

A.—Yes.

Q.—What was their reply?

A.—At that time the maximum was six trains per day.

Q.—They promised that?

A.—Mr. Elgee, I think, conducted the negotiations direct. He could give you better information, but my recollection is that they could put in six trains per night.

Q.—He says they agreed up to four trains, and six might possibly have been done, but we understood they were able to give more than six trains.

A.—No; we clearly understood that they could not give more than six trains at that time.

Sir Frederick Hopkinson: It was for the future?

Sir M. Visvesvaraya. For the future they were able to give more than six.

A.—That may be so.

Q.—What reports did the Development Director submit to the Government, monthly or weekly, showing the progress of the work, the rate at which the operations were being carried on and the financial results as compared with the estimate? Were those discussed and reports made at intervals?

A.—I cannot speak before my time, but perhaps I ought to make it clear that one of the objects of organising the Directorate and appointing a Director who had a salary larger than any member of the Government except the Governor himself was, as I understood it, to relieve the Government of detailed examination of routine returns of that kind. There was a weekly report submitted by the chief engineer to Messrs. Meik & Buchanan of which a copy was supplied to the Director every week, and there was a detailed weekly report of the progress of dredging supplied to the Director every week, and as far as I can recollect, to Messrs. Meik & Buchanan. At least latterly, that report was sent to Government every week, but generally speaking, it was the business of the Director to inform the Government of any unusual departure from the programme.

Q.—Who generally made the appointments? Who recommended the appointments and who sanctioned them?

A.—All the appointments were made by Government. Some of them were made in the terms of this agreement on the nomination of Sir George Buchanan.

Q.—What was the system followed in ordering materials from England? Who made the first recommendation, who checked the indents, and who finally sanctioned them? What was the procedure followed? Did the matter ever come to the notice of the Secretary to Government and the Deputy Director?

A.—I have no clear recollection of any important material being ordered in my time, but the usual procedure is that it is ordered through the Director General of Stores.

Q.—All stores are ordered through the Director General of Stores?

A.—All stores are obtained through the Director General of Stores. Messrs. Meik & Buchanan may have taken a part in the purchase and probably did, but the Director General of Stores was responsible for the purchase, as far as I know, for the inspection and for shipments.

Q.—He is responsible for the rate and cost and for the quality of materials, but who was responsible for suggesting such-and-such materials are required and should be ordered, and then who sanctioned the quantities and transmitted them to the Director General?

A.—Sometimes a suggestion came, in the first instance, from the chief engineer, and sometimes, in the first instance, from Messrs. Meik & Buchanan; but I am only talking now from what I have read in the papers.

Q.—Who checked the quantities of materials ordered? In what branch of your office did they check the quantities ordered? Did you invite tenders through the Director General of Stores?

A.—The Director General of Stores would call for his own tenders and decide the matter on his own responsibility.

Q.—You did not ask to see the tenders?

A.—But they might in doubtful cases be referred by him to Bombay before acceptance—I think that is at his discretion—or he may be asked to do it in special cases.

Q.—Who took action about the Audit notes and the more important audit objections raised by the Accounts Department?

A.—I think all audit objections were ultimately disposed of under orders of Government.

Q.—By you as Secretary?

A.—The orders of Government were actually taken. I did not dispose of them personally, not on my authority.

Q.—Do not you think 90 per cent. are disposed of by the Secretary? Is not he the person who has the most authority in such matters?

A.—As a matter of fact we had very few Audit objections. We had a system of pre-audit. Anything which was objected to was probably sufficiently important to go up to Government.

Q.—The pre-audit is mechanical, but the actual Audit objections raised on the more important questions by the Accounts Department come to you on a separate basis. Finally they were dealt with by Government, you say?

A.—Yes.

Q.—Are all the objections properly dealt with and a Government resolution placed on record, or is an order passed and the papers recorded?

A.—Would you repeat the question?

Q.—Are all these objections considered by Government, and a Government resolution placed on record; or are they disposed of by an office note?

A.—No. Explanations are taken from the staff concerned, and they are considered.

Q.—What is the final shape in which the order issues?

A.—Usually a Government order.

Q.—A Government resolution?

A.—Or an order.

Q.—Who took notice of any great irregularities and suggested remedies? For instance, when the dredger failed to give the required output, who took action to remedy the defect if possible?

A.—The first important report in my time was Sir George Buchanan's in December, 1924, or January, 1925. That was brought to the attention of the Government at once and discussed by Government personally with Sir George Buchanan.

Q.—What action was taken on that report? Did you make any reference to the India Office, or to the Naval Architect, or did you make any reference to the builders of the dredger?

A.—So far as I recollect, not at that time.

Q.—Did you make it at any later stage?

A.—In the middle of 1925, when Sir George Buchanan was requested to come to Bombay with a representative of the makers, and also a representative of the Consulting Naval Architect.

Q.—But there is no description of the defects discussed, no order placed on record, and no report received? No report is on record, either from the firm or from Sir George Buchanan, of what was wrong and what remedies were necessary, and what steps should be taken by the Government. There is no conclusive action taken when the dredger failed to give the required output. I only want to know the facts. Can you tell us why that was so?

A.—That involves rather a long story.

Q.—When a machine is not working satisfactorily, the usual thing is to make a reference to the manufacturers and ask them why it is so, and what steps they would take to remedy what was wrong. If they are not legally bound to improve it, or to put it right, then they might be asked to say what additional charge they will make for putting it right. Was anything like that done? There has been some informal correspondence and nothing more, so far as I can see. Why is that?

A.—There were frequent personal consultations between the Government and Sir George Buchanan, and according to my recollection a representative of Messrs. Simons & Co., was once or twice in Bombay possibly even in the dredging season of 1924-25.

Q.—But there is no clear statement showing what the communications led to in any of the correspondence: why is that?

A.—I think all the written reports must be before the Committee. As to personal discussions I cannot tell you, I was not present.

Q.—The Government should have put pointed and definite questions to the engineers and builders, asking them why the dredger was not working satisfactorily and what remedies they had to suggest. But apparently such questions were not put and there are no direct replies on record.

A.—So far as I am aware, the working of the first season was not looked upon as conclusive of the dredger's efficiency.

Q.—How could it be conclusive when you allowed material to escape through the foundations of the sea-wall? It could not be conclusive. The proper thing was to take immediate steps to find out all the difficulties and to apply remedies, was it not?

A.—That may be so; but Sir George Buchanan did not think so, so far as I can gather.

Q.—As I can understand, the Development Director did not actually take part in the technical supervision of the works. He had something to do with it, but I have not seen any note by the Development Director at any time on any technical matter?

A.—He was not in any way responsible for the designs, for example.

Q.—Not even for examination of the designs submitted to him by the engineers?

A.—So far as I know, the only instance in which the Director may be said to have interfered with the course of operations laid down by Messrs. Meik & Buchanan was when the sea-wall was sealed.

Q.—That makes the matter clear. You have stated in your Back Bay Inquiry note that you are a little afraid the Government of India might not accept block 8 without the other blocks being completed. Is that what you mean?

A.—Not necessarily; but I should think they would expect block 8 to be put into such a condition as would fulfil the original intentions of the Government.

Q.—You want proper access to that block?

A.—It is not my business. It is the business of the Government of India. I only draw the attention of the Committee to the point.

Q.—What made you raise this question now?

A.—I had seen no evidence recorded on the point.

Q.—As far as I know, it is possible to find access to the site by a broad road. You are satisfied that you did not require the help of the Public Works Department in supervising this work?

A.—I have never said so.

Q.—It is said in some quarters that the Public Works Department should not have been superseded in the construction of this work, but it should have been under the supervision of the Public Works Department just as the Sukkur Barrage. What is your opinion on that point?

A.—I should not like to use the word "supersession." You cannot consider the organisation apart from the other schemes. The Public Works Department is organised in two branches. The Government might have organised the present Department on exactly the lines laid down, denoting it the Public Works Department Development

Branch; but it is only a name one way or the other. There is no material difference. As regards personnel, the personnel is another matter.

Q.—You have got engineers, and you have got several officers employed on reclamation. You must remember the relations of the Government to these officers, or the relations of these officers to the Government, are temporary, because they are temporary employees. Is it right to entrust them with all appointments, and with the ordering of material, without any technical scrutiny on the part of any permanent Government official, or on the part of any permanent Government Department? Was it safe to do this?

A.—I think so.

Q.—It was safe to entrust the ordering of materials and the appointment of engineers, without any scrutiny by any technical officer of Government?

A.—They were all officers of Government. The Public Works Department themselves have many temporary officers. All their specialist officers are temporary officers. Many of the staff on the Sukkur Barrage are temporary officers.

Q.—There is a distinction between temporary and permanent officers. The permanent officers have a stake in the Department?

A.—The first Chief Engineer was a permanent servant of the Government.

Q.—It was by accident more than anything else?

A.—So far as I am aware, Mr. Lewis was always a permanent servant on the cadre. He was on the permanent staff of the Government.

Q.—That may be; but there were the other officers. It is not that I am making any reflection on them, as no doubt they are very good men?

A.—In every scheme we had Superintendent Engineers who were permanent members of the Public Works Department cadre: Mr. Harvey and Mr. Browne.

Q.—How many of them?

A.—Those two—I think there are three.

Q.—What is the total number of engineering officers employed in the Department?

A.—I could not answer that offhand.

Q.—One of the witnesses said that there were 20 officers, of whom only one was an Indian. On that I am not particular; but why did not you take some European officers from the Public Works Department on to this reclamation work?

A.—I cannot say. That is before my time.

Sir M. Visvesvaraya: Thank you. You had made some points very clear.

Sir Frederick Hopkinson: In your note you throw doubt on the certainty that the Government of India will accept mere completion of Block 8 without means of access through Block 7?

A.—Yes.

Q.—I suppose when the Government of India agreed to take Block 8, it was understood that that was only a part of the full scheme?

A.—Yes.

Q.—And that if Block 8 alone were finished, the Government would be in a totally and entirely different position. They might say: " We have no access to this Block "?

A.—Yes.

Q.—" It is not what we agreed to take. We agreed to take Block 8, which is a portion of a larger scheme "?

A.—Yes.

Q.—Therefore you suggest that conceivably the Government might refuse to take Block 8?

A.—They might require the Government of Bombay to make some alternative provision.

Q.—At any rate the only access to Colaba is through the bottle neck past the Colaba Post Office?

A.—Yes.

Mr. Billimoria: In answer to the Chairman you said the reports for the years 1923-24 and 1924-25 working were not quite satisfactory—the output was not very satisfactory?

A.—Yes.

Q.—What was the nature of the information that could ever reach the public? What was the source? It would be the annual reports of the directorate, would it not—any information that the public could glean of how the works were going on would be the annual reports of the Development Department?

A.—And the debates in the Legislative Council.

Q.—Were all the facts disclosed in the annual reports of the Development Department?

A.—I could not answer that offhand without referring to the reports again.

Q.—You must be very familiar with these reports, as Secretary of the Department?

A.—That is quite true; but I am not prepared to say.

Sir M. Visvesvaraya: As Deputy Director you must have drafted them?

A.—No, I did not.

Chairman.—Sir Lawless Hepper said he drafted them and took the whole responsibility for them.

Mr. Billimoria: Will you take those reports. (*Same handed.*) If you will kindly look through these reports, there is no indication anywhere to the effect that the work is not satisfactory?

A.—I think that is so.

Q.—That is so, is it not?

A.—Certainly up to 1925.

Q.—The public were therefore absolutely kept in the dark and ignorant of the true state of affairs?

A.—I cannot agree entirely with that statement. I should explain that in September, 1924, a special Advisory Committee was constituted to examine and to report on all Directorate schemes, and I think that at the outset, at least, the Government hesitated to deliver any opinion which might appear to be a judgment previous to the judgment of this Committee. It might make matters clear if I say that my own opinion is that the prevalent opinion on this subject has arisen from the fact that this special Advisory Committee took such a very long time to issue their reports, but all the information was submitted to them at once.

Q.—Were all the facts placed before the Advisory Committee? Were they told about this?

A.—I did not attend their meetings. I have no reason to consider that any material fact was withheld from them.

Q.—We have on the record that certain Members of the Advisory Committee complain that facts were not placed before them—even the Bombay Chamber of Commerce were not informed?

A.—I only know of one case where the complaint was made. It was that of Mr. Manu Subedar on the finance Sub-Committee. I attended a good many meetings of that Sub-Committee and I was present when he made the request. I pointed out to the Director that he had no authority, without the previous sanction of Government, to disclose Government records, and I pointed out that in some cases the sanction of the Secretary of State might even be necessary to disclose correspondence with him. It was a matter of routine under Government Orders that they should be consulted beforehand before their records were disclosed. Very little time was lost in obtaining their Orders and so far as I am aware there was no hesitation in handing over the information to Mr. Subedar.

Q.—How long did it take?

A.—A week or 10 days I should think—10 days at the most.

Q.—From his letters he has made a very serious complaint that material information was kept back and until that letter was handed in he was not given an opportunity of going through anything?

A.—Mr. Subedar frequently asked for information which took a considerable time to compile, but the correspondence for which he asked at that time was produced within a week or 10 days.

Q.—Were the Advisory Committee informed that the dredgers were not working satisfactorily. Were they told by your Department?

A.—The results were discussed on the basis that they were unsatisfactory so far as I am aware.

Q.—You were the Secretary at the time the agreement with Sir George Buchanan was terminated?

A.—Yes.

Q.—Do you think that the Government were justified in terminating that. It was done on your recommendation, partly, was it not?

A.—This is a decision of Government. I cannot recollect now in what precise terms I gave them any advice, but I agree that they were justified in terminating it.

Chairman.—I am not sure how far that question is within the terms of our Reference.

Mr. Billimoria.—It is on the records.

Chairman.—I do not know how far the legal question whether the Government was justified in terminating the agreement, is within the terms of our Reference. We have had the papers but it does not follow that that brings it within the terms of our Reference. Anyhow it would be very unwise of us to express any opinion on that matter. We must not express any opinion on it in our report.

Mr. Billimoria.—The point might arise in this way. Suppose one party has to be blamed for certain things, then it may be the action of the Government was absolutely justified. It would come under that?

A.—May I make the point clear. I am not responsible for the legal advice to the Government in the matter.

Q.—In answer to a question of the Chairman you said that you contemplated the disposal of the whole of the land would take about 11 years at an average rate of 40 to 60 rupees a square yard. That was the basis of the scheme?

A.—That was the basis on which the Loans Programme was drawn up so far as I can recollect now, but I never actually had to work on that Programme. The circumstances entirely changed by the time I had to handle the matter.

Q.—So you are not in a position to say anything in that respect?

A.—Beyond the bare statement which I have already made.

Q.—Then you cannot say who was responsible for suggesting that?

A.—No.

Q.—That the whole area could be disposed of in 11 years?

A.—No.

Q.—The documents that are before us and the correspondence with the Government of India distinctly indicate that the Public Works Department in the past contemplated from about 40 to 50 years for the disposal of that area. Since you cannot express any opinion on that I will not trouble you about it. Then in answer to the Chairman you said something about overcrowding. A passage was read out to you suggesting that there was overcrowding in the City. What was that overcrowding of. Did it consist of the lower classes, the middle classes or the wealthy classes?

A.—All classes in 1919-20.

Q.—In what proportion?

A.—It is difficult to say. I think everybody was crushed in Bombay at that time.

Q.—Did you find many millionaires coming into Bombay or was it the working classes that were gathered together, who came out from the districts?

A.—Well, I can speak for my own community. They were living in very crowded circumstances at that time.

Q.—How many would they be—500, 1,000 or 2,000?

A.—I will give you an example. The premises of the College of Science had to be used for a time as a hostel in order to relieve the congestion.

Q.—What would be that number. How many people would that be compared to an increase of population from 800,000 to 1,200,000. What would be the proportion of those well-to-do classes to that increase?

A.—I would not like to make any estimate now.

Q.—It would hardly be any—is not that so—not more than 400 or 500 people?

A.—Of Europeans I think it might be more than 400 or 500.

Q.—How many more, roughly?

A.—Up to about 1,000 or 1,500 perhaps.

Q.—So you did not expect that this other 400,000 or 500,000 that had come into Bombay would go and occupy the reclaimed area on the sea front—you did not expect them to go and live there?

A.—I was not concerned with the scheme at that time, but so far as I know no one contemplated that those classes would live on the Reclamation.

Q.—For whom was the scheme? Was it for the poor classes or for the rich classes?

A.—I should say partly for office accommodation and partly for the housing of the middle classes, especially the upper middle classes.

Q.—When you talk of office accommodation, which portion of this reclaimed area would be occupied by offices? What do you contemplate?

A.—In the vicinity of Church Gate Street Station.

Q.—That is a small area. That is block No. 2?

A.—Yes.

Q.—That is a very small area compared to the vast scheme of reclamation. It is proportionately a small block.

A.—You have the exact figures.

Q.—Block No. 2 is, I think, the part you mean, and block No. 2 is about 500,000 square yards?

A.—Yes.

Sir M. Visvesvaraya: Four-and-a-half lakhs of square yards?

A.—Yes.

Mr. Billimoria. That would be the only area that you contemplated would be taken up by offices, and the rest would be a residential area?

A.—Yes. I do not know what was contemplated by the authorities at that time. I am giving you my personal opinion, looking back at things now.

Q.—You do not want to express any opinion on that? Then you were asked by Sir M. Visvesvaraya about the audit objections. Were there any serious objections from the audit department and from the Accountant-General?

A.—In my time I cannot recollect anything serious.

Q.—Were they all of a technical nature?

A.—Yes; as far as I am aware.

Q.—Did not the accounts officer point out that the cost of filling in the reclaimed area was far in excess of what was contemplated, taking depreciation and interest into account?

A.—When was that? I think that was after the state of affairs was well known to Government.

Q.—It was worked out that the total expenditure on the project, taking what it was going to cost per cubic yard, when compared with the estimates of Sir George Buchanan, was far in excess of what had been contemplated.

A.—Would you refer me to the document from which you are quoting?

Q.—It is the document signed by Mr. Bean and Sir Lawless Hepper showing a cost of about 16 rupees per cubic yard, as against 5 annas per cubic yard.

A.—This is not an audit report. This officer, Mr. Bean, is both accounts officer and audit officer. These accounts he compiles as accounts officer, and this is a review of his own which he made on his own responsibility, and with some of it I disagreed at the time.

Q.—If you will kindly turn to the last page to which I am referring, you will find that besides the accounts officer some other gentleman has also signed it, Sir Lawless Hepper.

A.—Yes.

Q.—Did he put in any note of dissent suggesting these figures were not correct?

A.—He has not.

Q.—Would you assume, therefore, that that shows the total expenditure on the works as worked out by the accounts officer is correct, or have you any explanation to offer?

A.—No; at the time when these accounts came to my hands I protested against the manner in which they had been brought for signature to Sir Lawless Hepper without being scrutinised in the Department first of all.

Q.—What are your objections to them? Will you kindly explain?

A.—Because I should refuse to sign any accounts unless I had an opportunity of scrutinising them; and there is no certificate showing in what capacity the audit and accounts officer has signed the report, and there is nothing to indicate what the parties respectively certified.

Q.—In what material respect do you object to the statement? In what respect is it inaccurate?

A.—I cannot go into details now. That is a matter which Mr. Elgee could offer an opinion on better than I can, I think.

Sir Frederick Hopkinson.—It might help you if I pointed out that this cost included depreciation on capital. We have not in our figures of cost touched on depreciation of capital or interest on capital.

Mr. Billimoria.—That is right. Even if this were eliminated, I should point out the figure is far exceeded.

A.—May I mention another point? I think this statement also included the results for the "Kalu" which in 1924-25 was only working for about an hour and a half a day when it could work. It was then mostly idle.

Sir Frederick Hopkinson.—That could not be included if you are taking the total cost of the dredger.

A.—Quite so; but it was by itself misleading, perhaps.

Sir Frederick Hopkinson.—There are several things there which would not be, in any case, comparable with the figures with which we have been dealing. For

instance, it gives establishment charges, and it also gives the Secretariat Department. The Secretariat Department has nothing to do with the cost of dredging in any figures that we have been dealing with.

A.—Quite so.

Mr. Billimoria.—Do you know whether the Auditor-General did not raise objections on several occasions with regard to the estimates having been exceeded?

A.—Do you mean without Government sanction?

Q.—The Government sanction was obtained after the Auditor-General pointed out these things.

A.—There may have been such cases.

Q.—What was the control exercised by the Department? Why were these exceeded until they were pointed out by the Auditor-General?

A.—Unless you give me the actual instance it is very difficult to explain. All I can say is that under the system of pre-audit no bill would have been passed by the audit and accounts officer unless it was within the amount of the sanctioned estimate. Payment stopped automatically as soon as the sanctioned estimate was reached.

Q.—All those objections are on the records and will not go further. They are all printed. If you estimated 11 years for the disposal of the entire area which constituted 22 lakhs of square yards of land, it would give an average of two lakhs of square yards for disposal every year?

A.—Yes.

Q.—Do you expect the land in that area to be disposed of at an average of two lakhs of square yards a year now?

A.—That is entirely a matter of price. If you put the land up at one rupee a square yard you would dispose of it in 24 hours.

Q.—At the price of 50 rupees a square yard do you expect it?

A.—Not at present.

Q.—You recommend that the scheme should be completed as such, but if the land could not be disposed of would you recommend that the scheme should be completed, or that you should go cautiously and slowly?

A.—Do you mean would I recommend now that the scheme should be prosecuted continuously to a conclusion?

Q.—Yes.

A.—No.

Q.—Could you tell me what is the access to the reclamation area for people to come to it? There is the railway line and there is no other approach. How are people to go over in blocks 1 and 2? What is the access there? Did anybody think of that?

A.—Yes; the B.B. & C.I. Railway are under an obligation to remove the railway line from Church Street station to Colaba station within a fixed date.

Q.—So you expect the public to have access to blocks 1 and 2 *via* Church Gate—going up Queen's Road and going through to that block?

A.—And from the Chaupatti end.

Q.—What is the access through the Chaupatti end? That is also a long way round. People will have to walk all the distance from Chaupatti to go to the Marine lines?

A.—You can come round right down along from Chaupatti and proceed right along the front.

Q.—Provided you have a motor-car. Taking ordinary people who have not the luxury of a motor-car, how can they have any access to that? How can they reach these blocks? There are no over-bridges contemplated.

A.—I do not think I follow you. People go to Chaupatti at present on foot.

Q.—Is that the only way that you think is the right way of developing this area without getting access to that? There is not any road by which you can reach block 1. The line would run through all this portion up to Colaba (*pointing on the plan*). People would have to cross that and there are no bridges to reach this place. You will have to build some over-bridges which would have to be provided for in your estimate.

A.—The only part which is not directly accessible is the Recreation Ground in Block 1.

Sir Frederick Hopkinson.—Where is the future terminus of the B.B. & C.I. Railway. Is it Church Gate?

A.—Yes.

Q.—The point Mr. Billimoria is making is that there is no direct access across the Railway unless you go right back to the Marine lines?

A.—For people debouching along this road, for instance, there is no access except footbridges, but there are footbridges.

Sir Frederick Hopkinson.—It would be a very simple matter to put a couple of footbridges here.

Mr. Billimoria.—What about the other people, carriages that want to go round Church Gate Station? If you are really developing this area you would require some bridges there, and a number of them if the whole area had to be reclaimed?

A.—I do not agree.

Q.—Do you not?

A.—No.

Q.—Do you think that any land which is not accessible will realise a better price?

A.—I think the access would be ample when the Railway betwen Church Gate and Colaba is removed.

Q.—That is your view?

A.—Yes.

Sir Frederick Hopkinson.—Is there an actual agreement between the Government and the B.B. & C.I. Railway that the railway is to be done away with south of Church Gate?

A.—There is an agreement between the B.B. & C.I. Railway and the Secretary of State under which the Secretary of State can give them notice.

Q.—At some time?

A.—There is a limit. I forget the exact year.

Q.—He can give them notice to discontinue running south of Church Gate?

A.—Yes.

Q.—Has he to give it within a certain time?

A.—I think the notice has actually been given.

Q.—It has?

A.—I think so.

Sir M. Visvesvaraya.—Did you say the notice has been given?

A.—Yes.

Sir M. Visvesvaraya.—Then the railway line will be stopped.

Mr. Billimoria.—There has been some objection with regard to that notice. The Railway Company have said that afterwards, if they want this line to be reinstated, they would not be prepared to do so without compensation?

A.—There have been objections raised, but the fact is they have received notice.

Q.—Are you going to discontinue it? Has that been decided upon in the terms of the notice?

A.—They may resist and they probably will, but so far as I am aware they are bound by the terms on which they hold the line.

Q.—That notice is subject to electrification and the electrification is not complete?

A.—No.

Q.—Is not that so?

A.—No.

Q.—I think that is in the correspondence somewhere?

A.—The Government may have agreed for other reasons not to give notice until the electrification scheme is completed, but the terms on which the B.B. & C.I. Railway hold the line were framed long before there was any thought of any electrification scheme. It goes back 30 or 40 years.

Chairman.—Are you satisfied that the Government can, if it has not already done so, give them notice to discontinue running south of Church Gate?

A.—Perfectly satisfied.

Sir M. Visvesvaraya.—Then where will be the terminus?

A.—Church Gate Street would be the terminus for the suburban traffic. The terminus for the long distance traffic will be either at Grant Road or Victoria Terminus, but so far as I know that question is not decided.

Sir Frederick Hopkinson.—There will have to be some trams taken on to Church Gate or some other means of communication?

A.—Yes, or buses.

(The Witness withdrew.)

The Committee Assembled at 2.30 p.m. on the 4th October, 1926, all the Members being present.

47th Witness, Mr. E. W. Knight.

Chairman.—What are your Christian names?
A.—Ernest William.

Q.—In the spring of 1912 were you assisting Mr. Kidd in the wash-borings in the harbour of Bombay?
A.—Yes.

Q.—Were you one of what he describes as the Observers?
A.—I was his foreman.

Q.—He says: "Two observers, both non-commissioned officers of the Royal Engineers, were employed, one on each craft, who got the craft into line, observed and recorded positions and measured and recorded depths and tide gauge. They also acted as foremen in charge?"
A.—That is correct, except that I was not a non-commissioned officer in the Royal Engineers at that time. I was an ex-non-commissioned officer in the Royal Engineers.

Q.—He refers to you as being on one of the craft and a colleague on another craft?
A.—Yes.

Q.—About how long were you employed in taking these borings?
A.—I went out from England, I think on the 21st January. I was back here again, either late in June or early in July—I forget at the present time exactly when as it is a long time ago to remember.

Q.—You went out to Bombay specially for this work?
A.—Yes.

Q.—Were you in Mr. Kidd's employ before that time?
A.—No, but prior to that I was Inspector of Government against him when he was building the Bombay Breakwater.

Q.—Were you familiar with the Bombay conditions?
A.—Yes, very familiar.

Q.—How long had you been concerned with the harbour and breakwater?
A.—I was in the Submarine Mining Corps in Bombay for a matter of six or eight years, surveying and laying mines in the harbour, and I was about 4½ years as Inspector of Bombay Breakwater for Government as non-commissioned officer of the Royal Engineers.

Q.—That was before 1912?
A.—Yes, that was in 1896 onwards.

Q.—Had you ever taken wash-borings before you began this work for Mr. Kidd in 1912?
A.—Not wash-borings but other kinds of borings.

Q.—By "other kind of borings" you mean borings with core drill?
A.—Ordinary American rod drills—the ordinary rod drills.

Sir Frederick Hopkinson.—With an auger at the end?
A.—Yes.

Chairman.—A shell auger?
A.—A shell auger or a drill or whatever the case may be—whatever you were called for to do.

Q.—That is a recognised method of taking borings, is it not?
A.—Well, for certain types of work.

Q.—Would boring with a core drill or a shell auger have been appropriate in Bombay Harbour?
A.—It would not have been as efficient as the method employed by Mr. Kidd.

Q.—Why not?
A.—Because his method was a very, very simple method and very, very effective in my opinion—accurate and effective.

Q.—But are not the methods of core boring and boring by shell auger perfectly certain in their operation?
A.—I should not say so. I should not say they would be any more efficient or as efficient as wash-boring for mud, which is what we were boring for. We were only trying to find how much mud was on the rock then in Bombay Harbour.

Q.—You can get through mud with wash-borings?
A.—Yes.

Q.—The difficulty begins when you are getting into stiff and unctuous clay, does not it?

A.—I do not know that there would be very, very great difficulty in getting through anything until we got to the rock in Bombay Harbour.

Q.—But generally speaking with wash-borings is not it an almost impossible method of getting through stiff clay?

A.—I never tried it.

Q.—What do you say?

A.—I do not know that I ever tried it.

Q.—Let me describe it and you will tell me if I am describing the method that you employed accurately. You had lengths of metal pipe with an internal diameter of 2 inches?

A.—I am not quite sure whether it was 2 inches or 2½. It is a long time ago to remember. It may have been 2½ inches or it may have been 2 inches so far as I know.

Q.—At this lapse of time it is impossible to remember a detail like that?

A.—And I have lost my notes.

Q.—We have Mr. Kidd's statement and he speaks of it as 2 inches?

A.—I should say that is correct but I have lost all my notes.

Q.—So far as your recollection goes?

A.—It may have been 2 inches or 2½ inches.

Q.—An internal diameter of 2 inches?

A.—Yes.

Q.—An external diameter of 2½ inches about?

A.—An ordinary standard tube—the ordinary water tube.

Q.—The question I asked was, an external diameter of 2½ inches?

A.—It may be or it may not be; I cannot tell you from memory.

Sir Frederick Hopkinson.—Slightly less?

A.—I should say less.

Q.—But practically 2½ inches?

A.—Yes.

Chairman.—At the end of the pipe the end was constricted down to——?

A.—Less than 1 inch.

Q.—According to Mr. Kidd down to 1 inch?

A.—I could not argue about that. I consider it was considerably less. It was a reducing socket screwed on to the end of this tube, and as far as my memory carries me it was about ½ inch.

Q.—So be it. A reducing socket is rather like the point of a pencil?

A.—Exactly, an ordinary reducing socket—a standard reducing socket screwed on.

Q.—Do you remember what lengths these pipes were in?

A.—No, I cannot tell you. They were in standard lengths. We cut them in standard lengths and screwed them, but I forget what they were. They were all in sections so that there would be no mistakes in calculating.

Q.—You had several lengths of these pipes which you were able to screw together and get down through what you describe as the mud?

A.—Yes.

Q.—First of all the apparatus with yourself and the other men was on a moored raft, was it not?

A.—Yes.

Q.—You took up your position by a series of cross-bearings so that you would know exactly where you were on the surface of the harbour?

A.—Yes, we had a line of cross-sections from a base line running along the shore, and we hauled out with anchors a certain given distance—whether they were 100 feet or 100 yards I have forgotten now—they were either 100 feet or 100 yards. That was hauled out and then angles were taken by a sextant from that alignment and checked the cross-sections from each end of the base line observation.

Q.—So that you would be able to record your position in the harbour accurately day by day?

A.—Reasonably accurately. It could be checked when it got into the office by the protractor to see whether we were to lay the pipe or whether we were not to, whatever the case may be.

Q.—The process was, was it not, that you lowered this 2-inch pipe with its reducing socket down through the sea until you touched the mud?

A.—Until we touched the top of the mud.

Q.—You may have to screw on three, four, five, six or seven sections, according to the depth at which you were working?

A.—Yes.

Q.—According to the statements that have been made you did succeed in passing through the mud right down, I think, to 70 feet in depth to moorum or rock?

A.—Always, we always got to something hard, whether it was moorum or whether it was rock. It was hard. We went down till we got no further.

Q.—In this system of wash borings you drove water by a hand pipe down through the hollow pipe, did you not?

A.—Yes.

Q.—That being forced out at the end of the reducing socket enables the pipe in theory to sink through the mud?

A.—Yes.

Q.—That is the object of it?

A.—That is the object.

Q.—What sort of pressure was the pump giving?

A.—To the best of my recollection we tested some of that and I think we got up to between 80 and 100 per square inch, but I will not be absolutely sure—at least 80, anyhow.

Q.—Then when the reducing socket, the penetrating end of the pipe, touched the mud, did it sink by its own weight assisted by the water which was being pumped through?

A.—Not always.

Q.—Did it sink through any part of the mud?

A.—Yes.

Q.—About what depth of mud would it usually sink through?

A.—It would be just according to what the type of mud was. In some parts of Bombay harbour you get slurry on the top, and when you get out further you get a more consolidated type of mud.

Q.—You get the consistency of the material varying in different parts of the harbour?

A.—Exactly.

Q.—Some of the mud quite soft?

A.—Yes.

Q.—Take the softest type of mud, about how far down would the pipe sink of its own weight?

A.—That is a pretty tall question after all these years.

Q.—I know that we are dealing with things which happened a long time ago, but we want to get the best of your recollection.

A.—Sink without assistance?

Q.—Yes; without assistance.

A.—I should think we would go down about 6 to 8 feet at the top part of the slurry.

Q.—Then when you speak of assistance, how did you get it down through the denser material?

A.—We had tackles on the end of the tube and a flexible portion on the top from the pump, and we raised and lowered the pipe with those tackles, and the men jumped it down the same as you jump an ordinary drill just to clear the ordinary pressure of water and get a flow of water on to the mud, which would clear the mud away—a succession of lifts and drops, and lifts and drops.

Q.—Were you taking notes of each of the borings? Was that part of your duty?

A.—Yes.

Q.—On probably one-half of this area?

A.—I should think so. I should think I did more than half of it.

Q.—The document to which I am now referring is " No. 308, chief engineer's office, Back Bay reclamation scheme, general plan showing borings taken in Harbour." You are responsible for about half of the figures recorded on this plan?

A.—I should think so. I do not know about the figures recorded on the plan, but I am responsible for the figures that were sent in to the office by me.

Q.—You passed the figures into the office?

A.—Yes.

Q.—One would presume that they were correctly put down here on the plan. As I understand it, you took no borings which would bring up to the surface the strata through which your pipe passed?

A.—We did get that on several occasions.

Q.—You mean mud adhering to the tube?

A.—No; if we stopped pumping what was in the bottom of the tube would be the strata you were in You pulled it up to get it.

Sir Frederick Hopkinson.—When you pulled the tube up?

A.—Yes; we pulled the tube up many times to inspect it.

Chairman.—How would you described the material that you found on occasions in the reducing socket?

A.—I think all we ever got there was mud and blue clay. That was the description.

Q.—Up to now you have not told us anything about the wash borings penetrating into blue clay. You have spoken of it up to now as mud?

A.—Yes; there is very little difference between the Bombay mud and blue clay. It is a bluer substance, but it is very similar to mud. It is stiffer, that is all.

Q.—As you got down deeper and deeper was there a greatly increased resistance?

A.—Yes.

Q.—Would it be a fair description of the clay to call it hard clay?

A.—No; I should not think so.

Q.—Would it be a fair description to speak of it as a stiff clay—the blue clay?

A.—Yes.

Q.—Stiff?

A.—Yes.

Q.—This plan has a large number of small circles on it which indicate the position of each boring, and the references say: "The black figures indicate the surface of mud." Does that mean the top figures, do you know?

A.—I should think so.

Q.—Then: "The blue figures indicate the surface of blue clay." In fact, on this plan there are no blue figures, they are all black?

A.—Yes.

Q.—Would that be a middle figure?

A.—I cannot tell you.

Q.—Take any one of these you like. They are all black figures, are they not?

A.—Yes.

Q.—The reference which is closest to your right hand says: "The black figures indicate the surface of mud."

A.—Yes.

Q.—On that plan there are no blue figures, but is not that meant as the middle figure of the three?

A.—I cannot answer that question. I do not know anything about the plans. The plans are all prepared in the office after our work is done, and I cannot tell you that from memory.

Sir Frederick Hopkinson.—That is not the original drawing. The original drawing has been traced, and that is a print from the tracing. That is why the figures are black —the colours did not come out.

A.—It is the middle figure that is blue.

Sir Frederick Hopkinson.—Apparently that is it.

Chairman.—The plan shows in some places a depth of as much as 30 feet of blue clay. You can take that from me. How long would it take you to get your pipe through a depth of blue clay of 30 feet?

A.—I cannot tell you. It is a long time ago now. It used not to take very long. Some holes were stiff and some were easier than others; but I forget now. I cannot tell you how long we were getting down.

Q.—You say some of the blue clay was stiff. Was some of the blue clay easier?

A.—Yes; when we were down in the places outside Sunk Rock it used to take us a good long time to get down. It was pretty stiff going through there. But I cannot give you in time how long it took us—it is a long time ago.

Q.—Do you mind looking at the map? Where is Sunk Rock?

A.—It is the next lighthouse to the Prongs in Marine Lines.

(The position of Sunk Rock was pointed out on the plan.)

Q.—You say the area round about Sunk Rock was very stiff?
A—.Yes; this cross-section between Oyster Rock and Sunk Rock.

Q.—There the material was very stiff in character?
A.—Yes.

Q.—The material in block K, according to you, would be very stiff?
A.—Yes; getting well out towards Sunk Rock. It is right outside Oyster Rock. It is not much inside Oyster Rock. It is outside *this* way. (*Pointing on the plan.*)

Q.—Who told you what apparatus was to be used for the purposes of these wash-borings?
A.—Mr. Kidd.

Q.—Was he out in Bombay at the time when you began?
A.—He came out a week after, practically at the time we began. He came a week after we left England. He followed us one ship behind.

Q.—He followed you out?
A.—Yes; we were out getting ready. He was out in time to see the first boring.

Sir M. Visvesvaraya.—Roughly speaking, what time did it take you to lower the pipe through 10 feet of hard clay or stiff clay? Mr. Kidd says the whole thing took 20 to 30 minutes to get through 30 feet.
A.—He is giving you a limit. It is somewhere about that.

Q.—Each boring took 20 to 30 minutes?
A.—Yes; when we got out on stiff stuff it took you some time.

Q.—The whole operation?
A.—From one point to another.

Q.—To complete the whole boring?
A.—It is just according to how far you are going down. Do you mean in 10 feet only?

Q.—The whole length, say 30 feet.
A.—The connecting up and boring, and everything?

Q.—Yes.
A.—I should think about an hour.

Q.—What was the maximum pressure you applied?
A.—80 to 100 lbs. per square inch—I cannot say which.

Q.—That is 230 feet. Did you pierce through the moorum to any depth at all?
A.—We may have got into a little bit of moorum. We could not get very far through the moorum.

Q.—Soft moorum?
A.—We might get down a foot or 18 inches into the soft moorum; you would not get further.

Sir Frederick Hopkinson.—What sort of pumps did you use?
A.—Semi-rotary pump, 2½-inch bore.

Q.—Worked by one man?
A.—Two, and four sometimes.

Q.—Did it have a long handle on?
A.—We duplicated the handles.

Q.—A semi-rotary pump is rather awkward to work with more than two men?
A.—Yes. To the best of my memory we duplicated it and put a long handle on and made it into a kind of 45 degree angled thing. I forget how it was but we had four men on sometimes.

Q.—Did you have india-rubber pipes from the pump outlet to the top of the boring pipe?
A.—Canvas hose. As a matter of fact we had both, both rubber and canvas, chiefly canvas.

Q.—What sort of connection did you have?
A.—Brass union.

Q.—To the top of the pipe?
A.—Yes.

Q.—Your suction pipe would be thrown overboard?
A.—The suction pipe was thrown over the side of the raft.

Q.—Did you have a pressure gauge on the pipe?
A.—Not always. We had a pressure gauge for testing purposes to find out what pressure we were actually getting. We got a gauge to find out exactly what pressure we were getting. We did not use the gauge always. We used it just to find out what pressure we were capable of getting.

Q.—Where was the gauge fixed?
A.—Now you have got me. It would be on the delivery I suppose.
Q.—Not on the canvas delivery?
A.—No, certainly not.
Q.—Nor on the vertical pipe?
A.—No.
Q.—Can you remember where it was fixed?
A.—I forget at the present minute.
Q.—It is rather important. I wish you would try and remember.
A.—We used to take pressure anyhow on the delivery. I forget where we connected the gauge.
Q.—You do not remember where the pressure gauge was fixed?
A.—No.
Q.—How often did you use the pressure gauge. If it were fixed on the pump there would be no reason why you should not use it for every bearing?
A.—Yes, but we did not think it necessary to use it. We used the pressure gauge for our own information to see what pressure we were accustomed to get. It was of no value to us, knowing what the pressure was, so long as we were getting through. We just did it to find out what we could get on these pumps.
Q.—Whose idea was it to put a pressure gauge on?
A.—I forget that. Presumably Mr. Kidd's.
Q.—Could you tell when your pipe touched the blue clay after getting through the mud?
A.—You could.
Q.—It refused to descend?
A.—It refused to descend. Sometimes we used to have to draw it up and clear it. We used to find it had choked and we had to clear it out.
Q.—It was choked with clay?
A.—Yes.
Q.—You just lifted it out of the hole and pumped into it?
A.—Sometimes we had to unscrew it and clear it.
Q.—It got properly choked?
A.—Yes.
Q.—Did you get any samples of the clay at any time?
A.—Yes.
Q.—What size of pieces?
A.—The same size as the bore of the pipe.
Q.—Do you mean you brought up core?
A.—Yes, we would get core by stopping pumping at any time and pressing the pipe down with half-a-dozen men. You could press it in and get samples.
Q.—That would be a ½-inch pipe?
A.—Half-inch, and it would practically get loosely inside.
Q.—You could squeeze the ½-inch nozzle end of the pipe into the clay?
A.—Yes.
Q.—Stop your pump, pull it out, and extract that as a sample?
A.—Yes.
Q.—What sort of clay was it?
A.—Ordinary Bombay blue clay. It is very like blue clay.
Q.—Will you take that sample. (*Sample of clay handed to the witness.*) Was the clay you got up anything like that?
A.—No.
Q.—Nothing like that?
A.—No.
Q.—You would have a difficulty in getting a pipe with a hand pump into that?
A.—It is just according to what it is like when it is wet.
Q.—It is not soft?
A.—No, but you would get through that I should think.
Q.—You think you would with a hand pump?
A.—I should think so, not as it is but when it is wet.
Q.—When it is saturated?
A.—Yes.

Q.—Is that anything like the end of the pipe? (*Sketch showing reducing socket from 2 inches to ½ inch handed to the witness.*)

A.—Yes, that is it.

Q.—Supposing that is the surface of the clay your water jet (because it becomes a water jet now) has to wash out a hole as big as the external diameter of the pipe above it?

A.—Yes, it washes round here until it has got that size.

Q.—What volume of water did you pump? A semi-rotary pump gives you a very small volume.

A.—I forget what the suction was. It was a fairly good volume.

Q.—It is not a question of the size of the suction. It is a question of how much the pump valves would pass. Semi-rotary pumps are not fitted for any rapid delivery?

A.—No, they are not.

Q.—Is not it customary that in all borings of this kind you want a large volume of water to enable the pipe or pile to descend through the material?

A.—Yes.

Q.—Do you think that a ½-inch orifice at the bottom of the pipe would really give sufficient water to blow out that clay in a hole large enough for the pipe to descend through it?

A.—Well, it always got down to the rock in Bombay Harbour.

Q.—Rock or moorum?

A.—Yes.

Q.—It did?

A.—Always.

Q.—Did you find the clay varied at all from the top to the bottom in hardness?

A.—From the top of the clay to the bottom of the clay do you mean?

Q.—Yes.

A.—It varied. The further you got down the harder it got. The pipe went down with greater difficulty the further you got down.

Q.—That might be due to friction on the pipe?

A.—It might be due to friction.

Q.—You really had no means of telling unless you took samples, whether the clay actually varied in character?

A.—No, I would not like to say.

Q.—You said just now that you took notes of all these borings. I did not quite catch what you said about that. Have you got them now?

A.—No, I lost them. I was torpedoed and I lost my notes and my books. I got torpedoed coming home—or rather going out as a matter of fact on another job and lost my notes.

Q.—You say you jumped this pipe down. Did you have various pulley ropes to lift it and drop it?

A.—Yes.

Q.—What is the weight of 70 feet of 2-inch pipe?

A.—I cannot tell you.

Q.—You spoke just now about the consolidated type of mud. Do you think there is any real difference between the material that was on the surface and at the bottom, except that it was more consolidated. Do you think the mud was of the same character as the clay?

A.—No. The mud is considerably blacker. It has the same texture. There is no grit or anything of the sort in it. There is no grit in any of the Bombay mud.

Q.—Therefore it would not be correct to call it silt?

A.—At the top?

Q.—Yes—it is mud, is it not? Silt usually means a large proportion of sand.

A.—Yes.

Q.—Therefore you would call this mud?

A.—Yes.

Q.—Not silt?

A.—Slurry or mud.

Q.—I have seen men walking in it up to their arm-pits?

A.—Yes.

Q.—That is the sort of stuff?

A.—Yes. You get that on the top in Bombay. You get that everywhere in Bombay Harbour.

Q.—So that your pipe would drop into that at least 6 feet?
A.—I should think so.

Q.—Without any appreciable resistance?
A.—Yes.

Q.—Would you mind telling me what sort of apparatus you used. Did you have two boats coupled together with some planks or boards or something of that kind?
A.—Yes.

Q.—And a cat-head rigged up on top of that?
A.—Yes.

Q.—A tripod?
A.—A tripod in the centre of two rafts. The two rafts were two boats covered with a platform.

Q.—And the pipe in between the two boats?
A.—The pipe and tackle in between the two boats.

Q.—You have four moorings for it?
A.—Yes.

Q.—How long did it take you to move from one place to another?
A.—It was according to what the tide and wind was like.

Q.—About how long?
A.—Something like half an hour.

Q.—How long would it take you to make a boring, supposing you got mud and 30 feet of clay?
A.—Approximately an hour I should think.

Q.—Roughly speaking 1½ hours for a boring?
A.—Yes.

Q.—That is pretty quick?
A.—Yes.

Q.—You did not lose any time?
A.—No; it is a long time ago.

Q.—I quite appreciate that, but it is pretty quick work?
A.—Yes; it may have been longer.

Q.—You evidently did the whole work very quickly?
A.—Yes; it is a very quick job.

Q.—I suppose Mr. Kidd wanted it done quickly?
A.—Yes.

Q.—It is no mean job to take 1,300 borings in 3½ months?
A.—That is so.

Q.—You said to the Chairman just now that the wash boring system was more efficient, effective, and accurate than the core boring.
A.—For that type of boring, soft mud boring.

Q.—I am speaking of the clay now.
A.—For the stuff that we found in Bombay harbour.

Q.—It could not be as accurate because you could not get at the core; or do you mean that the stuff was so soft that you could not, with a core drill, get up the proper core?
A.—You could get it.

Q.—You could?
A.—Yes.

Q.—Therefore, that would certainly be more accurate than wash boring, would it not?
A.—I do not see why it should be.

Q.—Because you would pull the actual stuff out from a defined depth.
A.—You could do the same with wash borings.

Q.—No; because you do not see what is going on until you pick your pipe up.
A.—You stop pumping and push it down. The water is all out, and you get the impression of the stuff—of what you have got.

Q.—Did you often do that?
A.—Yes.

Q.—You said just now that it was soft light blue clay in the harbour. Would you call that sample ordinary light blue clay?
A.—No; this is a different type of stuff altogether. This is clay mixed with some kind of moorum.

Q.—With a little kankar?
A.—Yes.

Q.—Little bits of lime?
A.—Kankar.

Sir M. Visvesvaraya.—This sample was picked up from the reclamation area?

Sir Frederick Hopkinson.—Yes.

Sir M. Visvesvaraya.—So it is not natural material.

Sir Frederick Hopkinson.—You had never done wash borings before, I think you said?

A.—No; this was my first experience of wash borings.

Q.—How could you tell directly you got through the mud that you got on to the clay?

A.—You could tell by the different way the pipe went down. You could not get it down through that without using force. You had to keep easing the pipe and jumping it.

Q.—But jumping alone would not take it down?
A.—Jumping, and the pressure at the same time.

Q.—Jumping alone would not take it down?
A.—No.

Mr. Billimoria.—Were you satisfied that there was sufficient material available in the harbour for reclaiming 1,145 acres?

A.—That question had nothing whatever to do with me. I did not see the finish of the work. I was only employed on getting the borings and handing in my results to the office. The other part of the work was probably in the offices at Bombay and Poona.

Q.—Did you find that this material was suitable for reclamation purposes?
A.—That is not for me to say. I was not interested in that.

Q.—Was the boring taken on an exhaustive scale?
A.—Exactly.

Q.—To prove the existence of the material?
A.—Exactly.

Q.—The borings were taken on a very exhaustive scale?
A.—Yes.

Q.—What did you find the clay to be, soft or hard?
A.—Ordinary Bombay clay, soft, or stiff, or medium.

Q.—Will you kindly explain what you call soft clay, medium clay, and stiff clay?
A.—The usual thing that is found in Bombay harbour.

Q.—Is not there any difference between the various descriptions which you have just now referred to?

A.—Well, it is as I explained not long ago, blue clay or blue mud, whatever you like to call it. It is considerably stiffer than the top portions of it, and that comes out in the samples which have been brought up. It is fine, stiffish, bluish clay, with no grit, or anything of that kind, in it.

Q.—Does the material in the bed of the harbour or bed of the sea change in lapse of time, or does it remain the same? Do you know anything about that?
A.—No.

Q.—If somebody took borings in 1909 for the purposes of reclamation, and if reclamation had to be undertaken in 1919 would you be satisfied with the borings of 1909, or would you get a fresh survey made in 1919 before embarking on the scheme?

A.—Well, that is a pretty big question. It is just according to whether any changes have been made in the harbour.

Q.—Ordinarily, supposing somebody was sent out in 1909 for investigation purposes and the scheme was not taken in hand, but later on after 10 or 12 years it was found advisable to undertake the scheme, would you go on the estimates of your investigations of 1909 or would you have a fresh survey made in 1919?

A.—I do not know. It is just according how much I knew about the original one.

Chairman.—You told me and Sir Frederick Hopkinson that it was ordinary light blue clay?
A.—Yes.

Q.—You have told Mr. Billimoria that it was stiff bluish clay. The two things do not go together—stiff and ordinary light blue clay.
A.—I was speaking of the colour of it.

Q.—Ordinary light blue clay is one thing, and stiff bluish clay is another, is it not?
A.—I was speaking of the colour. The colour is of light blue.

Q.—In using the word " light " you were using it in reference to the colour as opposed to density?
A.—Yes.

Sir Frederick Hopkinson.—Do you agree with Mr. Kidd's description of it, that it was stiff clay?

A.—It is a very funny point for me to decide which is stiff and which is not stiff in clay. Taking the stuff that we got out of there, as you went down through the top stuff you got into mud, which has slurry stuff on the top, and then it gets a little bit stiffer, and it gets stiffer and stiffer the further you go down.

Q.—Stiffer in the sense that it is more difficult to push the pipe down?
A.—Yes.

Q.—That would be natural, because you have so much more skin friction on the pipe?
A.—Irrespective of that.

Q.—How do you know that?
A.—Because I have seen it brought out of the harbour in the same manner.

Q.—You have seen variations in the quality and character of the clay?
A.—Yes.

Q.—Would you call it generally stiff clay or soft clay?
A.—Well, it is not as stiff clay as you would meet outside in the sea.

Q.—Do you know the London clay?
A.—Yes.

Q.—Is it as hard as that?
A.—No.

Q.—Can you compare it with any clay you know of in England?
A.—No; I cannot. It is too fine.

Q.—Is it harder than bungum?
A.—No.

Q.—That is also blue?
A.—Yes.

Q.—That is material you get in the Humber?
A.—I have worked in the Humber.

Q.—You ought to know bungum.
A.—I have worked at Immingham on the docks there.

Q.—Did you not get bungum there?
A.—I was on the docks entrance there.

Q.—Did you not get bungum there?
A.—I do not know what it was called.

Q.—It is blue soft clay. You would hardly call it clay. Did you ever go over to the King George Dock?
A.—Yes.

Q.—Did you see bungum there?
A.—I saw plenty of clay there. I was diving there at the entrance to Immingham Dock a good many months removing clay, as a matter of fact; removing the entrance there.

Chairman.—Thank you. (The Witness withdrew.)

(Adjourned to 5th October, at 11 a.m.)

The Committee Assembled at 11 a.m. on the 5th October, 1926, all the Members being present.

48th Witness, Mr. William Kidd, M.I.C.E.

WRITTEN STATEMENT.

1. In answer to the telegram dated Bombay the 6th August, from Sir Grimwood Mears to me stating that important questions had arisen regarding the borings referred

to in the project prepared for the Government of Bombay by Messrs. Lowther, Kidd & Co., in 1912, and asking for further information, the following statement has been prepared.

2. The Enquiry Committee desire to know in greater detail :—

(*a*) How long the borings continued?

(*b*) What methods were employed? and

(*c*) With what results?

3. Before proceeding to answer these enquiries, a short resumè of the proceedings which led to the preparation of the 1912 project may be given.

I.—Preliminary.

4. My first connection with the project arose in 1910 when I submitted a preliminary suggestion to the Government of Bombay that the old idea of the reclamation of Back Bay might be revived on the basis of the requisite filling material being obtained from Bombay Harbour instead of from the adjacent hills, as in the first project belonging to the sixties of last century. In making that suggestion it was accompanied by a statement that its feasibility depended entirely upon whether the requisite material was available in the Harbour, that no sufficient or reliable information existed on that question, and that a complete survey would be necessary to settle it.

5. Three possible sources from which to obtain material had been considered before that view was expressed, viz :—

(1) Dry material—" Moorum " from the foot-hills outside of Bombay.

(2) Dredged material from Bombay Harbour.

(3) Dredged material from Back Bay.

With regard to (1) it was concluded that having regard, among other things, to the position of the sources of supply available and the cost of transport, the cost would be prohibitive.

6. With regard to (2) and (3) it was at once apparent that Back Bay was part of the open ocean, subject to the full forces of winds and seas. Observation of the Bay during a stay in Bombay extending from 1904 to 1908 had shown me that from the month of April or May to the month of September or October, in some years both months included—dredging operations in the Bay would be impossible; indeed for the greater part of that time the dredger and pipe-line would have to take shelter within the Harbour. In addition to that, for a great part of the remaining six months of the year, dredging operations would be seriously interrupted by the heavy ground swell which prevailed; and which, even when it was not heavy enough to prevent dredging work altogether was yet heavy enough to seriously interfere with its efficiency and to cause risk of serious damage to the dredger when working, its ladder and cutting apparatus being then in contact with the sea bottom. Thus for five or six months of the year dredging operations are impossible, and there is a further three months during which a swell prevails, heavy enough to interfere seriously with the efficiency of these operations and cause serious risk of damage to the dredger.

7. A rough preliminary survey of Back Bay was made in the spring of 1910 with the sole object of ascertaining whether the sand indicated on the Admiralty Chart in parts of the bed of the Bay, existed in thick or thin deposits? Spot Soundings by means of a steel-pointed probe were made over an extensive area with the result that in most cases a hard rock bottom with little or no sand was found, and in the others some two or three feet depth, only, of sand was proved.

8. These considerations—particularly those of the sea conditions—led to the conclusion that if the requisite material could be obtained from the Harbour there could be no question as to its being the preferable source.

9. Had the result of the Survey of the Harbour proved unfavourable, no doubt Back Bay as the only practicable alternative source would have been further investigated by a more complete survey, but the result of the Harbour Survey being what it was Back Bay was deemed to be defintely inferior to the Harbour as a source from which to obtain the filling materials.

10. In the course of carrying out the works of the extension of the Royal Indian Marine Dockyard between 1904 and 1908, a considerable quantity of dredging work was done which afforded ample opportunities of seeing the nature of the materials forming the bed of Bombay Harbour. These were of three kinds, viz :—

Soft Mud;
Blue Clay;
" Moorum " and rock

lying over one another in the order named.

11. I had occasion during the same period to make such careful study of the strata in another part of the Harbour as was necessary for the preparation of a tender for the important work of the Sewree Reclamation of the Bombay Port Trust. This study included the sinking of borings in the vicinity of the proposed work. I had subsequent opportunities of seeing the dredging work in progress and satisfying myself of the nature of the strata there. I had, moreover, opportunities of seeing from time to time the construction operations of the Alexandra Dock, and of examining the ground there. In all cases the nature of the ground proved to be the same—viz :—mud alone or mud succeeded by blue clay, overlying the " Moorum " or rock, all the materials being uniform in character in every case.

12. The mud needs but little description, being a recent alluvial deposit brought down by the rivers discharging into the Harbour during the Monsoon rains; consisting of loose material washed down from the slopes of the hills surrounding Bombay Harbour which consist of basalt, the surface being converted into " Moorum "—a kind of brown earth resulting from the decomposition of the original basalt rock. The mud is very soft on the surface, gradually stiffening as it increases in depth. Although very soft when freshly dredged it produces firm ground when deposited on a hard bottom after becoming settled and dried.

13. The Blue-clay underlying the mud proved in the course of dredging operations at the R.I.M. Dockyard to be of such a character as to yield exceptionally favourable results in dredging work in consequence of the fact that its consistency is such that in working a bucket-dredger the normal output of the machine is doubled or more than doubled. This happened because the spaces between the buckets ran nearly solid in addition to 100 per cent. full-buckets. The material takes and retains the impress of the rivets of the buckets; being of the consistency of butter at a normal temperature.

14. Between 1904 and 1907 a cutter-dredger had been employed in dredging a deep water channel in Lake St. Peter in the River St. Lawrence leading up to Quebec. I had obtained particulars of the design and working of the dredger in connection with my estimates for the Sewree Reclamation. The striking feature of the case was the similar character of the material in the St. Lawrence to the blue-clay in Bombay Harbour. Indeed, as far as could be judged from the very particular description given in the information I had obtained, the blue-clay was either identical or very similar. The results of the working therefore assumed great importance in forming my conclusions in respect both of Sewree and Back Bay. It appeared to be completely established that blue-clay had been successfully dealt with by a cutter-pump-dredger and that, provided the power of the cutting and pumping machinery were proportionately increased to the output required and the longer delivery pipe, similarly good results could reasonably be anticipated in Bombay.

The dredger " I Israel Tarte " exerted about 1,200 horse power and cost but £32,760 at American prices, but it carried out its work of dredging over 3,500,000 cubic yards at an average cost of under 8 cents of a dollar (gold)—say 4d. per cubic yard.

15. I had in the Spring of 1912 an opportunity of seeing the dredging of the blue-clay by a cutter-pump-dredger tested on a practical scale in Bombay Harbour. The Sewree Reclamation was then in progress, and following a discussion I had with the then Chief Engineer of the Bombay Port Trust the dredger " Jinga," which had until then been confined to dredging the soft mud overlying the blue-clay, was then put to the blue-clay itself.

The data of the results subsequently supplied to me by the Chief Engineer are not sufficiently precise to yield the exact relative figures of output as between blue-clay and mud, but they shew that in the period which included the operations in blue-clay there was an increase of 19 per cent. over those for the total periods in which the operations were wholly in mud. The material dredged no doubt included a small proportion of mud, inasmuch as the clay cannot in practice be dredged without the adjacent and overlying mud being included. I have seen one of the areas into which reclamation was divided for construction purposes satisfactorily filled with the blue-clay. The dredger experienced no difficulty in cutting and discharging it through a delivery pipe 4365 feet in length, though I did not regard the pumping machinery on board the " Jinga " as being highly efficient.

16. This experience and information as to the character of the materials forming the bed of Bombay Harbour was available when I undertook the Survey in 1912, with the exception of the experience of the working of the " Jinga " in blue-clay at the Sewree Reclamation, the results of which I saw while the Survey was in progress and of which I subsequently obtained the data.

17. The position when I was called upon to undertake the Survey incidental to the preparation of the project of 1912 has now been described.

II.—Borings for 1912 Project.

(*a*) *Committee's question*: " How long the borings continued? "

18. At the request of the Bombay Government I proceeded to Bombay arriving there in January, 1912. I had been preceded by my chief assistant who was making preparations according to my instructions to commence the boring operations when I arrived. The apparatus was of such a character that preparations were quickly completed and actual boring operations were commenced early in February, 1912 by the first set of apparatus—a second set being provided and started shortly afterwards. It was known that weather-conditions would remain favourable for the boring operations up to the middle of May or after, and the question whether further sets of apparatus would be required to complete the entire Survey by that date was determined by experience in the early days by the progress of the operations. Being simple in character the munipulation of the apparatus was quickly mastered by the crew; rapid progress was soon being made and it was found that two sets would prove enough.

19. The results in respect of progress were that over 1300 borings—which covered the entire area to be investigated—were completed by about the middle of May, the weather conditions being then such that further borings could have been obtained had it been necessary.

20. The outdoor operations extended from early February until mid-May, 1912, a period of about 3½ months. Long days were however worked, the crews starting from the shore usually at 6.0 a.m. and seldom returning ashore at the end of the day's work until after dark. In other words the working day was 10 to 12 hours instead of 8 hours as on board the dredgers and similar craft working in the Harbour. The results showed that each machine took 7 to 8 borings per day on the average; the numbers varying with the position and depth of the borings. The programme provided for the sinking of the borings either down to the level of the hard surface—" Moorum " or rock—or, alternatively, to a depth of 70 feet below water level, and this was carried out.

21. The total time spent in the preparation of the 1912 project was 7 months, viz :—January to August—my undivided personal attention being given to it throughout. This is apart from prolonged study devoted to the subject at intervals from 1904 onwards.

III.—The Methods Employed.

22. A brief description of the plant employed together with photographs was attached to the Report on the 1912 project. The boring apparatus was composed of ordinary steam or water tubes and fittings 2 inches internal diameter, bought from the stock of a Bombay merchant. The penetrating end was a diminishing socket—2 inches to 1 inch—attached to a length of ordinary tube; sufficient tubes were screwed together to reach the bottom of the Harbour; these were pushed by hand into the mud until it began to offer resistence. A quarter-bend then attached to the top of the tubes was connected by an india-rubber hose pipe to a hand-pressure pump so that water could be forced down the tube through the reducing socket. When the tubes entered the blue-clay the escaping water found its way through the opening at the lower end and up the exterior surface of the tube, thus reducing the skin friction of the clay gripping the pipe, and so enabled the tube to be readily passed through the clay down to the hard bottom, or, alternatively, to the 70 feet depth as the case might be. The force-pump was kept continuously at work from the time the clay was penetrated until the completion of the boring. The tubes were sunk by hand—some of the crew taking hold of the tubes themselves and pushing them downwards and others pulling downwards on hand lines attached to their upper part—the sinking squad numbered 6 hands.

23. The tubes were drawn occasionally to observe the material contained in the mouthpiece. The materials proved to be throughout (1) soft mud (2) blue-clay (3) where the hard bottom was reached, " Moorum " or rock. There was never any doubt as to when the mud ceased and the blue-clay was entered, the former being very soft—offering small resistence to the tube, and the latter being comparatively stiff and offering sufficient resistence to leave no doubt as to its character; the cutter was moreover examined from time to time so as to verify it. Position observations, levels and the nature of the materials were entered into the journals of the observers on the spot.

24. The apparatus was carried upon a working platform supported by two boats all bolted together to secure a firm structure. An overhead tripod carrying a pulley was provided. The whole was secured in position by a system of anchors enabling the apparatus to be moved into a new position after each operation and securing it there while the boring was being made.

25. Positions were taken up on the section lines previously laid out on the shore by adjustments of the moorings, and as soon as the tubes were sunk, sextant observations were taken by the observers to determine the exact position. A base line had been

adopted with the Prongs Lighthouse and the Dome of the Taj Mahal Hotel as its ruling points, the sextant observations being taken on these points and on the section marks then being worked to.

26. My chief-assistant—a qualified surveyor—laid out the section marks on shore and erected tide-gauges so as to be visible from the boring rafts. Two observers—both N.C.O.'s of the Royal Engineers were employed afloat—one on each craft—who got the craft into line, observed and recorded positions, and measured and recorded depths and tide-gauges. They also acted as Foremen in charge. I personally spent the greater part of the day throughout the entire period in seeing the operations carried out thoroughly with the object of obtaining reliable information. The results were recorded on a large scale plan from day to day as obtained; the records showing :—

(i) The level of surface of mud;
(ii) The level of surface of blue-clay;
(iii) The level of surface of Moorum or rock, or alternatively. the bottom of boring.

That record plan accompanied the report on the 1912 project and it was left with the Bombay Government.

27. It will be understood from the description of the boring apparatus and power employed that it was incapable of penetrating any hard material, or any material that was too hard for efficient cutter pump-dredging. The deepest borings taken passed through as much as 30 feet depth of blue-clay; the fact that an apparatus of the kind described enabled a tube with an external diameter of $2\frac{1}{2}$ inches to be passed through that depth of material in the actual sinking time of 20 to 30 minutes clearly proved that the material was not hard, and left no doubt in my mind as to its suitability for efficient dredging by a cutter-pump-dredger of appropriate design. Moreover its smooth slippery character showed it to be eminently favourable for projection through a long pipe to the reclamation—a very important consideration—and lastly it was particularly favourable for making up new ground in a reclamation. The whole of the material actually penetrated by the boring tubes corresponded exactly with the material actually dredged at the Dockyard extension and the Sewree Reclamation.

IV.—Results of the Survey.

28. These were embodied in the report and plans of the 1912 project, a large general plan showing the positions of the borings and recording in every case the levels of the surface of the mud of the Harbour bed, in many cases the level of the blue-clay and in all cases the level of the bottom of the boring which was either the surface of the "Moorum" or rock, or, alternatively the bottom of the boring where the rock surface was below a depth of 70 feet below water level. From these data the quantity of material available was derived.

29. As to the character of the materials the object was mainly to ascertain whether they corresponded to the materials which had been dredged at the R.I.M. Dockyard and at the Sewree Reclamation at both of which actual dredging operations had been carried out, and where, consequently, the material could be seen and examined under conditions much more favourable to correct conclusions than would have been possible from borings alone. The results established that the materials were essentially the same. They have been described in the report of 1912 and above.

In respect of quantity available the result is summarised in a statement contained in the report that more than three times the quantity of material required had been proved by the borings. In supplement of that statement the following figures have been extracted from my book of calculations for the estimate :—

"(I) *Pumped Filling*

"Total quantity measured to face of sea wall and to finished surface Level 92.00. Cubic feet 724,975,269.

"Deduct : Sea wall	...	2,366,753	
Moorum	...	70,222,007	
			72,588,760
Net total, Cubic Feet			652,386,509
= Cubic Yards		24,162,463.	

"(II) Contents of Mud and Clay in Harbour.

"Total proved. Cubic Yards 109,985,488.

" The pumped filling required being 24,162,463 cubic yards and a ratio of cut to fill of 1.00 to 0.70 having been adopted, gives cubic yards 34,517,804 as the requirements measured in cut in the Harbour,

" and $\frac{34,517,804}{109,985,488}$ = 3.18 times requirements.

" 30th September, 1926."

ORAL EVIDENCE.

Chairman.—Were you engaged from 1904 to 1908 on the extension of the Royal Indian Marine Dockyard?

A.—Yes.

Q.—In what capacity?

A.—As the Agent of the firm of contractors for the work.

Q.—Were you there throughout the whole of those years, or did you go away during the monsoon period?

A.—I went off, with the exception of the first year, 1905. We had commenced the works, I should say, in October of 1904. I stayed throughout the monsoon of 1905 in order to see whether it would be feasible to carry on work during that season; but, having found it to be not a profitable operation to work during the monsoon, I was away in subsequent years

Q.—Did a rotary cutter suction dredger form any part of the plant used there?

A.—Not in that case.

Q.—Have you any personal experience of stiff and unctuous clay ever having been successfully dealt with by a rotary cutter suction dredger?

A.—*No personal experience except that in the year 1912, when I was engaged upon this very survey, I was an eye-witness of what I call the successful cutting of the same blue clay at the Sewri reclamation.

Q.—By what vessel?

A.—By a vessel called the " Jinga."

Q.—Have you followed her very disappointing performances?

A.—Of the " Jinga? "

Q.—Yes.

A.—No.

Q.—Let me tell you a little about them. There was also another vessel called the " Kalu," was there not?

A.—I know them both.

Q.—That was a sister ship to the " Jinga "?

A.—Yes, a sister ship, but a ship which invariably gave enormously inferior results to the " Jinga"

Q.—They were, apart from results, indentical ships, were they not?

A.—I believe so.

Q.—And up till now have you believed that the work of the " Kalu " and the " Jinga " was successful?

A.—At the Sewri reclamation?

Q.—Yes.

A.—Certainly.

Q.—I am now reading from Sir Lawless Hepper's statement, and in addition to Sir Lawless Hepper's statement we have the official record of the joint work of the " Kalu " and " Jinga " as compiled by the Port Trust. The " Kalu " and " Jinga " were each designed to deliver 2,000 cubic yards of material through the pump line, were they not?

A.—Yes, I believe so.

Q.—Per hour. Sir Lawless Hepper says this: " The actual results of the working of the Port Trust dredgers ' Kalu ' and ' Jinga ' were recorded in detail in a report stated to have been prepared by the late Mr. Messent, Chief Engineer of the Port Trust, and printed about the year 1915. Taking the results obtained by actual measurements, the figures are as follows. The ' Kalu ' dredged 1,433,005 Brass. The ' Jinga ' did 2,191,754 Brass, making a total of 3,624,759 Brass. The ' Kalu ' took 6,066 pumping hours to deliver that material. The ' Jinga ' took 5,841, with the result that that is equivalent to an average output of 1,126 cubic yards per pumping hour for both the vessels."

* Mr. Kidd notes that before 1912 no British engineer had had any such experience.

Sir Frederick Hopkinson.—That is each vessel, is it not?

Chairman.—Is it?

Sir Frederick Hopkinson.—The "Jinga" did an average of 1,426 cubic yards.

Chairman.—We must be careful about this. Let me have your figures, Sir Frederick

Sir Frederick Hopkinson.—The "Jinga" did an average of 1,426 cubic yards an hour. The "Kalu" did an average of 903 cubic yards an hour. The average of those two is 1,164.

Chairman.—We must look into this because Sir Lawless Hepper deals with it.

Sir Frederick Hopkinson.—He means the average of the two, I think.

Chairman.—You are satisfied about those figures?

Sir Frederick Hopkinson.—Yes.

Chairman.—Then let us take those figures. The "Jinga" did 1,426 cubic yards per pumping hour. That is 574 less than her guaranteed output.

Witness.—Yes.

Q.—In the neighbourhood of 30 per cent?

A.—Yes.

Q.—Would you regard that as satisfactory?

A.—Not in the nature of the material in which they were working at Sewri for the most part

Q.—The nature of that material was a soft material, was it not?

A.—Well, that brings in a very important point.

Q.—First of all, was it a soft material? I know your other point and I will bring it out in a moment. Was it a soft material?

A.—It was entirely the ordinary mud of the harbour—the ordinary mud overlying the blue clay.

Sir Frederick Hopkinson.—No clay?

A.—No clay in the early stages. That is the point I want to make presently.

Chairman.—There was no clay in the early stages?

A.—No clay, I think, except in the last year in which they were working.

Q.—The "Kalu" did 903 cubic yards. That is less than 50 per cent. of her guaranteed output?

A.—Yes.

Q That would be a very disappointing result?

A.—It would indeed.

Q.—In dredging operations like this, when you put a large amount of money into the plant it is essential, is it not, that the dredger should work to the calculated time?

A.—Surely.

Q.—Otherwise you get overburdened with interest?

A.—Quite so.

Q.—And "on" costs?

A.—Yes.

Q.—And a scheme which might very well be a complete success if the dredger worked to expectation might be a disastrous failure if she gave an output such as that of the "Kalu" and "Jinga"?

A.—Clearly. May I just mention one very important thought which is passing through my mind, which is very well illustrated by the case of these two vessels and the figures you have just given. It is the question of the men who are working. It may be much more a question of the men who are working the machine than of the machine itself.

Q.—This dredging operation of which we are speaking took some four years, did it not—1909 to 1913?

A.—I have data to the middle of June, 1912. I do not know when it was finished.

Q.—July 12th, 1913, it appears to be

A.—No doubt that is right.

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NOTE.—Mr. Kidd has noted that his figures do not agree with those of Sir Frederick Hopkinson. Sir Lawless Hepper arrived at the average output by taking the total outputs of the "Jinga" and "Kalu" and dividing them by the total pumping hours of the two dredgers, *i.e.*, 3,624,769 Brass divided by 11,907 pumping hours = 304 Brass or 1,126 cubic yards per hour. Mr. Kidd further points out that the "Jinga" did an average of 1,388 and the "Kalu" 873 cubic yards per hour; the average of the two would therefore be 1,130 cubic yards.

Q.—I can understand your saying that at the outset the men who are working the machine may play an important part; one man may get a good result and the other a poor result; but at all events in the second, third and fourth years you would expect the full output, would you not?

A.—Surely.

Q.—Do you know that, in the belief that possibly it was the men who were responsible for the small output of the "Kalu," the crews were actually changed over —the "Kalu" crew into the "Jinga" and the "Jinga" crew into the "Kalu"?

A.—Yes, I believe so.

Q.—But still no better result was obtained?

A.—That I do not know.

Q.—On page 208 of the evidence a witness is speaking to the work done by the "Kalu" when she got into position on this present reclamation. He used the phrase "when she got into position" because she had to dredge herself a flotation. "When she got into position she was pumping 22,000 cubic yards per week for the last ten weeks over more than two-thirds of the output of the season. (Q.) But how many hours a day?—(A.) The actual pumping hours would be about 12 hours. It is 406 cubic yards an hour." That, again, is a very disappointing output, is it not?

A.—Extraordinarily so.

Q.—And a very expensive one?

A.—Quite.

Q.—Except for your belief that in 1912 the "Jinga" was doing good work, you have had no actual practical experience in the working of a rotary cutter suction dredger?

A.—No.

Q.—Now suppose, when you started to write your report, you had been in possession of the figures of the work done by the "Kalu" and the "Jinga" in 1909, 1910 and 1911, do you think you would have recommended a rotary cutter suction dredger for this reclamation?

A.—I was in possession of these very figures, and I still recommended it.

Q.—Let us look at those figures for a moment.

A.—The figures I have, of course, naturally do not agree very closely; although they do approximately, with those you have read to me; but substantially the result is the same. May I show them to you? (*Handing in figures.*)

Sir Frederick Hopkinson.—They are probably from the same source.

A.—Yes, they are signed by the late Mr. Messent, Chief Engineer, who gave me this information personally for my guidance.

Q.—They are the actual figures?

A.—You will see that I got possession of that paper from Mr. Messent in the month of August, 1912, at about the time I was engaged actually in writing my report.

Chairman.—We know now that from the figures before you the "Jinga" was giving about 30 per cent of her guaranteed output, and the "Kalu" less than 50 per cent.?

A.—Yes, both of these being in soft mud; but you are aware that I was in possession of figures applicable to blue clay from other parts of the world.

Q.—Your belief was—and a belief backed up by the fact that when the "Jinga" got into clay she did relatively well, that a dredger operating in the harbour on a mixture of mud and blue clay would give a satisfactory result?

A.—Yes, it would, in my view.

Q.—Were you shaken at all by the figures of the "Kalu" and the "Jinga"?

A.—Not in the very least. Perhaps I had better give the reason why.

Q.—Please do.

A.—I was familiar with both of these boats, and had a very low opinion of the efficiency of their machinery.

Q.—You refer in your report to the superiority of Canadian and American rotary cutter?

A.—Yes.*

Q.—Again I ask you, had you any personal knowledge of them?

A.—Not personal knowledge, but that opinion was founded upon technical papers which had been sent to me by a Canadian engineer.

Q.—Do you know if the cutter used both on the "Jinga" and on the "Kalu" was the patented design of a Canadian?

A.—If it was not the actual patent of Mr. Robinson it was a very close copy. I am not able to say which.

---

* Mr. Kidd notes that he refers to American cutter pump dredgers as a whole.

Q.—Of course, as regards the cutter of the " Sir George Lloyd " you cannot speak?
A.—No.

Q.—I think we may take it that the cutter of which we shall hear in the course of to-day—the cutter affixed to the " Sir George Lloyd "—is indeed the invention of a Canadian, and has Mr. Robinson's name stamped upon it. In your report on page 2 you say in the second line of paragraph 6 " A system of boring by hydraulic tubes was devised which proved to be perfectly reliable as well as rapid in action." Had you, before you commenced to explore the bed of the harbour, ever taking borings on a considerable scale?
A.—Yes.

Q.—When and where?
A.—It was my custom, in connection with all the contracts in which I was interested, to take borings for my own guidance over the site of the work, so as to make out my working programme. For example, I may quote Hong Kong as a case in point. At the Naval Docks there was very considerable doubt about the nature of the material we were to dredge there, according to the data supplied by the authorities.

Q.—Who were they?
A.—The Admiralty engineers, and before we selected a dredger we made a system of borings—not so many as in this case but fairly complete—in order that we might know what work the dredger had to do.

Q.—Was that done with a core drill?
A.—It was done with the ordinary old-fashioned drill working inside a tube; but there we had reason to anticipate, upon the information before us, much harder material.

Q.—Where had you done, over any extended area, wash borings?
A.—Nowhere, except in this instance.

Q.—The very fair way, if I may say so, in which you put the matter on page 2, paragraph 6, does indicate that it was at first something in the nature of an experiment.
A.—Well, it is a system which I believe is very much better understood in America, and much more widely adopted there, than it is in this country. The suggestion arose in this case from my having read of a system of borings taken in America by a similar process.

Q.—You therefore sent out a man as Chief Engineer, was he?
A.—Surveyor.

Q.—And two ex-non-commissioned officers of the Engineers and gave them instructions to obtain certain pipes and prepare a certain apparatus?
A.—Quite so.

Q.—And you followed, I think, by the next boat?
A.—Yes.

Q.—You told us you were present on very many occasions when the borings, which are recorded on this map, No. 308, were taken?
A.—Yes.

Q.—You would be on one or other of the two floating rafts?
A.—Yes.

Q.—What pressure per square inch do you think was given by the semi-rotary pump which you employed on the works?
A.—I had a pressure gauge fixed to the pump, and by frequent observations in the deeper borings I found we had reached up to a pressure in the neighbourhood of 100 lbs. per square inch.

Q.—Was it a Wilcox pump?
A.—I do not remember the name, but it was one of those circular diaphragm pumps, with a handle which works in the sector of a circle.

Q.—Was this the kind of thing? (*Showing catalogue of Messrs. W. H. Wilcox & Co., Ltd.'s quadruple acting Wilcox semi-rotary wing pump.*)
A.—That is exactly the pump.

Q.—I am told that, according to the makers' own description, you will not get more than 34 lbs. to the square inch from a pump of that character?
A.—I can only repeat the fact that we attached an ordinary pressure gauge to the pump, and that we did occasionally rise to pressures of, I think, nearly 100 lbs. I do not remember that we ever went over that, but nearly up to it, in the case of the deeper borings.

Q.—Will you just give us a description. Let us assume you are on the raft which is moored in any position you like over any one of these borings. Will you give us a description of what happens? Take it from the moment when the men have moved away from one boring and have got to the site of another, have fixed their positions, and are just beginning to work. What is done then?

A.—The first thing is to take the tubes, of which I have brought a specimen with me here to-day. As a rule they are in lengths of about 12 feet.

Q.—The internal diameter is two inches?

A.—Yes, two inches.

Q.—And the external diameter roughly 2½ inches?

A.—The external diameter measured over these sockets is probably 2½ inches We can test that presently.

Sir Frederick Hopkinson.—It is a little over 2½ inches?

A.—Yes, a little over 2½ inches probably. Then we take enough of these lengths, beginning with *this* cutting point.

Chairman.—At the end of one two-inch pipe there is a reducing socket?

A.—A reducing socket is attached, as you see *here*.

Q.—Is this actually one of the things which were used?

A.—No.

Q.—This is merely provided by way of illustration?

A.—Precisely—probably made by the same factory.

Q.—At the end of the lowest tube of all comes your reducing socket?

A.—Yes.

Q.—The object of that is to give an increased pressure to the water as it comes out, is it?

A.—No—merely to provide a cutting point.

Q.—Will you now carry on the process from the moment when that is put over the side and the others are screwed up?

A.—The lengths of pipe are screwed upon *this* in succession until the pipe rests upon the mud.

Q.—When it touches the mud does it penetrate at all of its own weight?

A.—Its own weight will sink it into the mud.

Q.—At what distance?

A.—To probably a distance of six feet, gradually stiffening.

Q.—Yesterday Mr. Knight told us there was a good deal of variation as regards the consistency of the mud and clay. Is that right?

A.—Of the mud and the clay in proportion to the depth. In both cases, as you get deeper down, the material becomes stiffer, whether mud or blue clay.

Q.—Then, you say, it sinks first of all by its own weight to the extent of some six feet into the mud?

A.—Yes.

Q.—Up to that moment there has been no pumping of water?

A.—No pumping at all, until the blue clay is entered.

Q.—The pumping begins as soon as you feel the resistance of the blue clay?

A.—Quite so.

Q.—I will take this shortly, Mr. Kidd. You have stated in your report emphatically—and these figures are produced—that in every instance you got down either to 70 feet below low water level or on to moorum or hard rock?

A.—I do.

Q.—And that invariably you cut through the clay to at least a distance of 70 feet, if there was 70 feet of clay?

A.—If there was 70 feet, yes. As a rule there was much less than 70 feet of clay, because you have sometimes, it may be, 20 feet of water to begin with out of the 70 feet, and then you may have in certain cases probably 15 feet of mud. I am speaking from recollection of many years ago. So that that would leave only 35 feet of blue clay.

Q.—Still, 35 feet of blue clay and 15 feet of mud would be a very excellent face for a dredger of the type of the "Sir George Lloyd"?

A.—Certainly. That would be very favourable for a dredger.

Q.—Was there a gradually increased resistance as the pipes sunk deeper into the clay?

A.—No. The gradation was more marked in the case of the mud than in that of the blue clay. The blue clay did not materially stiffen between its upper six feet and its lower six feet. The mud perceptibly stiffened in the last six feet of a 15-feet depth. Blue clay is more uniform throughout its depth.

Q.—You say the blue clay had a practically uniform resistance throughout its depth?

A.—That is what I would infer, because although we did meet with more resistance the deeper we got down in pushing this pipe into the blue clay, I should attribute that not to the clay itself being harder but to the greater depth of pipe which was immersed in the clay.

Q.—What is called skin friction?

A.—Yes, skin friction.

Q.—On page 27 of the statement which you have been good enough to give us, you say, " It will be understood from the description of the boring apparatus and power employed that it was incapable of penetrating any hard material, or any material that was too hard for efficient cutter pump dredging "?

A.—Yes.

Q.—If there was all this material of the character set out in this map 308, can you explain why the " Sir George Lloyd " gave its very unsatisfactory output?

A.—I have been considering that question very closely, and I see that not only has the output been given at a very low figure—I think one-quarter of the estimated figure——

Q.—Shall we get the figures exactly right? The number of pumping hours which Sir George Buchanan estimated could be done by the " Sir George Lloyd " was 2,550 (page 3 of Sir Lawless Hepper's report). In 1923-24—that is from the 8th December, 1923, to the beginning of the monsoon of 1924—she worked 843 hours, which, as you see, is a third of the estimated 170 days' working. Instead of dredging 2,000 cubic yards per hour she dredged 1,020, which may be said to be 50 per cent. In 1924-25 she increased her pumping hours to 1,473, but instead of dredging 2,000 cubic yards per hour, she dredged 856 only. In 1925-26 she dredged 959, so that you get 50 per cent. for 1923-24, about 42 per cent. for 1924-25, and just under 50 per cent. for the years 1925-26. Whatever be the cause, the result is lamentable, is it not?

A.—It is indeed.

Q.—Are you in a position to help us at all as to the reason why this vessel did not dredge 2,000 cubic yards per pumping hour, if there was in the harbour the material set out in map 308?

A.—Naturally, I have been thinking about this point a good deal, and if I may read you a statement which I have here, I think it will deal with the matter. I understand that several witnesses, all of whom have been concerned in the working of the dredger, appear to have stated that the material has been of an unsuitable character for the dredger. These statements appear to be based in common upon the unsatisfactory output of the dredger. That, however, appears to me to be putting the cart before the horse. The unsatisfactory output of the dredger may prove the unsuitability of the dredger for the material. It cannot prove that the material is unsuitable for an efficient dredger. If any dredger already in existence is put to work in any given material, and the results prove to be unsatisfactory, the dredger is pronounced to be unsuitable for that particular material, and the remedy is to substitute a suitable one; but, in the present case, the dredger was specially built to do this work. The harbour was deemed the only source of material available that rendered the project feasible, and that source had been accepted by the designer of the dredger. It therefore followed that the design should have been based upon the actual material to be dredged. The exact character of that material should have received particular examination by means, not merely of the borings, but by an actual dredging trial.

Q.—Do you mean an actual dredging trial with a bucket dredger, or something of that character?

A.—A bucket dredger would have done perfectly well, and would have shown the designer himself exactly what material he was going to deal with.

Q.—Interrupting you for a moment, your point is that you are of opinion that no specification should have been sent to any dredger designer unless it had been accompanied by specimens of the actual material existent? Is that it?

A.—No. Specimens are no good in a matter of this kind, because the material alters its character from the moment it is brought out of the bottom of the harbour into the air. It immediately proceeds to harden and to dry.

Chairman.—This is a piece of the clay taken from one of the blocks whilst we were there.

Sir Frederick Hopkinson.—Feel its weight

Chairman.—It is extraordinarily stiff and extraordinarily heavy, is it not?

A.—Yes, it is.

Q.—What we want to know is this. Naturally, if specimens of clay were dredged from various portions of the harbour, and were sent to Messrs. Simons, they would arrive in a hard, dry condition?

A.—Like *this.*

Q.—But could they not be sent surrounded with seawater?

A.—Actually what I think is that, in all the circumstances, the right thing to have done would have been for Messrs. Simons to have gone out to Bombay with the designer

of the dredger, to have borrowed for a week or, if you like, a month, one of the Port Trust dredgers, and to have tried this material at any point of the area shown on *this* drawing, so that they would have had in their minds the knowledge which I had in my own mind during the course of my dredging operations at the Marine Dockyard.

Q.—That, of course, would have caused considerable delay?

A.—The delay was immaterial in view of the importance of the question.

Q.—You say that whatever the delay that would have been caused, it would have been more than counterbalanced by the advantage which would have been gained?

A.—Many times.

Q.—I would still like to come back to this other question. Assume that six or eight samples of clay were taken from various portions of the harbour and put into four-gallon tins surrounded with seawater, would they not have arrived at Messrs. Simons in approximately the same condition as they were when they were dredged from the sea?

A.— Not necessarily so.

Q.—There would be a certain expansion, would there?

A.—It rather depends upon the nature of the material. There are some materials —they all pass under the name of clay; but sometimes a piece of clay, however hard it may be, put into a bucket of water will fall to pieces. There are other clays which will remain intact for a hundred years.

Sir Frederick Hopkinson.—This is not a clay which will fall to pieces?

A.—I think not. My impression of this clay is that it would maintain itself intact in water.

Q.—I know the material of which you are speaking, but *this* is not that material?

A.—Quite so.

Chairman.—Therefore, do you agree that material could have been dredged from the harbour transported in four or six-gallon tins, and delivered at Messrs. Simons in much the same condition as it was on the day it was dredged?

A.—Certainly.

Q.—Would that have been, in your view, a useful indication to the builder of the dredger?

A.—It would have been a very useful indication, but I should much have preferred the course I have suggested.

Q.—When we visited the reclamation site and handled some of the wet clay, the impression we got was that it was of a sticky character. Was that what you meant by the use of the word " unctuous "?

A.—Exactly so. The expression I have used about the clay is " stiff and unctuous." I had the curiosity the other day, although I did not at the time, to turn up a good dictionary to see the definition of both those words, and I found that one definition of the word " stiff " was " not easily worked, tough," and I found a second definition to be " presenting difficulty." With regard to the word " unctuous " I found there were two definitions also which seemed to be applicable. One was " greasy, oily," and the second was " being greasy or soapy to the touch."

Q.—It so happens that I have the same definition in front of me here. That is exactly why I asked you the question—whether by " unctuous " you meant " sticky "? Now, " sticky " and " soapy " are two quite different things, are they not?

A.—Yes.

Q.—You see the point I am on. If you have got a soapy, slippery material, you are going to have less resistance in your pumping operations?

A.—Precisely.

Q.—If you have got what I understood you to mean by the word " unctuous " when we handled the clay—a sticky substance—you are going to get more resistance in your pipe, are you not? It is going to ball up.

A.—If it were sticky that would be so. It never struck me as being sticky in that sense.

Q.—But did not you tell me two minutes ago that, by the word " unctuous " you did mean sticky?

A.—No, surely not? I made a mistake if I did. I have given the dictionary definition of unctuous as " being greasy and oily," and secondly " being greasy or soapy to the touch."

Q.—But, before you gave that definition, my recollection is, which we will confirm in a moment, that I asked you carefully whether by " unctuous " you meant " sticky "?

A.—Then I am afraid I gave you a wrong answer.

Chairman.—Perhaps the shorthand writer will read the passage in question.

Shorthand Writer.—" (Q.)—When we visited the reclamation site and handled some of the wet clay, the impression we got was that it was of a sticky character. Was that what you meant by the use of the word ' unctuous '? (A.) Exactly so."

Witness.—That was a mistake on my part. I had not taken your meaning clearly.

Chairman.—In your report——?

A.—Excuse me, I had not quite finished my written statement. You asked me if I could make any remarks which I might think would be helpful to you on this question of the low output?

Q.—Yes, I am sorry I interrupted you. Will you continue?

A.—I had said that it followed that the design should be based upon the actual material, and naturally the design should also be adapted to the distance of transport, and other conditions. That a satisfactory design could have been evolved by such means will, I think, be agreed, seeing that the same material had already been successfully dredged on a practical scale. I refer to Sewri.

Q.—That is your reference to the " Kalu " and the " Jinga," is it?

A.—Yes, at Sewri.

Q.—But that must be qualified now, must it not, by the figures I have given you of the " Kalu " and " Jinga "—1,426 cubic yards the " Jinga," and 903 the " Kalu "?

A.—Yes, qualified, except in this respect—that the best figures of output which I have on my papers apply to the period during which the " Jinga " was working, for the most part, in blue clay. Shall I continue?

Q.—Yes.

A.—It would now appear, therefore, that the unsatisfactory results of the dredging are due either to the design of the dredger being inadequate, or that the dredger was not efficiently worked, or possibly to a combination of those two causes. I have no data, either as to the design or the working of the dredger, to enable me to form any opinion, and I am not in any case called upon for one, I understand. I do, however, think that the unsatisfactory results of the working of the dredger do not in the least prove that the material is unsatisfactory. On the other hand, the results obtained in the actual dredging operations at the Marine Dockyard were that the bucket-dredger " Kuphus " of moderate power dredged blue clay at the rate of 550 cubic yards per hour, and the " Jinga "—a cutter pump dredger of but moderate efficiency—dredged and discharged the same material through 4,365 feet of pipe at the rate of 1,480 cubic yards per hour.

Q.—Where do you get that? You have taken the best figure of her performances. Is that right?

A.—No. I have taken the figure for the period during which, to my knowledge, she was dredging blue clay for the first time. 1,480 cubic yards per hour.

Sir Frederick Hopkinson.—We make it 1,426—the completed figures.

Chairman.—Therefore, your best figure of the " Jinga's " performance is 25 per cent. below her guaranteed output?

A.—Quite so, but my point for the moment is that her best figure of output was during the period in which she was working in blue clay. And here I think I must tell you of an incident within my own experience. The late Mr. Messent was a very old friend of mine. We consulted together very frequently about our respective affairs. He consulted me about this time as to the idea of dredging the blue clay underlying the mud. When I say " consulted " me, I mean as ordinary personal friends we discussed the matter at dinner one evening. He told me that his dredging men were opposed to the idea of putting the dredger at the blue clay, and that he had never, up to that point, succeeded in getting them to do it; they were afraid of a breakdown. I advised him to press the point, and to make the experiment, which he did, and the experiment resulted in the figure I have just given. Several times during the course of that experiment I went on board the dredger with Mr. Messent to see the operation being carried out.

Q.—Did the " Kalu " work in clay at all?

A.—The " Kalu " was working in clay during this period.

Q.—Did she ever do 50 per cent.?

A.—I beg your pardon, not the " Kalu "—that I do not know. The " Jinga " I am speaking of.

Q.—You were speaking of the " Jinga," and then I asked you whether the " Kalu " ever worked in clay?

A.—I should think it very likely, but I do not know.

Q.—Does that conclude your note?

A.—Yes. I have a further note about some American data that were sent to me. That is at your service if it is wanted.

Q.—With regard to the sea wall, in your report you specify for a certain design of sea wall. It was to be a rubble stone embankment protected with 25-ton concrete blocks thrown pell mell?

A.—Yes.

Q.—And to have a coping of concrete upon it?

A.—Yes; for only a part of the distance.

Q.—The sea wall would perform two functions, would it not? First of all, it would make an enclosed lagoon.

A.—I regarded it as merely to protect the reclamation. Temporarily, of course, it would form a lagoon.

Q.—It was an obvious necessity as regards the reclamation itself?

A.—Surely.

Q.—If you are going to dredge material and pump it into an area that you propose to reclaim, you must shut that area in somehow or other?

A.—Surely. You have, moreover, to protect the reclamation permanently from the attack of the sea.

Q.—That is the other object?

A.—Yes.

Q.—Did you, in your design for a sea wall, contemplate that any serious proportion of the reclaimed material would percolate through it and escape into the open sea?

A.—Not for a moment.

Q.—You state in your report that you feel entirely satisfied of the sufficiency of your proposed design of the sea wall. Was the ability of your sea wall to retain that which was pumped into it amongst the matters on which you felt satisfied?

A.—Yes.

Q.—In your specification, at page 9, you provide moorum in backing to sea walls?

A.—Quite so.

Q.—That is, moorum was to be used to seal the sea wall as a backing?

A.—No; I would not say that. With regard to the greater part of the sea wall, according to my idea, it was a solid and complete structure for more than three-quarters of its entire length. The remaining quarter, intended to be rubble embankment protected by concrete blocks, would naturally have been composed of heavy rough material upon the sea slope, the finer material to form a core to provide for the possibility of the material passing through from the interior. But nothing would have contributed so much to prevent any escape of the material from the reclamation into the sea by means of the rubble wall than the use of blue clay.

Q.—But surely the sea wall must be designed of such a character that whatever material you are pumping into the reclaimed area must be retained by it?

A.—Surely.

Q.—If it is worth while pumping it in it is worth while retaining it?

A.—It must naturally be so.

Q.—At page 9 of your report you estimated in 1912 that for 325·23 lakhs you could reclaim the 1,145 acres?

A.—Yes.

Q.—That is, for about £2,400,000?

A.—I think it is rather less—it is £2,170,000.

Q.—I am now taking the rupee at the rate of 1*s* 6*d*.

A.—Yes; but, of course, in 1912 I was working on 15 rupees to the £.

Q.—I am treating a lakh of rupees as £7,500.

A.—Yes. At this time, as you are aware, 15 rupees to the £ was the standard exchange, and a lakh was £6,666.

Q.—Was that, in your opinion, a safe estimate of cost?

A.—That is what I intended it to be.

Q.—That is what you estimated it to be?

A.—Yes.

Q.—I am using your own words. In order to get safety did you add 20 per cent. to what you describe as the already high rate of labour?

A.—I did. You will find the schedule of wages there, page 11, Report of 1912.

Q.—And 20 per cent. on the estimated cost of materials and plant?

A.—I believe so.

Q.—We have the figures here, but in 1919 am I right in thinking that prices had gone up three times as compared with 1912 prices?

A.—In 1919 I was not in Bombay, but in 1920—in the cold weather of 1920-21—I was there, and the figure that I arrived at after careful study of an estimate I was engaged upon, was 2½ times the pre-war rate.

Q.—That is even in 1921?

A.—In 1921—the spring of 1921.

Q.—When I was asking you about the prices of 1919 as compared with 1912, I meant, for instance, such things as the ordering of a dredger in 1919 as opposed to the ordering of a dredger in 1912.

A.—I was thinking in the answer I have just given you of 2½ times the Bombay local expenditure only. I doubt if that would apply to the cost of a dredging machine which would probably be higher in 1921—more than 2½ times pre-war prices.

Q.—Are you aware that Sir George Buchanan estimated that he could do the work for 367·61 lakhs in the year 1919?

A.—I was informed of that very astonishing statement during my visit to Bombay in 1921.

Q.—If yours was a reasonably close and careful estimate in 1912, your figure in 1919 would be in the neighbourhood of 700 lakhs or more, would it not?

A.—Two and a-half times would be 812 lakhs.

Q.—It would be eight crores.

A.—Eight crores. My informant, I may tell you at this point, regarding the amount of Sir George Buchanan's estimate——

Q.—We have got that on record, so there is no question about it.

A.—That is not my point.

Q.—Do not tell us anything that your informant told you because we shall get a little wide of the enquiry.

A.—Very well.

Q.—We are just content to take that fact without carrying it any further for the moment. You speak in your report of your proposed use of American steel shovels for moorum?

A.—Yes.

Q.—The use of those would depend upon the face of the particular hill that you were excavating?

A.—Precisely.

Q.—Had you yourself any personal knowledge of any place in the neighbourhood of Bombay were moorum could have been obtained by the use of American steel shovels?

A.—I think I have indicated the place here. Paragraph 30 of the report states that: "A royalty has been provided for the removal of moorum from lands at Trombay by a wayleave for a proposed branch railway."

Q.—I am asking you this question for this reason. If you have any local knowledge of a definite character that moorum can be obtained at any particular place in the vicinity of Bombay and in such a quantity that it can be dealt with by steam shovels, we shall be very glad to have that information?

A.—I would be very glad to give you any information I can.

Q.—You say here Trombay?

A.—Yes. One reason why I selected this place was that in connection with the previous scheme for reclamation at Sewri it had been my duty to make a tender for the work at Sewri, and in making out my estimate this question of moorum supply was a very important one. I made considerable exploration of likely sources in order to arrive at the best which was in this neighbourhood, and there I put down a considerable number of borings and trial pits with a view to settling whether moorum or loose material was there, or whether we should get down to hard rock, and I got more favourable indications in this neighbourhood of Trombay than anywhere else I explored.

Chairman.—We are very much obliged to you.

Sir M. Visvesvaraya.—What was the result of your investigation into this question of the supply of moorum or soil available?

A.—I found that I could get the quantity required—the figure I forget now—but a substantial proportion probably for what was required in the present case—at Trombay and its neighbourhood without encountering very much of what I call rocky moorum.

Q.—How many miles is that place from the present reclamation site?

A.—The Sewri reclamation?

Q.—No, the Colaba reclamation?

A.—The intention here—it is mentioned somewhere in this report—was to make a branch railway from Trombay to the nearest station, which was just outside Bombay Island. I think the names were mentioned, and I have an impression they are there,

but it is the station immediately off Bombay Island. There would have been a branch railway of probably five miles or thereabouts to this hill Trombay that I have referred to.

Q.—You had to construct a new line of railway about five miles long before you got into touch with it?

A.—Five miles or thereabouts. I do not know if you have a map, but I would like to point out the place on it.

Q.—From what station would you take your branch line?

A.—That is just what I want to verify on the map.

Chairman.—Anyhow, it is the nearest station?

A.—The nearest station. These events are 14 years old in my memory.

Sir Frederick Hopkinson.—The names of the stations are Matunga and Kurla. It is paragraph 14. You deal with the possible connection with both the railways, and you say you had negotiations with the Railway Companies and you based your estimate on a site on the north end of Trombay Hill?

A.—Yes.

Q.—" Where the western slopes of the hill are formed by extensive talus of suitable material "?

A.—Yes.

Sir M. Visvesvaraya.—That would probably be within 10 miles of our site?

A.—Approximately.

Q.—So you have abundant material within 10 miles of the reclamation site?

A.—Quite so.

Sir M. Visvesvaraya.—That is an important point for us.

Sir Frederick Hopkinson.—Do not forget that that is only for the quantity required under his estimate, not the quantity to finish the whole of the reclamation.

A.—It is for the quantity indicated (2,600,815 cubic yards).

Sir M. Visvesvaraya.—There are other quarries.

Sir Frederick Hopkinson.—That is only as far as he goes.

A.—You must check my mileage figure on your map.

Sir M. Visvesvaraya.—The original project of 1865, you state, was based on moorum, earth and dry filling?

A.—So I was informed.

Q.—The difficulties of transport seem to have led to the abandonment of that project, as you have remarked?

A.—Well, about 1865, as I understand, a little reclamation was actually done and the material was brought from Malabar Hill and Cumballa Hill; but that was no longer feasible in 1912.

Q.—At what rate did you expect to obtain material from Trombay in those days? Can you recollect, roughly?

A.—I should need to derive the figure from the timetable and the quantity here, but the total quantity of moorum provided for here was only 2,600,000 yards, so that it was a bagatelle.

Q.—It was about one-tenth of what we wanted?

A.—Yes.

Q.—Can you tell us roughly what the rate was in those days?

A.—I think it is in my mind that two trains a day were contemplated by the Railway Company.

Q.—And the cost?

A.—My figure is one rupee, 12 annas per cubic yard.

Q.—In paragraph 8 of the statement you have supplied to us you say: " These considerations, particularly those of the sea conditions, lead to the conclusion that if the requisite material could be obtained from the harbour there would be no question as to its being preferable."

A.—That was my view.

Q.—Dredged filling was preferable to dry filling?

A.—Dredging in an exposed sea way is one of the most difficult, expensive and uncertain operations imaginable in engineering.

Q.—So you wanted it from the harbour, not from the open sea?

A.—Other things being equal, as between the harbour and the open sea, I prefer the harbour.

Q.—The total quantity we want for this project is about 28 million cubic yards?

A.—Yes.

Q.—At 1 rupee, 12 annas a cubic yard, which is the figure you have mentioned, the cost would roughly be what?

A.—But it would be a very different figure to-day.

Q.—I quite see that. The cost would be 490 lakhs?

A.—I take your figure.

Q.—You should remember the transport facilities have improved since?

A.—Yes; they have electrified the railway.

Q.—We have made enquiries and we find that it is possible to get moorum at 1 rupee, 4 annas, or less?

A.—Delivered to the site?

Q.—Yes. Actually they are getting it for 1 rupee 9 annas in small quantities?

A.—Yes.

Q.—Without any proper organisation?

A.—Yes.

Q.—With an efficient organisation, and with a proper understanding with the railway authorities we may be able to get it for 1 rupee, 4 annas?

A.—Yes.

Q.—If you get it for 1 rupee, 4 annas the cost will be 350 lakhs for 28 million cubic yards?

A.—Yes.

Q.—Now your project was 325 lakhs?

A.—Yes.

Q.—And Sir George Buchanan's project was 367 lakhs?

A.—Yes.

Q.—Those two projects were quite satisfactory as dredging propositions, but would you have thought it worth while to risk dredging if the cost went up to 702 lakhs?

A.—Not if the cost went up in ratio to nearly three times the original estimate.

Q.—So what was a sound proposition at 367 lakhs of rupees ceased to be such when the project went up to 702 crores?

A.—No doubt.

Q.—Since by dry filling the work could have been done cheaper?

A.—Quite so; but it occurs to me to say, lest I be thought to agree that the substistitution of moorum filling for pump dredging is a sound way, that everything depends upon the efficiency of your dredging machine. I still say that I am perfectly convinced that the reclamation can be filled up more cheaply to-day by means of an efficient pump dredger properly worked than it can be by any other method; and nothing has happened to persuade me that that is not so.

Q.—The distance to be pumped is rather considerable, is it not? The distance to which the pumping has to be done is rather considerable in this case?

A.—It is the same now as in 1912.

Q.—You went into all the calculations then?

A.—I provided for 12,000 feet of transport in addition to a gravitation fall at the end of 12,000 feet for the remote corners of the work.

Q.—Were your calculations based on the actual working of any similar plant abroad?

A.—Well, I had very complete data as to the cost of working dredgers in America. Mark you, no other data applicable to this business were available at that time inasmuch as no English engineer, as far as I am aware, had ever carried out a reclamation scheme upon the principle of pump dredging. But on the other hand, many schemes of that sort had already been concluded in America and in Canada.

Q.—In Canada particularly?

A.—Yes.

Mr. Billimoria.—Of this magnitude?

A.—Well, particulars of one case sent to me, which was of land reclaimed in front of Chicago in the lake, was to an extent of some 700 to 800 acres, if my memory serves me aright.

Sir M. Visvesvaraya.—You stated that steam shovels can be used for moorum—for digging in moorum?

A.—Yes.

Q.—Have you done that anywhere? Have you actually used them?

A.—I had no occasion to in my contract at Bombay.

Q.—Is not moorum a very hard material to deal with with steam shovels?

A.—As you probably are aware, you may have moorum in all degrees of hardness—from quite loose earth up to very hard rock. It is all a question of the amount, of its decomposition, and of how near the surface it may be.

Q.—As you go deeper it becomes harder generally?

A.—Yes, generally, the further you go into the mountain. After all, moorum is nothing more or less than decomposed basalt rock, and its hardness or otherwise depends on how far the decomposition has proceeded.

Q.—The steam shovels were dealing very satisfactorily in the Sukkur Barrage with the material?

A.—That is loose material.

Q.—Steam shovels are not often used for digging in moorum?

A.—It depends. The trials which I made in Bombay in connection with the Sewri Reclamation showed a material which was eminently suitable for steam shovels.

Q.—Moorum?

A.—Yes.

Q.—You have had experience of that?

A.—In the trials at Bombay by borings and open pits there was no question about the material exposed in those pits being suitable for steam shovel work.

Q.—You have seen that clay is described as soft clay for the purposes of the dredger design?

A.—By whom?

Q.—By Sir George Buchanan.

A.—I can only place against that my own description, stiff and unctuous.

Q.—So it was not quite correct to say that it was soft clay?

A.—Not at all correct.

Sir Frederick Hopkinson—In his report in 1919 he calls it hard clay.

Sir M. Visvesvaraya.—Yes, but in the specification and in the same report you will notice he describes it for the manufacturers as soft clay?

A.—Then that is probably the root of a good deal of your trouble.

Q.—That is my point. A good deal of the trouble is due to the incorrect description of the clay?

A.—Quite so.

Q.—You agree on that point?

A.—Well, I do not know. I have to accept what you say. I merely say that I should never have described it and never have described it as soft clay.

Q.—You are prepared to help us with your advice on these technical points?

A.—Most emphatically.

Q.—You would have no objection to calling it hard clay?

A.—I would not go quite so far as that, not for the most part.

Q.—You would not call it hard clay?

A.—No.

Sir Frederick Hopkinson.—Would you for that bit? (*Pointing to sample.*)

A.—Yes, I dare say I would in its present condition, but I would like to see it in its original condition.

Sir M. Visvesvaraya.—It does not represent the clay in its natural condition?

A.—No.

Q.—It is taken from the reclamation area and sent up here?

A.—Yes.

Q.—Another important point which has arisen in connection with this Inquiry is whether it was a wise thing to arrange for tests on the Clyde and not on the site. Some tests of a perfunctory character, if I may say so, were carried out on the Clyde, and then the plant was sent out 5,000 miles. There it was put to work and did not do its duty?

A.—I have had a little experience of tests on the Clyde, and do not attach very much value to them.

Q.—We have had that opinion from other engineers also?

A.—Yes. The conditions on the Clyde are very favourable to exceptionally high results.

Q.—You know people have said so?

A.—Yes.

Sir Frederick Hopkinson.—Perhaps that is why the Clyde was selected.

Sir M. Visvesvaraya.—What would you have done, supposing you were the principal or purchaser in this case, in order to ensure that a good dredger was delivered to the site? What is the usual practice?

Chairman.—Is there any usual practice?

A.—I believe the usual practice is to go to the dredger builder and order the dredger.

Sir M. Visvesvaraya.—That seems easy enough, but what is the next step. How do you make the dredger work successfully?

A.—It was not quite the step to be taken in this case because as has been indicated here the whole conditions were unprecedented. It required very special study and a very special design for any dredger that was going successfully to cope with this work.

Q.—That does not seem to have been done in this case?

A.—I am not aware of what has been done. I have to be informed by you.

Q.—You are aware that in the case of the " Kalu " and the " Jinga " a guarantee was secured from the same builders to give a minimum output per hour?

A.—Yes, which they never did.

Q.—That experience was available?

A.—It was.

Q.—They do not seem to have profited by that experience?

A.—I think there were some very useful lessons in the experience of the Sewri Reclamation to be derived, which were applicable to this case.

Q.—Another point about which I want your opinion is this. The engineers have calculated that working 170 days at the rate of 2,000 cubic yards per hour for 15 hours a day you can get 5,000,000 cubic yards per season?

A.—Yes.

Q.—Is that a correct calculation from your experience? It is arrived at in this way. Fifteen times 2,000 means 30,000, and multiplied by 170 is 5,100,000?

A.—Granted that you had provided a dredger capable of removing 2,000 yards an hour, yes.

Q.—It is feasible?

A.—2,000 yards an hour is not an impossible output for a dredger, but in this case, having regard to the length of the delivery pipe and to all the conditions attaching to it, it certainly would have been the most powerful dredger that had ever been built in the world. That is what I had in contemplation when this report was written—conditions were unprecedented I think I say.

Q.—You have said that the ratio of cut to fill is ten to seven?

A.—The cut to fill is ten to seven; that is, dealing for the most part with blue clay, I should say.

Q.—Where do you get that figure of ten to seven?

A.—I made certain experiments in connection with the Sewri Reclamation when I was estimating for that, which led me to adopt that standard.

Q.—That means really 30 per cent. is lost?

A.—Thirty per cent. is lost, and it is lost mainly in my view in evaporation. You see in the upper portion of the Reclamation, whether it be in Back Bay or at Sewri, above the tide level the clay or mud or whatever it be becomes dried by the sun. In the course of drying it loses no less than over 50 per cent. of its bulk by evaporation.

Sir Frederick Hopkinson.—The clay does?

A.—Not the clay—I beg your pardon, the soft mud, but not the clay. The clay loses very, very little indeed by evaporation.

Sir M. Visvesvaraya.—That is because the material outside is partly water and partly mud?

A.—Yes, clearly.

Sir Frederick Hopkinson.—I have got a tin of mud here, and we will send it round to the testers and have it evaporated and find out exactly what it is.

A.—Except that I might suggest that a tin that has been out of water for some time has probably lost something.

Q.—It is in water now.

A.—It is an experiment I can tell you in a moment about.

Q.—This stuff has about the consistency of treacle?

A.—I can tell you precisely the experiment on which that figure was founded. When I was engaged in working out these estimates for Sewri I had a large iron pan 5 feet square and 2 feet deep filled with mud freshly collected from the harbour. We placed it over a slow fire and in the sun for some time, and by weight the loss was over 50 per cent.

Q.—But what was it in volume?

A.—That I cannot tell you.

Q.—That is the important thing. Weight does not count at all.

A.—My figure is by weight.

Sir M. Visvesvaraya.—Even in the Reclamation area the mud and water may remain permanently in the lower levels?

A.—Yes.

Q.—What is the proportion of pumping time to total working time, normally, from your experience?

A.—Barring breakdowns I should put it at between 80 to 90 per cent. in the ordinary case.

Q.—What do you take as the actual material pumped to the total quantity of water and material pumped?

A.—That is a very difficult question or a very material one. In soft mud you will get a very poor performance. That is why in the back of my own mind I invariably preferred blue clay to the mud—that we should get more efficient results and carry a higher percentage of clay in the water than we should by soft mud.

Q.—So that you have no opinion of soft mud?

A.—No.

Sir Frederick Hopkinson.—You are bound to take that 15 feet of mud before you can get to the clay?

A.—Of course you are.

Sir M. Visvesvaraya.—This is a point that has not been answered. Are you in favour of a guarantee for the proper performance of the dredger at site or on the Clyde? You said not on the Clyde. May I take it that it would have been better to have had a guarantee for working on the site?.

A.—It would, of course.

Q.—You may be aware it was done in the case of the " Kalu " and " Jinga " by the same makers?

A.—I do not know.

Q.—You may take it from me?

A.—Yes, but I do not know myself.

Q.—If it was done in the case of the " Kalu " and " Jinga " it would have been a wise thing to do the same in the case of the " Sir George Lloyd " and the " Colaba " also?

A.—Yes.

Q.—Did you ever contemplate dredging in Back Bay?

A.—I contemplated it, but I only contemplated it in the eventuality that the material might not be found in the harbour. If it was found in the harbour I would not go to Back Bay.

Q.—Do you consider that there is enough material in Back Bay?

A.—I never investigated that very fully. As soon as I was satisfied that the material was available in sufficient quantity in the harbour we did not pursue the investigations in Back Bay further.

Q.—Do you think that any changes have occurred in the bed of the harbour since the borings were taken in 1912?

A.—It is extremely improbable.

Q.—Do you think that dependence could be placed on the surveys of 1912 in designing in 1919?

A.—Surely.

Q.—You do not think there would be any deposits or erosion of the bed in the interval?

A.—The only thing that might have happened in the interval would be a further accumulation of soft mud. Bombay Harbour is gradually shoaling—becoming shallower.

Q.—You think that good types of dredgers could be built in order to dredge in the blue clay you have described?

A.—I feel sure of it.

Q.—Would you work in two shifts or three shifts?

A.—In three shifts.

Q.—Contractors would not wish to lose time but would work in three shifts?

A.—Certainly three shifts was the basis of my calculations.

Q.—They have not been working in three shifts out there?

A.—I believe not. In all my estimates three shifts were provided for—a continuous 24 hours' work.

Q.—Every contractor does that. Was it right to have started the sea-wall from both ends?

A.—I would not myself have done so.

Q.—You would have cut up the site into small bits by dividing walls?

A.—I intended to start at the *outer* end as a matter of fact to get the shelter of the wall coming round against the prevailing onset of the sea.

Q.—The outer end means the " Colaba " end?

A.—Yes.

Q.—You wanted to start from that end?

A.—To start from that end and work along towards the north.

Q.—Did you make provision for storm water drains?

A.—Yes.

Chairman.—It is in the group under P.W.D. estimates?

A.—Yes, item 5 on page 9.

Mr. Billimoria.—Do you mean that is included in the figure of 59.45?

A.—Yes.

Sir M. Visvesvaraya.—You gave a rate of 9 annas 3 pies pump filling?

A.—Yes.

Q.—That was to include the value of the dredger?

A.—It did.

Q.—Over how many years did you distribute the cost of the dredger, roughly?

A.—Well, the total cost of the dredger was absorbed in the cost of the work so that it was written off. There was a full charge of the first cost of the dredger included in this item.

Q.—Several engineers have deposed that this is not a dredging proposition at all in the circumstances now revealed. What is your opinion on the point?

A.—I never regarded this scheme as being feasible at all except upon the basis of a dredging proposition.

Q.—At what cost do you think this can be regarded now as a feasible financial proposition, now that you know so much about it?

A.—I do not know that my opinion upon that is of any value.

Chairman.—At what date—I do not quite understand your question?

A.—I understand what I am asked is—at what total cost I would have regarded the scheme as a feasible commercial proposition.

Chairman.—In what year?

Sir M. Visvesvaraya.—In 1920?

A.—I cannot say.

Q.—And now at the present date?

A.—I have never looked into that question. It is not an engineering question.

Sir M. Visvesvaraya.—You are a contractor and you also take into consideration the financial aspects of a scheme?

Sir Frederick Hopkinson.—It all depends on what you get for the land?

A.—Quite so.

Chairman.—You were prepared to reclaim a certain area at a certain price in 1912?

A.—Yes.

Q.—What they did with it was not your concern?

A.—Quite so. As a matter of fact it is within my knowledge—I was working in very close co-operation with the Public Works Department in this business—that both in 1910, when the preliminary scheme was put in hand, it was elaborately investigated by Mr. Cameron, who was then the head of the P.W.D., and in 1912, upon my report, is was similarly investigated by his successor, Mr. Kemball.

Sir M. Visvesvaraya.—I have given you the quantity of filling to be 28,000,000 cubic yards?

A.—Yes.

Sir M. Visvesvaraya.—Would you, knowing the rates now, consider the cost of 600 lakhs excessive?

Chairman.— That is for moorum filling?

Sir M. Visvesvaraya.—We want the reclamation, whether done by dredging or by moorum filling, whichever is cheaper?

A.—You mean at a total cost of 800 lakhs do I consider it would be feasible?

Q.—I said at a total cost of 500 or 600 lakhs would you recommend the construction of this reclamation—at a total value of 500 or 600 lakhs?

A.—If it was a good proposition at 325 lakhs in 1912, as I am advised it was, it would be, I think, at double that amount in 1926.

Q.—Was it right that the manufacturer should have accepted a specification of this character, that the dredger could pump about 5,000,000 cubic yards per annum?

A.—If a dredger builder is furnished with certain data by his client I take it that his business is to build a machine which will comply with the requirements and with the descriptions which have been given to him in that statement. I take it if he does that he has fulfilled his responsibility.

Q.—But usually the dredger builder is held responsible for the output. It should do what he has promised it should do?

A.—That is expected, of course.

Sir M. Visvesvaraya.—Can you call upon the builder to put the plant right?

Chairman.—The witness cannot possibly answer that question. That is on the construction of the particular contract.

A.—That is all I can say. It depends upon the terms of your contract with the builders.

Sir M. Visvesvaraya.—I think as a business man we might get it from you.

Chairman.—It depends on the construction of the contract.

A.—I have not seen the contract and I do not know. It is a lawyer's question.

Chairman.—It is a question no witness could answer.

Sir Visvesvaraya.—I do not know whether this question is objectionable or not but I want to put it to you. Cannot the dredger be made to deal with the desired output either by increasing the power of the engines or the design of the cutter?

A.—I am sure that a dredger can be built which will remove this material satisfactorily. I do not know what your present dredger is like or how nearly she may approach to the machine that I am certain can do it.

Q.—When a dredger fails to give the promised output what are the measures usually taken by the purchaser? I am putting to you an elementary question. As a contractor you can tell us the various processes through which you go.

A.—I have never personally got very much satisfaction out of the failure of a builder of a machine to carry out its specified duty.

Q.—You never yourself got any satisfaction?

A.—No doubt there have been cases where with a very rigid specification and a very obvious failure damages could be recovered, but I have never known it done in the case of a dredger.

Sir Frederick Hopkinson.—There is one thing I should like to say to Mr. Kidd for his satisfaction about this description of clay that he has put here. I put the question to the Chief Engineer in Bombay as to whether after his experience and knowledge of this material for over between three or four years he could give me a better description than yours, namely, " stiff and unctuous," and he said he could not.

A.—I am very glad to hear that, Sir Frederick.

(Adjourned for a short time).

Sir Frederick Hopkinson.—You were speaking this morning about having included the storm-water drains in your estimate. There is nothing in your estimate itself which shows that the storm-water drains are included. It only says roads, lighting and drains. I do not think those include the storm-water drains at all?

A.—I must say that that part of the estimate, as is noted here, was prepared for me by the P.W.D. I discussed these points with Mr. Kemball, who was then the Chief Engineer, and he told me that he had people on his staff who were much more familiar with this business than I was, and he said, " We will make this estimate and give you the figure."

Q.—You will see from your own report that the words " storm-water drains " are not included?

A.—No.

Q.—And I suggest to you that " drains " means only those road drains which are ordinarily put in in such a case? The storm-water drains are the continuation of drains already existing across the city of Bombay——.

A.—Which I know.

Q.——which you know, and which are very large?

A.—Yes.

Q.—Some of those drains, I believe, go up to as much as 9 feet in diameter?

A.—My recollection is about that.

Q.—The total cost of those drains was 64 lakhs—£482,000?

A.—Yes.

Q.—That appears to have been omitted by the P.W.D. in giving you the estimate for the drains?

A.—I do not remember that the point was ever discussed.

Q.—We have looked at the P.W.D. details and we cannot find any mention of storm-water drains at all, and they are not included in your estimate. The value of them being 64 lakhs, it comes to more than your total estimate for roads, lighting and drains, so obviously they could not have been included?

A.—It rather would appear so.

Q.—Sir George Buchanan, in making his estimate in 1919, also does not mention the storm-water drains, but he slightly increases the figures which have been given him by the P.W.D. Evidently he had no knowledge whatever of these storm-water drains and did not provide for them in his estimate. Did you send in any plans with your original estimate to the Government—for instance, the section of the embankment wall?

A.—Yes. There was a complete set of drawings which I think are scheduled at the last page of my report.

Sir Frederick Hopkinson.— We have not seen them.

Witness.—On page 22 of this report you will find a list of them, numbering 10 in all.

Sir Frederick Hopkinson.—Have you had them, Mr. Elgee?

Mr. Elgee.—No, I have not seen them.

Sir Frederick Hopkinson.—They are filed away somewhere, clearly.

Witness.—They number 10 in all—the drawings lodged with the report.

Q.—The total cost of the dredging plant supplied for the Back Bay reclamation was about £855,000. Can you give me any idea of the amount included in your estimate for plant?

A.—I think I can. I have carefully kept my original estimate book.

Q.—I want you to include the pipe lines?

A.—Perhaps you would like me to run over the items?

Q.—Yes, if you will. I will put them down if you will call them out?

A.—Pumped filling, plant delivered and erected at Bombay: a dredger of 7,500 horse-power.

Q.—That is two-and-a-half times the horse-power of the dredger sent out there?

A.—Your difficulties are explained! £130,000. Pipe line 11,500 feet, £86,250; shore piping 3,500 feet, £4,375. Add for coupling up and setting the pipes afloat, £7,500; terminal delivery pontoon, £3,000; tug and water boat combined, £7,000. Anchor lighter, £2,500. Two barges for coaling and similar at £3,000, £6,000. Boats, £1,000. An oil launch, £2,000. Telephones to the dredger, £500. Workshop equipment, slipway, £12,500.

Q.—There is no need to have that, because that does not appear in the other estimate?

A.—Sundry further provisions, £10,000, total £272,625.

Q.—That you were going to do with one pump only?

A.—No. There was a "booster" subsequently included. It is called here "Relay pump barge." This is the working cost. I am afraid I cannot lay my finger upon the prime cost for the moment.

Q.—There is no hurry. I would like to get the cost of this booster. Was it a floating booster?

A.—It was a floating simple square barge with a pump and an electric motor on board. That is my recollection. So far as I remember, the cost was put down in my estimate at £15,000. I give you that figure from memory.

Q.—That is almost exactly one-third of the cost of the "Sir George Lloyd" and the "Colaba" and the other pumping appliances?

A.—Do I understand that the "Colaba" was regarded as what I have just called a "booster"?

Q.—A booster only. She was a boat almost identical with the "Sir George Lloyd" dredger, with propelling engines. In fact she was almost an identical ship, except that she had not a ladder. So that if your price in 1912 were multiplied by three for 1919, we should get almost exactly what has been paid for the present pumping plant?

A.—Quite so.

Q.—That points to the fact that three is a correct multiple?

A.—Yes, as I understand it was at that time.

Q.—It is a correct multiple for the difference in cost as between 1912 and 1919. Therefore, in order to get an accurate estimate for the purpose of showing the total cost to the Government in 1919, the cost of the provision of plant should have been three times as much as your estimate of 1912?

A.—Quite so.

Q.—There is one thing to be noticed, and that is that your plant in 1912 gave two-and-a-half times the horse-power of the " Sir George Lloyd "?

A.—Quite so. That is a very important point.

Q.—Therefore the dredging plant in 1919 cost a good deal more than three times your cost?

A.—Yes, power for power.

Q.—There is another thing, too, to be considered, and that is that your booster did not provide for a power supply. You were going to get that from the town?

A.—Yes; from the Tata Company.

Chairman.—There is the matter of the propelling engines.

Sir Frederick Hopkinson.—Propelling engines were unnecessary, as I suggested to Sir John Biles the other day A plain pontoon with a motor was what Mr. Kidd provided, and what he thought would be sufficient.

Witness.—We had a tug boat available to move the pontoon.

Q.—You provided for a tug?

A.—Yes.

Q.—It has been stated in evidence, and shown in detail, that the ordinary working losses of time between the total time the dredger worked and the actual pumping hours was 36 per cent., and there has been a general concensus of opinion amongst all the witnesses whom we have examined that that is not an unreasonable delay. You spoke this morning of getting between 80 and 90 per cent. of working time. That is what you based your figures on?

A.—Yes.

Q.—The Chairman of the Port Trust, who was the engineer, I think, when the Sewri reclamation was done,* gave it as his opinion, from his experience of the " Kalu " and " Jinga," that 36 per cent. was not an unreasonable figure?

A.—I do not agree.

Q.—You think it is too great a delay?

A.—Quite so.

Q.—The general feeling amongst all the witnesses has been that 36 per cent. is not an unreasonable time?

A.—I have been dredging by bucket dredger—I do not see that there is any need for distinguishing between a pump dredger and a bucket dredger—and I know that my working time, on that bucket dredger, was between 80 and 90 per cent.

Q.—They had a lot of trouble in Bombay from the high tides?

A.—Yes, they would do so, working on the outer edge.

Q.—They seemed to have lost a good deal of time on account of the strength of the tides?

A.—I had thought about that and, I think, provided amply for it in the shape of moorings, and especially of the mooring winches which were contemplated in the design of the dredger for which my estimate price was given.

Q.—With regard to the working of the dredger, here was a plant costing the large sum of £855,000, which began work on December 8th, 1923, and worked for the whole of that season on a single shift, that is, something between 8 and 9 hours. Do you think that a reasonable way to work such a plant?

A.—Not at all, more especially having regard to the enormous capital cost involved in that plant.

Q.—That would be the determining factor in making you work, as you said, 24 hours a day?

A.—Yes.

Q.—Do not you think that 99 per cent. of contractors who might be doing such a work as this would also wish to work 24 hours a day?

A.—I should amend your figure and say 100 per cent.

Q.—It would always be the normal thing for a man to do who was going to get the best out of his plant?

A.—Quite so.

Q.—The first season's work was described as experimental. What can you see which is experimental in working a suction dredger at a cost, for interest, of £50,000 or £60,000 a year?

A.—The whole question involved, to my mind, would have been the training of the crew for the working of the vessel, and I should have hoped to have got towards normal efficiency within two months.

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* Mr. Kidd notes that this is incorrect. The Chairman of the Port Trust was not then in Bombay.

Q.—They described it as an experimental season's work. The second year they worked a total of 15 or 16 hours a day, 64 per cent. of which was pumping time. The whole dredging was to be done in five years, which represented an output of 5,000,000 yards a year. Fifteen or 16 hours a day at 64 per cent. efficiency meant a maximum output of a little over 3,000,000 yards a year. Can you tell me how anyone could frame an estimate on a certain number of yards to be done which, according to his own outputs of 3,000,000 a year, taking it at 2,000 yards an hour, could come anywhere near that?

A.—They must have used totally different data in arranging their working programme from those which they employed in their original calculations.

Q.—Do not you think the data they used was simple arithmetic?

A.—Surely.

Q.—There never has been any intention apparently, up to the present time, until we were out there, of working the dredging plant 24 hours a day?

A.—That, of course, is astonishing to me.

Q.—In Sir George Buchanan's original estimate he says, "The plant has been designed to deal with 25,000,000 cubic yards in five years, working 170 days a year and 15 hours actual pumping a day in two shifts." That means, to get 15 hours pumping a day, plus 36 per cent., working 22½ hours a day in two shifts?

A.—Yes, but two shifts would never have been possible—two 12-hour shifts for a 24-hour day's work in Bombay. I provided for three crews.

Q.—You have an extensive experience of work in Bombay; you have been working there for years?

A.—For four years at the time this report was written.

Q.—With that experience you say you would, under no circumstances, have provided for working 24 hours a day with two crews only?

A.—Certainly not.

Q.—You would have had three?

A.—Yes, I would have had three.

Q.—Partly owing to the conditions of the climate?

A.—Partly, and there would have been no stoppage for meals. The ship would not have been stopped, except for some breakdown of machinery or shifting moorings.

Q.—Part of the 36 per cent. stoppages?

A.—Quite so.

Q.—So that under no conceivable circumstances, working 170 days a year and 15 hours pumping time a day, could you get five million yards a year?

A.—Even at the full output, no.

Q.—Unless you were working 24 hours a day?

A.—Quite so.

Q.—But there was no suggestion, up to the time we were in Bombay, that they ever intended to work the dredger more than two shifts, that is, 15 or 16 hours a way?

A.—In that case the original calculations could never have been realised.

Q.—As we know, they have not. I notice in your statement which you gave us yesterday that you estimated the cut to fill in the clay as 10 to 7?

A.—Yes.

Q.—I should be very interested to know where you thought that other 30 per cent. would go?

A.—With regard to the mud as distinct from the blue clay——

Q.—No, keep to clay.

A.—But my figure of 10 to 7 is based upon the combination of the mud and the clay.

Q.—Not on the clay only?

A.—Not on the clay only; and I may say that the loss upon the mud would have been much greater than the loss upon the clay.

Q.—In fact should there be any loss on the clay?

A.—I do not think there should be any loss on the clay.

Q.—It should be rather the other way about—that it would have bulked a little?

A.—I do not think it would have bulked.

Q.—Could you possibly disturb the blue clay, which has been at the bottom of that harbour for centuries, in any possible way without increasing its bulk?

A.—No, temporarily, you could not. If there had been any change at all it would have been in the direction of a slight increase. I want to make it clear that the 10 to 7 ratio was based on the fact that we could not get the blue clay without taking the

mud which overlay it, and there was, of course, a considerably heavier loss than the ratio between 10 and 7 taking mud alone.

Q.—You mean in the work done?

A.—In the work done at Sewri.

Q.—They had a 24½ per cent. loss there.

A.—That is rather less than my ratio. I had not that fact, and I am agreeably surprised that it is so.

Q.—I am not satisfied about this hand pump of yours. You told us you got from 80 to 100 lbs. pressure in that hand pump, and Mr. Knight told us the same thing yesterday. I was troubled about it, and I have since got the makers' catalogue, which gives the maximum pressure of his double acting pump as 70 feet. It says, "It may reach 70 feet." That is about 30 lbs. roughly, is it not?

A.—Yes.

Q.—You know probably better than I do that these makers' figures are rarely, if ever, reached in practical working?

A.—Quite so.

Q.—They take clean water and a new pump, and the valves fit perfectly. Everything is under the best possible conditions, which you do not get in ordinary practice?

A.—Quite so.

Q.—Then, if you turn to the quadruple acting pump, which is a better pump than the other, the maker gives a maximum pressure of 34·6 lbs. per square inch?

A.—Let me tell you exactly what happened. The object of this water pressure, to my mind, was to reduce the skin friction. It had no other purpose whatever.

Q.—It was not for cutting the clay?

A.—Not in the least. Very well, then. The normal pressure which was indicated on the gauge was that which was due to the depth of the water and to nothing else; but now and then when, in the course of operating the pipe, the men practically jammed the mouthpiece into the clay for a minute or two it may be, we would, in blowing out that piece of clay from the mouth of the pipe, run up to the pressure which I have given you, and immediately the plug of clay was blown out of the mouthpiece, the pressure came to normal.

Q.—So that it was not an effective pressure for cutting the clay?

A.—Oh, no. It had nothing to do with it in my mind at all. The object of the water pressure was solely to reduce the skin friction upon the pipe, because obviously 70 feet or rather 35 feet of that pipe stuck in the blue clay would have been jammed for good.

Q.—You want a fair volume of water for that?

A.—Yes.

Q.—It is not pressure but volume which is required to reduce skin friction?

A.—Quite so.

Q.—Therefore I am right in my doubts as to the general efficiency of this pump?

A.—Quite. Still, the fact remains that under those circumstances we did run up for a moment to a high pressure.

Q.—If I had been there I think I should have said, "Take that pressure gauge off and have it tested."

A.—Possibly that might have modified the figure I have given, but we were getting similar results on both barges.

Q.—However, the explanation you give is that it was only a momentary pressure?

A.—Yes, to blow out the clay plug in the mouth of the tube.

Q.—It is clear from Sir George Buchanan's report of September, 1919, that he had been making enquiries into the working of the "Kalu" and the "Jinga." If you look at the bottom paragraph of page 6 you will see he says, "Government are well aware that economy in this class of work can be attained only by securing that the suction dredgers and other plant required shall be of the best design. The difficulties which have arisen with the Port Trust dredgers serve as a warning on this point." So that he was evidently familiar with the failure of the "Jinga" and the "Kalu" to give their estimated output?

A.—Evidently.

Q.—Consequently he, as engineer responsible for the design of the dredger, would take precautions to see that he got something better than either the "Kalu" or the "Jinga" if he wanted to get his 2,000 yards a day?

A.—Evidently.

Q.—Did you ever hear how your tender for the Sewri reclamation compared with the actual cost of the work?

A.—I cannot give you the figures, but I have the impression that our tender was considerably below the actual cost to the Port Trust themselves.

Q.—Because Sir George Buchanan says the exact reverse, and he gives that as a reason for doing the work departmentally. You cannot give me the figure?

A.—I am afraid not. I do not think I have ever had it.

Q. It is unfortunate.

A.—I certainly have not seen the figure of the cost to the Port Trust doing the work departmentally. No doubt somewhere in my possession I have a copy of my own figures for the tender.

Q.—But you do not know of your own knowledge?

A.—Not the cost to the Port Trust.

Q.—I take it that what you said this morning about the ordinary prices in Bombay being two and a-half times as much in 1919 as they were in 1912——?

Chairman.—The witness said 1921.

Witness.—Yes, 1921.

Sir Frederick Hopkinson.—Very well, 1921—that the cost of the dredger would be in a larger ratio than that?—That is my impression.

Q.—Also, would that cover machinery purchased in England—cranes, locomotives, cement mixers and all that sort of thing?

A.—Quite.

Q.—So that do you think we would be far out if we took the fair ratio between 1912 and 1919 as being about three times?

A.—I think you would be a little more than fair. Putting everything together, I think it would be a little less than three.

Q.—We have figures which show us that cement, for instance, in 1919 was three and a-third times as much. Iron bars were two and a-half times as much.

A.—As a very important factor, could you give me the relative price of steam coal?

Q.—Coal was three and three-quarter times as much.

A.—That affects the matter. That leads me to modify the opinion I have just expressed. Instead of saying slightly under three times, I should be inclined to say slightly over, because the quantity of coal used in dredging is, of course, a very big factor in the cost of the working of the plant.

Q.—You think we should not be far out if we took about three times?

A.—I think about three times.

Q.—Therefore your estimate in 1912 of 325 lakhs would be, in 1919, 975 lakhs?

A.—Quite so.

Q.—You will be interested to hear that the latest estimate for finishing the work is a thousand lakhs. You spoke in your original report about a capping of concrete to the reclamation bank. What size was that?

A.—The idea of the capping was that, after the rubble mound had settled and after the random blocks had been put down on the sea side, having gone through perhaps two monsoons we should put a capping, as far as I remember, about three feet thick and twelve feet wide over the entire crown of the mound.

Q.—And a parapet in addition?

A.—No.

Q.—You were not thinking of a road coming close up to the edge of the reclamation?

A.—Yes.

Q.—Would not the waves break over that and flood the road?

A.—Not at this portion of the sea wall.

Q.—I am speaking of the general length of the sea wall.

A.—I am speaking now only of the rubble mound section where a capping of concrete was employed over the rubble.

Q.—Which end is that?

A.—The in-shore end.

Q.—Which do you call the in-shore end?

A.—The marine lines end. The reason why a uniform design of sea wall was not carried through from end to end, on the lines of three-fourths of the length of the outer part, was that the rock disappeared from the surface at that point and went to a considerable depth; and the solid concrete wall, such as was contemplated for the rest of the length, would have been expensive in the matter of foundations in order to get down to a hard foundation. Over the length of the solid concrete sea wall, while no parapet was provided for, there was a very heavy bull-nosed coping provided in *this* fashion. (*Indicating.*)

Q.—In the nature of a parapet?

A.—Yes, in the nature of a parapet. Another important point bearing upon that same thing is that round the curve forming the most exposed part of the wall to the south-west monsoon, the entire height of the sea wall, round the south-west corner, was for a considerable length raised ten feet about normal height—not only for the wall itself but for the whole of the roadway of 150 feet wide.

Sir Frederick Hopkinson.—I should like to see those plans. Is it possible for us to get them, Mr. Elgee?

Mr. Elgee.—I do not know where they are.

Q.—The statement has been made many times during the course of our enquiry that the material in the harbour was not suitable for the dredger. That seems an extraordinary way of putting it, does it not?

A.—As I said this morning, it is putting the cart before the horse.

Q.—Was not the proposition this—that the dredger was to dredge certain material from a certain place and put it in another place?

A.—Quite—with a dredger specially built for that purpose.

Q.—Therefore, was it not incumbent upon the people who were designing and building the dredger to make absolutely certain that the dredger was suitable for the material, instead of the material being suitable for the dredger?

A.—You could not make the material suitable for the dredger. You could make the dredger suitable for the material.

Q.—I do not know whether you can throw any light upon this, but the first season's dredging, which was called experimental, seemed to be better in output than the subsequent years, during which time they had gained experience in dredging. Can you throw any light on that?

A.—I cannot at all. I should have expected the reverse result.

Q.—To refer to this experiment of yours in making the borings. You do not suggest, do you, that the water actually cut up the clay?

A.—Not in the least. It had nothing to do with it whatsoever.

Q.—I have been rather puzzled by this, because it has been suggested several times, that the object of this wash boring was to enable you to cut the clay away so that the pipe could descend into it.

A.—That had nothing whatever to do with it. The sole object of the water was to reduce the skin friction up the side of the tube.

Q.—You had no intention of cutting the clay?

A.—None whatever.

Q.—You do not think it could have been done?

A.—It could not have been done.

Sir Frederick Hopkinson.—I have been very puzzled about it, because I said that I knew it could not have been done, but we have been told over and over again that you did intend to do it.

A.—No one knows the intentions in my mind in the matter except myself.

Q.—I entirely agree with you that wash borings in the mud are probably as satisfactory a means of ascertaining the depth of the mud as anything you can employ, but what has oppressed me very much has been the fact that you, a man with your experience, was going to wash out that clay with a hand pump. It is quite impossible?

A.—Quite impossible. I think I have made it clear in my written statement that, coming to my personal point of view, when I arranged to take these borings, all that was in my mind was to answer one question—to myself—so to speak, namely, " Is this blue clay in this part of the harbour the same material that I have been dredging at the Indian Marine Dockyard for the last four years? "

Q.—And you satisfied yourself about that?

A.—I satisfied myself perfectly.

Q.—That it was the same?

A.—I was perfectly satisfied. And, of course, my conclusions, and what I have said, about the nature of the material were not based on what I saw by means of this pipe, but what I had seen on board the dredger bringing the stuff up day after day to the daylight.

Q.—Could that clay change in character within a few miles?

A.—It could not.

Q.—It is formed by the same action?

A.—It is the same at Sewri. It is the same in the new docks which I visited constantly with my friend, Mr. Messent, where we saw the deep cuttings for the trenches of the dock walls, and the excavation of the body of the dock exposed to sight for the height of the wall of this room. The mud was lying at the top of the cutting; the blue clay followed; then the murum, and then the hard basalt rock at the bottom.

Q.—Then you have seen what, apparently, no one else connected with the Bombay Reclamation has been able to see—the actual blue clay dry; that is to say, you have seen it with your own eyes?

A.—Yes, lying in its natural condition.

Q.—The same as if you had been able to parcel up a piece of the sea, cut the front right away, go down in a diving bell and seen the actual conditions?

A.—Quite.

Q.—Therefore, you had the best opportunity possible of forming an opinion as to the character of the material which the dredgers were to dredge?

A.—A perfect opportunity.

Q.—And your description of the clay was based upon what you actually saw?

A.—Upon what I have seen and what I have handled and felt with my own hands.

Q.—Were you asked any questions by Sir George Buchanan, or anyone representing him, in 1919, as to whether you could give him any help in making up his tender, or in making him understand the physical characteristics of the material?

A.—I was never approached by anyone at that time.

Q.—I take it you could have been found at any time. Your address is always in the Institute list?

A.—Yes.

Q.—Do you know if Sir George Buchanan knew that you had been in Bombay?

A.—Yes, he certainly knew. As a matter of fact I met Sir George Buchanan in Bombay both before and after he undertook this work.

Q.—He did not ask you any questions about it?

A.—None whatever about the material.

Q.—I presume that had he asked you, you would have placed your knowledge at his disposal?

A.—Emphatically. I prefer to put it in this way: had the Bombay Government asked me to assist Sir George Buchanan, I should gladly have done so.

Q.—You said to the Chairman this morning that both the "Jinga" and the "Kalu" did better when they were working in the clay than when they were working in the mud?

A.—I am not sure about one of them—that she ever did work in the blue clay. The only one I can speak to is the "Jinga."

Q.—She did better in the clay than in the mud?

A.—Yes, she did better in the clay than in the mud.

Q.—We know her maximum average output was 1,426 cubic yards an hour?

A.—Yes. I think my figure for the clay was 1,480.

Q.—We have the actual official figures from the Port Trust. Was Mr. Messent satisfied with the way the dredger cut the clay?

A.—He told me he wished they had started upon the clay at a much earlier stage.

Q.—Could they have chosen? Would not they have had to take the mud off first?

A.—No. For some years after the work was commenced they deliberately skimmed the mud from over the top. Mr. Messent's experiments in the blue clay, as I think I have explained, arose out of a conversation with me. Up to that time his dredging masters had been extremely obstinate in refusing to tackle the blue clay.

Q.—You told us that this morning. What I want to get at is this. Do you think they got as much out of the "Jinga" as it was possible to get in that 1,426 yards an hour?,

A.—I think not, perhaps for this reason. I think the dredging masters may have been to some extent genuinely doubtful of the capacity of these boats to work the blue clay, and that they probably handled their vessels rather carefully.

Q.—But surely the dredging masters would be encouraged to give the maximum output, would they not?

A.—No doubt they would, but I have sometimes wondered whether the magical effect of a bonus would not have procured very much better results. In that connection I may tell you that in regard to the works at the Marine Dockyard, I had hired one of the Port Trust dredgers. A dredger was provided by the Indian Government, but it was a very poor one which I rejected. I negotiated with the Port Trust for the use of one of their boats—a vessel which had been working in Bombay Harbour for some 15 years before that time, and with the same crew on board who had been there for some years previously. We got outputs very much in excess of the best outputs which had ever been obtained in the Port Trust operations.

Q.—Did you say that was a bucket dredger?

A.—Yes, and I attribute those better results solely to the fact that I paid the crew a bonus on results.

Q.—It is purely a question of working?

A.—Yes—the operation of the ship.

Q.—That is to say, if you neglect to keep your winch going, you are not dredging anything?

A.—Quite so.

Q.—With regard to Back Bay, would you care to take the dredger "Colaba," costing £250,000 into Back Bay to dredge a hole for herself to lie in at low water?

A.—A very dangerous operation.

Q.—Would you go so far as to say that the fact that a dredger has done this—not the "Colaba" but the "Kalu"—shows that she has been extremely lucky?

A.—I would indeed. If you could tell me what part of the year she did it in, I could perhaps emphasise it.

Q.—I think it was in December.

A.—That was about the best month that you could have risked the experiment.

Q.—As a matter of fact the "Colaba" never went there, but it was in their programme of 1923 or 1924 to take it there.

A.—I think you have told me that the "Colaba" was the booster?

Q.—She was going to work in conjunction with another dredger in Back Bay, so that in all probability they would be going to have £500,000 worth of dredging plant in Back Bay.

A.—An extremely risky operation.

Q.—Actually the "Kalu," which was able to dredge 2,000 yards an hour, worked for practically a whole season in Back Bay, and she did 15,600 yards for the season.

A.—Eight hours' work (i.e., eight hours at 2,000 cubic yards per hour)?

Q.—No—only daylight tides. They went in at high water on the daylight tide; they picked up their moorings; they connected the ship up to the delivery line; they dredged for an hour, or an hour-and-a-half, and then had to run away again. Would you call that sound practical working?

A.—No—very unsound indeed.

Q.—You would not be surprised at the end of the season to know that your dredging had cost you 10*s.* a yard, would you?

A.—I should expect it.

Q.—In fact you would probably expect something a good deal more? The total cost of the dredging in the 1919 estimate, including machinery and working, was 8 annas a cubic yard.

A.—You mean 8 annas against all the items which are included in my estimate at 9 annas 3 pice in 1912?

Q.—Yes. Taking our figure of the cost in 1919 being three times as much as the cost in 1912, Sir George Buchanan's cost ought to have been 27 or 28 annas?

A.—Yes. My costs in 1919 would have been 27 annas 9 pies, including capital cost of plant.

Q.—We know that the dredging plant cost £850,000. If you divide that by 25 million, the total quantity of dredging to be done comes to almost exactly 8 annas. Therefore, under the 1919 estimate, you have got to do your dredging for nothing at all?

A.—Quite so.

Q.—That is the position.

A.—It is amazing.

Q.—Have you seen Sir George Buchanan's report?

A.—No.

Q.—How long did it take you to make up your report of 1912, including taking the borings?

A.—The actual time I was engaged was from the month of January, 1912, until late in August in the same year.

Q.—That is eight months?

A.—Call it seven.

Q.—What staff of engineers did you have with you?

A.—I had one engineer only, with two sapper N.C.O.s, who were doing observation work on the Survey.

Q.—Did you take any cross-sections of the reclamation area?

A.—We took a few to verify a very valuable plan that was already in the possession of the P.W.D. This plan seemed to me to bear all the internal evidence of having been so thoroughly well done that instead of taking a complete series of sections myself I checked three or four of the main points, and found them to compare so closely with this plan that I accepted the plan.

Q.—From that you were enabled to calculate the total quantity of filling required?
A.—Quite so.

Q.—It is rather a curious coincidence that in non-detailed plans such as that, you and Sir George Buchanan agree to a yard.
A.—Yes. That plan, I take it, is still in the possession of the Bombay Government.

Q.—Unfortunately we have not got it.
A.—It is an old plan dating back perhaps to many years before.

Q.—To show how well known it was, in this report from the Government of Bombay to the Government of India in 1911, on page 6, it says: "I am therefore to point out that the large reclamations being carried out by the Port Trust afford exceptionally complete data for estimating work of this kind." So that it was well known that the Sewri work had been done quite recently?
A.—Yes. It was in progress in fact at the time of my report of 1912.

Q.—Sir George Buchanan makes a point on page 9, second clause of paragraph 28, to this effect: "It is usual, when preparing estimates for a project of this magnitude, and especially when the estimates are those on which the authorities are asked to sanction the execution of the work, for all details to be furnished, but in this case details are left to imagination." If you will turn to a comparison of your estimate and Sir George Buchanan's on page 13, in 1919 he gives an estimate of what he thinks it ought to have cost in 1912, from which he gets a much lower price than you; but if you go to his final estimate on page 29 you will there notice that he gives identical items with your estimate, except that in the case of the sea wall he splits your one item up into six items, three of them being quite small amounts. You say you have not studied Sir George Buchanan's report?
A.—This is the first time I have seen it.

Q.—Otherwise I was going to ask you to tell us how you thought it compared with yours in the matter of details; but you cannot do that?
A.—I should need time to do it.

Q.—Did you have any conversation with Sir George Buchanan about the quality of the clay?
A.—Never.

Q.—Then you cannot tell me how he gets the idea which he puts into the paragraph at the bottom of page 9, that it is hard clay?
A.—Does he say it is hard clay?

Q.—He definitely say that at the bottom of page 9, the last line but one.
A.—I have not the slightest idea. That is a word which I have never myself used. I have called it stiff, but never hard.

Q.—He says on page 10 at the bottom of clause 31: "Moreover, the solid wall as proposed by Mr. Kidd would be very difficult and very costly to build, and would take a number of years to complete." Your estimate for the wall, I think, was 64 lakhs, was it not?
A.—Yes.

Q.—Sir George Buchanan's estimate was 118 lakhs?
A.—On the ratio we have already agreed, of three to one, the cost of the sea wall, according to my design, in 1919 would have been 195 lakhs.

Mr. Billimoria.—I will ask you one or two general questions first, and then I shall trouble you with regard to a few figures in Sir George Buchanan's estimate, compared with the figures in your original estimate of 1912. The item regarding storm-water drains was evidently overlooked by you in your estimate, since 59 lakhs could not possibly include roads, lights, sewage drains and storm-water drains?
A.—My answer to that is to say that Mr. Kemball, after discussion with me upon this question of roads and drains, decided it would be better that his department should become responsible for that estimate, and supply me with a figure to be incorporated in mine.

Q.—That is quite true, but the item of storm-water drains is as important an item as any of the items in connection with this reclamation?
A.—Quite.

Q.—And evidently it seems that it has been overlooked?
A.—That I do not know.

Q.—Supposing the Government had decided to employ you on the job, and supposing an eminent engineer had taken a number of borings and carried on an exhaustive survey, would you have depended upon his report entirely, or would you have made your own independent investigations and surveys before embarking on the scheme?

A.—I should have felt that it would be quite impossible for me to take part in the design of the dredger without seeing the material for myself quite irrespective of what might have been said by my predecessor.

Q.—You are also of the opinion that the builders of the dredger ought to have been familiar with the material which the machine was intended to dredge?

A.—I think in this case of the Bombay reclamation that Sir George Buchanan and his builders should have gone out to Bombay, and have hired a dredger from the Port Trust, and in the course of a very few weeks have satisfied themselves by digging here and there over the area to be dredged of what was exactly the nature of the material.

Q.—As far as your information, your survey, and your borings go, can you say that the material in the harbour is soft clay and not hard clay?

A.—I have never described it as soft clay. I do not agree that it is hard clay, but I have described it as soft clay.

Q.—You described it as stiff clay?

A.—Stiff and unctuous.

Q.—Would not there be a material difference between soft clay and hard clay?

A.—There might be a considerable difference, yes—a material difference for this purpose.

Q.—If a dredger was built for stiff clay, the specifications supplied to the dredger builders would be absolutely incorrect?

A.—I do not know what that specification was.

Sir Frederick Hopkinson.—A dredger that would dredge hard clay would in any case dredge soft clay equally well, would it not?

A.—Surely.

Mr. Billimoria.—I have not followed your answer.

Chairman.—He said a dredger that would dredge stiff clay would manage soft clay or any other kind of clay.

A.—But not necessarily hard clay.

Mr. Billimoria.—Therefore, if they were supplied with a specification to build a dredger for soft clay, that dredger could not be expected to get out hard clay?

A.—Or even stiff clay.

Q.—In that respect therefore the specifications would be absolutely incorrect?

A.—If the specifications said it was soft clay, they were absolutely incorrect.

Chairman.—Mr. Billimoria is referring to page 20 of Sir George Buchanan's report. (*Handing same to witness who perused same.*)

A.—All I can say about this paragraph is that if the dredger was designed for dredging 2,000 cubic yards of soft clay per hour, I am not surprised that she has made a very much less performance in stiff clay.

Mr. Billimoria.—Since you have that copy of the report in your hands, I will trouble you to turn to page 8, paragraph 25: "Meanwhile Mr. Kidd had, in July, 1913, submitted a proposal to spread the work over a period of 24 years and to divide the reclamation into sections, and he made an effort to carry out the first section of 84 acres for a sum of 37 lakhs." Is this different from the 1912 estimate?

A.—No. It is merely a portion of it as far as the figures go. No doubt they were modified to suit a very much smaller bulk of work.

Q.—You did not prepare separate estimates in 1912, 1913 and 1919. I am coming to 1919 in a moment.

A.—I must have prepared a special estimate for this sum of 37 lakhs which is referred to in this paragraph.

Q.—I am not concerned as much with this figure of 37 lakhs as with regard to the period and the sections. Did you not think it prudent that the work of reclamation should be carried on by sections and not as a whole? Did you not think it would have been much more in the interests of the Government if the work was carried out in sections?

A.—My advice to the Government was to carry out a substantial section of the work in the first instance; then to go slow, or possibly to stop, in order to ascertain at what rate land was likely to be taken up; then, as it was being taken up, to adjust the progress of the dredging henceforth to the rate at which the land was being sold.

Q.—If you will turn to page 13 of the Report you will find that you estimate your pump filling in 1912 at nine annas three pice a cubic yard?

A.—Yes.

Q.—Turning to page 8 of the Report, paragraph 25, in July, 1913—a short time thereafter you increased that rate to eleven annas three pice, after your subsequent experience that prices were gradually going up?

A.—Yes, that is quite true.

Q.—If you turn to page 9 of the Report, in paragraph 27 (*b*) you will find that in 1919 you increased the rate of murum topping to three rupees eight annas against your estimate of one rupee twelve annas in 1912?

A.—Yes.

Q.—That is because you took account of the fact that prices were advancing rapidly?

A.—Clearly.

Q.—Any comparison, therefore, made in Table A on page 13 between your figures and the figures which Sir George Buchanan gives in his estimate of 1912 could not stand in view of what is stated in those very paragraphs of Sir George Buchanan's Report?

A.—Quite so.

Q.—Turning to page 12 of Sir George Buchanan's Report you will see in the middle of the page " From Mr. Kidd's plans I see he proposes seven pipe lines across the peninsula. I think this number is excessive and have reduced the number to three." Have you any remarks to offer on that? Do you agree with Sir George Buchanan in reducing the number of pipe lines to three?

A.—No, I adhere to seven.

Q.—You think seven pipe lines is a sounder proposition than three pipe lines?

A.—Clearly.

Q.—Then on page 15, Paragraph 45 (*b*) you have again repeated that the completion of the work should take 24 years, thus avoiding payment of interest charges on the capital involved in the whole scheme until there is some certainty of the disposal of the whole of the land?

A.—Quite so.

Q.—You still adhere to that view?

A.—Yes. Of course the figure of 24 years would naturally have been dependent upon the policy upon which the calculation was made; that is to say, keeping the progress of the work just a little in advance of the taking up of the land.

Q.—The matter has to be considered not only from an engineering point of view but from a financial point of view as well?

A.—Yes.

Q.—You will agree with me that the financial aspect is very closely allied with the engineering project?

A.—Yes.

Q.—It is no good launching out on an engineering project without being sure of your finances?

A.—Quite so.

Q.—Will you now turn your attention to page 13, Paragraph 39? Sir George Buchanan differs from you and points out that the principal difference between you is the rate of pump filling. He says " Mr. Kidd's price being nine annas three pies per cubic yard compared with my rate of five annas, which is based on actuals for the class of work." What remarks have you to offer with regard to that?

A.—I will quote Sir Frederick Hopkinson who pointed out just now that the rate of eight annas was no more than equivalent to providing the capital cost of the plant, leaving nothing at all for doing the project.

Q.—Do you say that the rate of five annas was anywhere near the mark in the year 1919.

A.—My relative figure for the year 1919 would be 27 annas 9 pies—three times my original estimate.

Q.—Then on page 15, Paragraph 46, Sir George Buchanan says: " I have divided the work into four sections, and on the assumption that the sanction was given on, say, 1st January, 1920, I estimate that the work should be completed by the following dates," and on the following page he gives four sections completing the whole reclamation by December, 1926. Do you think it was ever possible to have done that?

A.—Obviously it was never possible with the plant which is there now.

Q.—If you will kindly turn to page 13 I will just trouble you with regard to some comparative figures. Item 2, with regard to moorum filling, is taken in your estimate in 1912 at 1 rupee, 12 annas?

A.—Yes.

Q.—The quantity being 2,600,815 cubic yards?

A.—Yes.

Q.—In Sir George Buchanan's estimate in Table B he reduces the quantity to 1,919,000 yards?

A.—Yes.

Q.—Which gives a difference of about 681,000 cubic yards?

A.—Yes.

Q.—Can you explain why he takes a smaller quantity there?

A.—I presume because he divided the area into a lesser number of sections than I had provided for. He had fewer cross banks to divide the work.

Q.—That would reduce the quantity?

A.—Yes.

Q.—He takes a rate of 2 rupees, whereas in January, 1912, you have assumed a rate of how much a cubic yard?

A.—So that my 1919 rate would be five rupees, four annas approximately.

Q.—Against 2 rupees?

A.—Yes.

Q.—Therefore, a figure of 48 lakhs is hopelessly out of the mark?

A.—Yes; quite hopelessly.

Q.—I do not know whether you have in front of you a copy of the revised estimate approved by Sir George Buchanan in 1922, in which he takes moorum toppings at 6 rupees, and the expenditure therefore is estimated at 60 lakhs?

A.—No; I have not.

Q.—That is the figure. I have marked it in blue pencil. (*Document handed to the Witness*).

A.—Thank you.

Sir Frederick Hopkinson.—Is that a cubic yard?

Mr. Billimoria.—He says a 6-rupee rate. It must be a cubic yard.

A.—Curiously enough, it does not say what it is. It says the quantities and gives the figure. I think it is cubic feet. It is percentage of cubic feet.

Sir Frederick Hopkinson.—This is moorum topping.

Mr. Billimoria.—That is the estimate approved by Sir George Buchanan in 1922. Probably that figure is not out of the mark, but in any case his figure of 38 lakhs is an impossible figure?

A.—Clearly.

Sir Frederick Hopkinson.—I do not understand this.

Mr. Billimoria.—Six rupees at 10 lakhs makes 60 lakhs.

Sir Frederick Hopkinson.—It is per brass—it is something under 2 rupees a cubic yard?

A.—Yes.

Mr. Billimoria.—When Sir George Buchanan drew up this report, he himself, at page 9, refers to what you yourself stated, that in 1919 prices had greatly enhanced. The actual words are that you made an offer on behalf of your firm to reclaim a gross area of 350 acres, but at greatly enhanced rates. That is paragraph 27 (*b*).

A.—Quite so.

Q.—So he had before him this very fact while he was writing this report, that prices had greatly enhanced?

A.—Surely.

Q.—Can you, as an engineer of experience, explain how in view of that opinion, when a person is writing a report he could take a figure far less than what is stated there?

A.—I have always been amazed at the simple fact that Sir George Buchanan's original estimate after the war was a lesser figure, or an approximate figure to mine made in 1912. That has always been an incredible fact to me.

Sir Frederick Hopkinson.—Not less than yours; it was slightly more.

A.—Slightly more.

Chairman.—It was 325 lakhs to 367 lakhs.

A.—The difference is immaterial to my remark.

Mr. Billimoria.—In arriving at the figure of 367 lakhs Sir George Buchanan deducts, or takes credit for, 10 lakhs of rupees in respect of plant; whereas in your estimate, which, I take it, was much more conservative and safe, you made no allowance in respect of any such reduction for plant?

A.—The plant was entirely charged in the estimates.

Q.—That means you expected the plant would have depreciated by the time the work would have been completed, and would be entirely without any value?

A.—It would have no value.

Q.—So, deducting 10 lakhs for the value of the plant would also paint a more rosy picture of the situation?

A.—I think so.

Sir Frederick Hopkinson. The value of the plant was so problematical as to be not worth considering.

A.—You could not think seriously of the chances of a sale.

Mr. Billimoria.—If any engineer was submitting an estimate which was to be on the safe side he would not make deductions of such large amounts from the estimate in respect of any figure which is only hypothetical or problematical.

A.—I think so.

Q.—Your rate of 9 annas 3 pies in 1912 includes the cost of the plant?

A.—It does.

Q.—So that if the plant were to cost three times as much the rate would advance proportionately?

A.—Certainly.

Q.—In spite of the definite fact that the value of the plant had increased considerably against your estimate of 41 lakhs on Sir George Buchanan's own figure of 61 lakhs it was not possible to estimate at 8 annas for pump filling?

A.—No; it is an absurd price, in my opinion.

Q.—Even assuming it at 61 lakhs it was not possible because the value of your plant which you have given us is £272,625 plus £15,000 = £287,625?

A.—Yes.

Q.—Which, taken at 15 rupees to the £, works out at 41 lakhs—61 lakhs is taken on the basis of 12 rupees to the £?

A.—Yes.

Q.—Therefore, the rate of 8 annas is hopelessly out of the mark?

A.—It is inadequate.

Q.—Will you turn to page 14 of Sir George Buchanan's report. In paragraph 43 he says: " The Back Bay reclamation scheme is a straightforward project without any of the difficulties that attended the Rangoon scheme." It was pointed out to you by Sir Frederick Hopkinson that he talked about the difficulties of the Port Trust on page 6 of the same report at the fifth line from the bottom of the page: " The difficulties which have arisen with the Port Trust dredgers serve as a warning on this point." Could you reconcile those two statements?

A.—I do not quite see the connection. I do not take the point in your mind, I am afraid.

Q.—It is a straightforward project without any of the difficulties.

A.—Yes.

Q.—He says at page 6 that the difficulties that the dredger had to meet with serve as a warning. If you want to leave that conclusion to the Committee, I have no objection

A.—I think it is more a question for them. My personal opinion on these points is of no value to the Committee.

Q.—Could you say that an estimate has been prepared with due care and consideration if within a short time thereafter the figures of cost should run into double the figure of the estimate? Is that possible if the conditions have remained just the same?

A.—It is a very bad estimate, of course.

Q.—If any individual corporation or Government were induced to launch into a scheme on the basis of that estimate would you consider that that body was let down?

A.—Evidently.

Chairman.—We are very much obliged to you for your evidence.

A.—If I can assist the Commitee any further at any time I am quite ready to do so.

Chairman.—Thank you very much.

(The Witness withdrew.)

SUPPLEMENTARY NOTE BY MR. W. KIDD.

18th October, 1926.

SIR,

ARISING out of my examination by the Committee on the 5th inst., I beg to draw attention to the question of the relative estimates of cost of dry moorum from the hills and mud and clay from the harbour for completing the filling of the reclamation.

Sir M. Visvesvaraya says " We have made enquiries and we find it possible to get moorum at 1 rupee 4 annas or less, " delivered to the site." And again, " If we get it for 1 rupee 4 annas, the cost will be 350 lakhs for 28 million cubic yards."

Answering Sir Frederick Hopkinson I state that " my cost (for filling) in 1919 would have been 27 annas 9 pies." I should have added, " including the capital cost of plant, staff and general expenses."

Lest it should be inferred from my answer as it stands that this rate for harbour dredging represents my present estimate, I have to point out that my present rate for dredged filling is *not more than* 12 *annas per cubic yard*, assuming that the present cost of operating the dredging plant will be about double that of 1912 and allowing for the capital cost of altering the plant so as to render it of the same efficiency as I provided for in 1912 estimate.

The relative cost of completion by the two materials will therefore be :—

(*a*) By dry moorum from hills :

28,000,000 cubic yards at Rs. 1.4.0	= 350 lakhs.
(*b*) By pump-filling from harbour :	
Dredged filling, 26,000,000 at annas 12	= 195 ,,
Dry moorum, 2,000,000 at Rs.1.4.0	= 25 ,,
Total	220 ,,
Difference in favour of pump filling	130 ,,
or at exchange 1*s.* 6*d.* per rupee	£975,000

I would further submit to the Committee that there is no greater certainty as to the cost of moorum filling than that of harbour dredging. The uncertainty as to the cost of so large a quantity as 28,000,000 cubic yards of dry moorum filling arises from the fact stated in the course of my evidence : " As you are probably aware, you may have moorum in all degrees of hardness, from quite loose earth up to very hard rock. It is all a question of the amount of its decomposition and of how near the surface it may be." That remark is specially forcible when 28,000,000 cubic yards is the quantity in contemplation.

I would like to emphasise my remark : " Lest I be thought to agree that the substitution of moorum filling for pump dredging is a sound way, that everything depends on the efficiency of your dredging machine. I still say that I am perfectly convinced that the reclamation can be filled up more cheaply to-day by means of an efficient dredging-machine properly worked than it can be by any other method, and nothing has happened to persuade me that this is not so."

I have estimated 12 annas as an outside price. If the Committee will give me the ratio of cost of coal, stores and crew's wages, 1912 to present time, and also lend me the machinery plans of the dredger, I will prepare a closer figure.

49th Witness, Mr. T. McMurray, representing the Firm of Wm. Simons & Co., Ltd., Renfrew.

WRITTEN STATEMENT OF MESSRS. SIMONS & CO.

Questions 17, 18, 19 and 20 of the questionnaire appear to be the only items relating our work and we submit the following replies :—

Q. 17.—Were the specifications and designs of Sir George Buchanan for the dredger " Sir George Lloyd " (hereinafter called the dredger) and the " Colaba " fit and proper for the intended work?

A.—The answer is yes if the reference is to the Specification and Design to which the dredger was built and the work referred to therein.

Q. 18.—Did the makers guarantee that the dredger would discharge 2,000 cubic yards of soft clay per hour through a floating pipe line to a distance of 5,000 feet?

A.—The answer is no. For us to give a guarantee of output on a contract such as that, we would require a guarantee as to the nature of the materials to be dredged and complete freedom of control during the guarantee.

We would say, however, that there is no possibility of the dredger failing to give the output named when working in soft clay under any reasonable conditions of operating.

Q. 19.—Did the dredger before delivery under proper test conditions in fact give the guaranteed output?

A.—The dredger was tested on the Clyde in soft clay and excavated at a rate about 75 per cent. in excess of that specified, and her pumping power was found to be well in excess of that required to meet the requirements of the specification.

Q. 20.—Was the dredger, when delivered, in all respects in accordance with the contract?

Was also the " Colaba," when delivered, in accordance with the contract?

If not, in what respect or respects did one or other or both fail to conform thereto?

A.—The answer to both questions is " Yes "

ORAL EVIDENCE.

Chairman.—What is your Christian name?

A —Thomas.

Q.—You are Director of Messrs. William Simons & Company?

A.—Yes.

Q.—You have given us a very short statement in which you have dealt with the answers to Questions 17, 18, 19 and 20?

A.—Yes, it is very short.

Q.—Question 17 is : " Were the specifications and designs of Sir George Buchanan for the dredger ' Sir George Lloyd ' and the ' Colaba ' fit and proper for the intended work? " Have you got the questions?

A.—I believe I have, but I remember the questions perfectly well.

Q.—You say the answer is : " Yes, if the reference is to the specifications and designs to which the dredgers were built and the work referred to therein "?

A.—That is so.

Q.—I do not know that I quite understand that answer. The question, if you will turn to it, asks whether the specifications and designs of Sir George Buchanan, whether for the dredger " Sir George Lloyd " or the " Colaba," were fit and proper for the intended work?

A.—We never saw any specifications and designs from Sir George Buchanan. We do not know what they mean by them, and, therefore, I have made that answer. The only thing that we saw that came from anybody else than ourselves were the specifications and designs that came from the Director-General of Stores, India Office.

Q.—The intended work, as you know, was to dredge if necessary to a depth of 70 feet below water level and to discharge 2,000 cubic yards of soft clay per hour through a floating pipe-line of 5,000 feet?

A.—Quite so.

Q.—I rather question whether your firm could answer Question 17?

A.—We could not. We did not know. As I say, we never saw any specification.

Q.—Coming to Question 18 we get quite a different state of affairs. " Did the makers guarantee that the dredger would discharge 2,000 cubic yards of soft clay per hour through a floating pipe-line to a distance of 5,000 feet." You say : " The answer is ' No ' "?

A.—That is so. We never gave any guarantee that the vessel would ever do anything of the kind in Bombay.

Q.—I am not asking you about " in Bombay." The question does not say anything about Bombay. Look at the question?

A.—Yes, I see the question perfectly. We never gave any guarantee to do anything of the kind, neither at Bombay nor anywhere else.

Q.—Did you guarantee her to do anything?

A.—No, we did not guarantee her to do anything.

Q.—What did you guarantee her to do?

A.—The only guarantee that we had there was the guarantee against faulty workmanship and material. We built the dredger to certain designs and specifications which gave complete dimensions for engines, boilers, ship and everything else.

Q.—But surely the specification started by saying : " The dredger is to be capable under ordinary working conditions of excavating 2,000 cubic yards per hour of soft clay from depths up to 70 feet below water level and deliver the spoil through a floating steel pipe of 5,000 feet long "?

A.—The specification says so, and the dredger can do it.

Q.—That is not my question. My question is : Did not the makers guarantee that the dredger would do that work described as I have read it?

A.—That was my answer in the first instance, that we did not guarantee it. We did not give any guarantee whatever with regard to output. That is a plain fact. It is not a matter of opinion.

Q.—Did you not undertake this contract on the basis that you were going to turn out a dredger to be capable under ordinary working conditions of doing this—there is the general description, look at it?

A.—I have seen it. I know that perfectly well.

Q.—Then just answer the question. Was not that the basis upon which you undertook the contract?

A.—No.

Q.—Is it your case that it would not matter the least to you whether the dredger could turn out 500 cubic yards or 1,000 cubic yards or no cubic yards?

A.—No, it is nothing of the kind. The vessel was tried here on the Clyde to the satisfaction of the India Office people to say whether or not she was according to the specification.

Q.—Was not the specification for a dredger to be capable under ordinary working conditions of excavating 2,000 cubic yards per hour?

A.—Yes, and she did more than that on the Clyde. She did 75 per cent. more than that.

Q.—Then turning back to Question 18 is not your answer " Yes " instead of " No," that the makers did guarantee it?

A.—No, we never gave any guarantee.

Q.—Is that your view of it? Are you serious about this? You are not playing with us over it?

A.—No, I am as serious as anybody can be.

Q.—I hope you are.

A.—I am much more serious than anybody else probably in connection with the thing.

Q.—I have pointed out to you the general description and asked you whether the answer to Question 18 should not be " Yes," and you say the answer should be " No "?

A.—That is so. We gave no guarantee, either written or any other kind of guarantee.

Q.—I do not know whether you are quarrelling over a particular word. Did you undertake that you would deliver a dredger which under ordinary working conditions shcuild be capable of excavating 2,000 cubic yards per hour of soft clay?

A.—We put forward, in the first instance, proposals showing vessels which we believed would be capable of doing that work. We did so in the first instance. When the thing was first discussed we put this forward and we believe that the vessel will do 2,000 yards of soft clay per hour through 5,000 feet of floating pipe-line. We are still of that opinion.

Q.—That is not my question. My question is: Did you undertake to deliver a dredger to be capable under ordinary working conditions of excavating 2,000 cubic yards per hour of soft clay?

A.—We did according to the specification.

Q.—Did you undertake to deliver a dredger capable of these details which I have read. Answer yes or no first of all.

A.—I am sorry, but I do not quite grasp the point of your question.

Q.—I cannot make it clearer, but I can repeat it. Did you undertake to deliver a dredger capable under ordinary working conditions of excavating 2,000 cubic yards per hour of soft clay?

A.—We undertook to deliver a vessel according to a specification and designs set before us which we believed was quite sufficient to enable that vessel to do that output you have indicated.

Q.—Surely the answer must be yes when a specification is sent to you and you are told that the dredger is to be capable of doing that. Do read the question. You say you know it, but do read it. Look at the specification. (*Document handed to the Witness.*) There is the document under your own signature. If you turn to the end of the document you will see there is your own signature.

A.—I have read it and know it perfectly well.

Q.—Have not you pledged yourself there that the dredger is to be capable under working conditions of dredging 2,000 cubic yards of soft clay per hour?

A.—It comes to this, as far as I can see, that in the first instance we are speaking of the word " guarantee." In my mind we have no guarantee written in which we write out that we will guarantee to do so and so. That is Question 18. That is why the answer comes to that.

Q.—Did you promise that they should have a dredger that would under ordinary working conditions do these things?

A.—We contracted to build a dredger according to the specification.

Q.—Then did you contract to build a dredger capable under ordinary working conditions of dredging 2,000 cubic yards of soft clay per hour to a depth of 70 feet? Did you contract to do it?

A.—We contracted to build this dredger according to the designs and specifications and dimensions that are here. This vessel was to be tested on the Clyde, and that was the end of it so far as we are concerned.

Q.—Then I will not ask you any further question on that.

A.—I am sorry that I cannot quite see that point, but my point is that we have no definite guarantee for this.

Q.—I think you are definitely fencing with the matter, and are not answering the question honestly and openly. That is what I think.

A.—Well, if that is so I had better leave this table. There is no good in my sitting here if you think that.

Q.—There is your own specification under your own signature, and I ask you if you did not promise, and did not undertake, or did not contract—we will leave out the word "guarantee"—to deliver a dredger capable of delivering 2,000 yards?

A.—We have this contract to do this vessel according to certain designs. We have no written guarantee that we will go to Bombay to do it.

Q.—I have said nothing about Bombay, and I have definitely omitted the word "guarantee" because you are shying at the word "guarantee." I ask you to look at that document once again—I shall not repeat my question—and ask you whether you did not promise or undertake or contract—use either of the three words you like—to deliver a dredger capable of dredging 2,000 cubic yards per hour of soft clay, and deliver it through a pipe line of 5,000 feet?

A.—I think I see your point.

Q.—I hope you do.

A.—I may be rather slow about it, but we have accepted this specification, which says that the dredger shall be capable of doing that, and we agreed to do that. We have accepted it.

Q.—Then the answer to question 18 is yes, and is not no?

A.—No; we gave no guarantee, not in my interpretation of the word "guarantee."

Q.—Then we come to question 19: "Did the dredger before delivery under proper test conditions, in fact, give the guaranteed output?" If you did not guarantee something what was the object of the trials on the Clyde?

A.—The object of trials on the Clyde was for the India Office representatives to satisfy themselves that the dredgers were capable of delivering all that was specified.

Q.—That the dredger was in accordance with the contract?

A.—In accordance with the contract and specification—that is so.

Q.—One term of the contract, for instance, was that she should do eight knots?

A.—That is so.

Q.—Another term of the contract is that she shall have sufficient pumping power to pump the reclaimed material through 5,000 feet length of pipe?

A.—Yes; the whole thing is for that purpose.

Q.—Another term of the contract was that she should be able to dredge soft clay at the rate of 2,000 cubic yards an hour?

A.—That is so. That is what I have stated here—that it is capable of doing that.

Q.—Then the answer to question 18 must be yes and cannot be no. About the trials on the Clyde, we have been told that it is impracticable to put a 5,000 feet pipe line on the Clyde.

A.—I beg your pardon.

Sir Frederick Hopkinson.—We do not accept that.

Chairman.—We have been told that it is impracticable to put 5,000 feet of pipe line on the Clyde.

A.—It is not impossible.

Q.—Impracticable.

A.—I think it is impracticable, but it is not impossible.

Q.—It is not impossible?

A.—No; it is not impossible.

Q.—Were you present at these trials?

A.—No; I am sorry I was not.

Q.—In fact, as you know, the "Sir George Lloyd" pumped through a pipe line that merely passed behind her stern?

A.—Yes; it was only the length of the ship.

Q.—Whether her pumping capacity was sufficient to deliver 2,000 cubic yards to a distance of 5,000 feet depended on some mathematical calculations?

A.—I do not know anything about mathematical calculations. I take it you mean that the people who were testing the vessel satisfied themselves by that means.

Q.—What they did was they calculated a certain water pressure?
A.—Yes; equivalent to what they thought was the proper head.

Sir Frederick Hopkinson.—They assumed something?

Chairman.—They assumed a certain required power to pump 5,000 feet?
A.—I believe they did.

Q.—And then they made an experiment with regard to water pressure?
A.—I believe they did. I believe that is what happened.

Q.—Is the " Sir George Lloyd " the biggest machine you have ever built as a dredger?
A.—No; I do not think she is the biggest machine we have built as a dredger.

Q.—Up to 1919?
A.—I think, on the whole, she is the most powerful pump plant perhaps, though we have had one with 51 inches discharge pipe instead of 42 inches.

Q.—Would that be before 1919?
A.—Yes.

Q.—Are you able to say whether or no the " Sir George Lloyd " ever got the contract speed on her trials?
A.—I believe she got over the contract speed on her trials—you mean steam, propelling?

Q.—Propelling.
A.—I believe she did.

Q.—If you look at the figures you will find she did not, but she got over eight knots after they had sheathed in her bows.
A.—That is the time I am thinking of; not when she was steaming with an open bow. They changed the propellers, I believe, or something like that. You see, the question of speed was a matter of no importance. The propelling engines were only put in to sail the vessel out to India, and for no other purpose.

Q.—But the propelling engines would be wanted during her work from day to day?
A.—Very little. They might well have been left out as far as that was concerned. They would have been left out except for the bald fact that it was cheaper to put them in and steam her out than have them erected out there.

Q.—Do you really say as regards the " Sir George Lloyd "—I am now distinguishing between the " Sir George Lloyd " and the " Colaba "—that it was not essential that she should have propelling engines?
A.—Nothing of the kind. It never was. It is not now.

Q.—How would you keep the " Sir George Lloyd " up to the face that you were excavating if you had the wind and tide against you?
A.—Well, we should never use propelling engines, not on this earth. She is held up by steel wire ropes.

Q.—You do not use engines to hold her up?
A.—No.

Q.—Then she is moored as she approaches her work?
A.—Yes; she approaches entirely with wire rope. They haul her up backwards or forwards or sideways, or anyhow they want to.

Q.—When she is quite completely secured does she use her propelling engines then?
A.—No; she never uses them from the time she goes on to the spot till the time she comes off at the end of the season.

Q.—Do you remember that your firm built the " Kalu " and the " Jinga "?
A.—They did.

Q.—Were they taken out to Bombay by your firm?
A.—They were. They were sent out by us.

Q.—And tested on the spot?
A.—They were. We guaranteed to do certain work with them on the spot. That is my distinction about guarantee. With the " Jinga " and the " Kalu " we guaranteed to set those boats to work and to run them for a little time till everybody could see how the thing worked and get it in working order and to do also certain guaranteed tests—to deliver certain quantities of material which was soft clay. As a matter of fact in the first instance we had it hammered into us that it was mainly mud and very little clay about it, but when we did come to work we found that we were dealing with all kinds of stuff there in certain places. But we sent the boats out there. Our contract was to deliver them in working order and work them for a certain number of working hours.

Sir Frederick Hopkinson.—Hours or weeks?

A.—I forget for how many it was.

Q.—Was it hours, weeks or months?

A.—It was hours as stated, but it ran into about three months working or something like that

Chairman.—Before you handed over?

A.—Before we handed over. We had to do a certain number of hours per day—pump an actual number of hours per day. That is the contract we had in Bombay. It was an entirely different thing from this contract which was purely construction.

Q.—The distinction that you draw is that the specification of the " Sir George Lloyd " merely gave you a description of what was desired and that the vessel was to be passed by trials in the Clyde?

A.—Absolutely.

Q.—You never contracted that she would do anything in Bombay, in the harbour?

A.—No, not in this world.

Q.—We appreciate that. The question whether that was a prudent contract to invite you to enter into is not a matter for you?

A.—No, that is a matter for anybody else I suppose. Everybody in this world would have their own opinion about it.

Q.—I suppose I am right in thinking that your firm had never been paid £450,000 for a dredger before?

A.—I would not say that we had never had a contract extending to that figure. I would not say that.

Q.—Had you ever had a contract which amounted for a dredger, a booster and the pipe-line, to £650,000?

A.—We have had a contract for a dredger that was nearly twice the price of the " Sir George Lloyd."

Sir Frederick Hopkinson.—£500,000?

A.—Over £400,000.

Chairman.—Taking the plant as a whole, the " Sir George Lloyd," the " Colaba " and the pipe-line came to about £650,000?

A.—Yes, something like that.

Q.—That is accurate, is not it?

A.—That is the whole lot put together.

Q.—That was a pretty big contract?

A.—They were bought at an expensive time.

Q.—I am not complaining at all. Would it not in your opinion have been a prudent thing for the people who were buying this plant to invite you to give a price for bringing the plant out to Bombay and running it for three months?

A.—Well I tell you quite frankly Sir George Buchanan did his utmost to get an undertaking to guarantee in Bombay and we absolutely refused to do anything of the kind.

Q.—You say Sir George Buchanan did wish you to enter into a contract to deliver on site and work for a time on site and you refused to do it?

A.—Yes. He wanted what I would call a proper guarantee to do her work on the site in Bombay.

Q.—The same as the " Kalu " and the " Jinga " contract?

A.—Yes, I suppose that was his idea. He wanted us to guarantee this dredger would do so much work on that site.

Q.—Why did you refuse?

A.—Well, there were several reasons in connection with that, and at the moment I do not recollect the whole of them. I think one of them was that we knew from the work that we had done at Sewri with the " Jinga " and " Kalu " that there was this possibility, although we were contracting to do soft clay we might be in the position of having to do stiff clay, very stiff clay, hard clay, moorum and all that sort of thing.

Q.—But the specification had said soft clay had it not?

A.—That is so.

Q.—If you were being invited to cut stiff clay, hard clay or moorum, you would have objected to that as not within the contract?

A.—We should, and then there would be a dispute and a struggle as to who was right and what are you going to do with it.

Q.—Did you know that the " Kalu " and " Jinga " had failed to give their output, the one by 30 per cent. and the other by over 50 per cent. in four years' working?

A.—Well, I do not know that that is a correct way of putting the question if I may say so. What actually happened was that the one boat on her average working instead of doing 2,000 yards an hour for five years or something like that, worked out at about 1,500; the best of the boats is only about 1,500.

Q.—1,426?

A.—Well, I am not disputing that it is 1,400.

Q.—That is the "Jinga"?

A.—I am not disputing it. I am only taking the Port Trust's figures as given to me by the engineer who is responsible. The other one I think only did 1,100.

Sir Frederick Hopkinson.—905?

A.—It may be 905. I do not mind whether it is 900, 1,000 or 1,100. It does not really matter. The point is that after five years—at least I take it that that is your point—that it did so much less than 2,000.

Chairman.—Not after five years?

A.—Yes, after five years.

Q.—The point is that whereas the contract stipulated that the "Kalu" and the "Jinga" should each of them be capable of dredging 2,000 cubic yards an hour, in fact when you take the average of the pumping hours right over the four years you get the "Jinga" doing 1,426, which is 30 per cent. below her guarantee, and you get the "Kalu" doing 903, which is more than 50 per cent. below her guarantee?

A.—Yes. Well, we did not guarantee the dredgers to do any capacity over five years' working. We guaranteed to do it for a certain time and we did 2,750 yards an hour on the trial.

Q.—Did not you guarantee that the "Jinga" and the "Kalu" should do 2,000 cubic yards an hour under ordinary working conditions?

A.—Yes, and the "Jinga" under ordinary working conditions did 2,750 yards an hour spread over something like three weeks' work I think it was.

Q.—Can you understand how over a period of four years they got these poor results. They got 30 per cent. less in the one case and more than 50 per cent. less in the other case?

A.—It is quite clear how it happened.

Q.—Why?

A.—They had lots of things to contend with. One boat had very much more difficult material to contend with than the other, and also I always felt myself that the human element had a very great deal to do with it.

Q.—Do not ordinary working conditions cover the human element. Ordinary working conditions does not include supermen?

A.—No.

Q.—Ordinary working conditions means the ordinary working conditions of wind, weather, tide and men?

A.—Well, yes, that may be so to a certain extent, but you get conditions arise when you have disgruntled men and they cause a lot of trouble in other circumstances of life, and they do in dredging.

Q.—What evidence have you got that either the crew of the "Kalu" or of the "Jinga" were disgruntled?

A.—Well, they told me themselves that they did want to get something more in the way of money than they were getting and they were very keen on having a bonus system, and I was rather keen myself that they should have it. I think all this dredging work ought to be paid on a system whereby if the men do more work they get more money. That is the system on which they ought to work but unfortunately the people at Bombay had no experience of that. They did not care much for it and they only went to the extent of paying them a bonus on the number of hours they worked, which to my humble opinion was no reasonable way of working it at all really.

Q.—Did you leave Bombay within three months or within six months of the delivery of these vessels?

A.—I think I landed in November and the pipe-line was not quite ready. These things never seem to be ready. The dredger is always ready first. But we got the pipe-line ready and I was there until some time, I think, in May or June—from November to May or June.

Q.—That would be in 1910?

A.—That was 1909, I think.

Q.—You have no personal experience of the working of those dredgers subsequent to May, 1909?

A.—Well, I could not exactly say that because I have been passing through Bombay at least two dozen times after that while they were working. I used to go and

see Mr. Messent and the engineers in charge and hear what they had got to say; I often went to hear and see them. We had a considerable amount of trouble with the pumps in one of them on account of dealing with a lot of stones and breaking a shaft and one thing and another. I often went and saw them and they told me how they were getting on and that sort of thing. I have never known them complain about anything so far as that point is concerned, except the particular items at the moment—any little things that were giving trouble at the time, mechanical details or things like that.

Q.—Whether they complained or not we have the solid fact of their official figures which are the ones I have given you.

A.—I accept that.

Q.—Do you consider that the output of the "Kalu" and the "Jinga" were satisfactory?

A.—I never considered them satisfactory; I am one of the dissatisfied people. I always think things should be better in the way of working than they are.

Q.—What about the "Sir George Lloyd"?

A.—I think the whole thing is rather unsatisfactory.

Q.—That is all—only "rather unsatisfactory." Have you seen the figures of the "Sir George Lloyd"?

A.—I do not know that I have seen very much about it except the figures that we have had for the first year that the "Sir George Lloyd" was working.

Q.—This is what your dredger the "Sir George Lloyd" did. In 1923-24 it worked for 843 hours, and the amount of material that it dredged per pumping hour was 1,020 yards. Does that strike you as a good result for a perfectly new dredger of the power and cost of the "Sir George Lloyd"?

A.—It is absolutely impossible for any human being to answer that question unless they know what the dredger was doing in the way of material. What was she dredging? Do you know? Can you tell me that?

Q.—Let us follow that out. You say that it is impossible to answer the question whether the dredger was performing satisfactorily until one knows the type of material she was working on?

A.—That is the point.

Q.—We have been told that the "Sir George Lloyd" was working in material which might have consisted of 10, 12, or 15 feet of mud, and below that 10, 12, up to 30 feet of blue clay.

A.—Did they give any idea of the consistency of the blue clay?

Q.—Mr. Kidd spoke of it as being stiff and unctuous.

A.—Did Mr. Kidd see the clay that the dredger was dealing with?

Q.—Mr. Kidd took borings in 1912.

A.—So I understand; but did he see the clay that the dredger was dealing with?

Q.—No.

A.—We jump back to the questions of borings. That is not what the dredger was doing. That is what I mean.

Q.—This is the position. Take map 308.

A.—That is the one about the 1,300 borings.

Q.—There are 1,159 recorded borings there.

A.—Yes.

Q.—They give three sets of figures in each little circle.

A.—Yes.

Q.—The first is mud, the second is blue clay, and the third is moorum. You see the rock 70 feet down?

A.—Yes.

Q.—Sir George Buchanan, when he made his report and when the specification was drafted, made no independent survey at all, and took no borings whatever. He trusted entirely to Mr. Kidd's surveys of 1912. Mr. Kidd has been here to-day, and he has told that there was a layer invariably of mud which might vary between 6, 10 to 12 or 14 feet. Then below that older deposit of blue clay which he described as stiff and unctuous.

A.—Yes.

Q.—He said that the "Jinga" was enabled to cut that clay when she was doing the Sewri reclamation, and got a better result than when she was dredging in mud.

A.—I do not agree with him at all as far as that last point is concerned, and I think I know a great deal more about it than Mr. Kidd does.

Sir Frederick Hopkinson.—Mr. Kidd's figures are the official figures. She was cutting mud first, and then she gradually improved as she got down into the clay.

Chairman.—We can see from the figures exactly what she did.

A.—I suppose I may take it that having been working with these dredgers for three months, I do know some little thing about them?

Q.—We want your help.

A.—I know the material you were handling.

Sir Frederick Hopkinson.—You knew that before you built the dredger?

A.—Yes; we did, to a certain extent. The only point is that we met a lot of things that you did not expect to find, don't you know. We used to pump through these big boulders of quarried rock, some of them weighing over four hundredweight, which passed through that pump leaving the periphery of that runner at an average of over 4,000 feet a minute.

Q.—Is that in Bombay?

A.—In the "Jinga."

Q.—Four hundredweight stones?

A.—Yes.

Q.—How long did your pump last after doing that?

A.—I have told you already we had broken five shafts in the course of the five years.

Q.—Would not it break the impeller, the pump, not the shaft?

A.—No; it did not. I have some smaller stones in the office. They did not weigh more than 100 lbs., but they are big ones. I had an investigation and the engineer who was responsible for the thing saw the stones.

Q.—Is that the "Jinga" and the "Kalu"?

A.—Yes—stones that weighed over 400 lbs.

Chairman.—Is this in the harbour?

A.—That is in Sewri.

Q.—Mr. Kidd says that as result of a conversation he had with Mr. Messent, he persuaded Mr. Messent to put the "Jinga" on the blue clay, and when she started on the blue clay she gave much better results than when she was dredging mud alone. He pointed to those figures which I have marked in green as showing the better output when the "Jinga" was working on the blue clay. What do you say about that?

A.—I cannot accept anything of the kind—nothing of the kind. The point is this. As far as I can understand, the Sewri reclamation was always rather a sore point with Mr. Kidd because he wanted to get the contract. As a matter of fact, Mr. Messent was perfectly frank with me, and Mr. Messent told me before the contract was placed that he did want Mr. Kidd to get it. He told me so, and he invited me to go and see Mr. Kidd to see if we could not supply the plant to him. I did go and see Mr. Kidd, but Mr. Kidd was like many other people at that time—he said that the only place in this world where he would buy the plant would be America.

Q.—On page 15 of the statement he has given us he says: "I had in the Spring of 1912 the opportunity of seeing dredging of the blue clay by the cutter pumping dredger possible on a practical scale in Bombay Harbour." That is a reference to the "Jinga"?

A.—Yes.

Q.—"The Sewri reclamation was then in progress, and following a discussion with the chief engineer of the Bombay Port Trust"—that is Mr. Messent—"the dredger 'Jinga,' which had naturally then been confined to dredging soft mud overlying the blue clay, was then put on to the blue clay itself. The data of the results subsequently supplied to me by the chief engineer are not sufficiently precise to yield the exact relative figures of output as between blue clay and mud; but they show that in the period which included the operations in blue clay there was an increase of 19 per cent. over those for the total period in which the operations were wholly in mud. The material dredged, no doubt, included a small proportion of mud, inasmuch as the clay cannot in practice be dredged without the adjacent overlying mud being included." What do you say as to the ability of the "Jinga" to cut the blue clay which existed in the neighbourhood of the Sewri reclamation?

A.—Well, we cut all the clay that was there right down to the rock. We went through the mud, we went through the silt, we went through the soft clay, we went through the stiff clay, we went through the yellow clay to the moorum right down to the rock.

Q.—If you did that with the "Jinga," what was your objection to doing the same thing with the "Sir George Lloyd," which was more powerful?

A.—Well, we were asked to do this at a time when there were very high prices going for everything, and there were people coming along every day wanting to pick a berth in our yard to build a ship in. To go out there and take on a very responsible

contract to do this dredging out there—well, we really did not think we ought to do it. Besides, we thought that that was a job really for a contractor. We are only poor dredger builders. We are not wealthy contractors who can go and take a scheme for a million of money and do what they like with it. We are dredger builders.

Q.—Your point of view was at that particular time that it was not good enough business for you to take a contract with the bargain that you should take out a boat to Bombay and work her for three months?

A.—No; we did not think that was quite good enough because there might be all kinds of things arising.

Q.—I understand your answer.

A.—We poor dredger builders, as a matter of fact, do not want to be contractors. We have had a very well-known engineer invite us to build more than half a million's worth of plant in this country, to run it for 12 months, to be responsible for paying the wages of the crew, the coal and everything, and guarantee that we would not do less than so many hundred cubic yards an hour for 12 months' work. In my opinion, it was an absolutely absurd thing to ask any dredger builder to do. We are to go 5,000 or 6,000 miles away, don't you know, and set up this work and run it there on a guarantee. How could we guarantee unless we knew exactly what was in the harbour? We did not know. It is true we had been told about these borings and that sort of thing, but we did not know. We could not guarantee anything.

Q.—Is there anything in writing between your firm and Sir George Buchanan about the proposal that you should take the vessel out to Bombay and test her yourselves there?

A.—No; there is not.

Q.—Nothing?

A.—I do not know of anything. There is nothing. I think I am right in saying that; but he did ask us to do it.

Q.—I think we are agreed now that in the limited form of Question 18, if we leave out the word "guarantee" the answer is yes. You quarrel with the word "guarantee"?

A.—Yes; we want to keep that word out. You see my point. "Guarantee" in our mind is a guarantee that we going to do a thing, don't you know.

Q.—I do not attach any importance to the word "guarantee," but the rest of your answers and my questions have cleared it up.

(*Adjourned.*)

The Committee Assembled at 11 a.m. on the 6th October, 1926, in Committee Room "A" in the House of Lords, all Members being present.

49th Witness, Mr. Thomas McMurray, Director of Messrs. William Simons & Co., Ltd.

(EXAMINATION CONTINUED.)

Chairman.—Do you remember when it was that Sir George Buchanan said he wanted the dredger to be tested at Bombay—about what month?

A.—It was when he first spoke about the dredger. He spoke about having some guarantee at Bombay, or something of that sort, when he first spoke about it.

Q.—Do you mean he put it as vaguely as that—that it was to be tested at Bombay, or something of that sort?

A.—No; I do not think that he put it as vaguely as that. He put it in writing, as a matter of fact. No; he did not put it in writing. He suggested that, and I demurred to having a test. That was it. When he first spoke about this dredger he spoke about the work it had got to do.

Q.—What are you reading from?

A.—I am not reading from anything.

Q.—What have you in your hand?

A.—I have in my hand the first letter we have from Sir George Buchanan. It is dated the 25th July, 1919.* I presume you have a copy of it.

Q.—We will come to that in a moment. The second paragraph of that fixes, if my recollection is right, that he had had an interview with you, and perhaps more than one interview?

A.—He had only one, I believe, at that time.

* See Appendix III.

Q.—Only one?
A.—Yes.

Q.—About how long before the 25th July would that interview be?
A.—I think, as far my recollection goes, it was only just a day or so.

Q.—A day or two before?
A.—Yes; I am not sure that it may not have been exactly the same day, don't you know.

Q.—So be it. Just tell us, as far as you can recollect it, the conversation that you had with him on this particular point that the dredger should be tested at Bombay.
A.—Well, he said he would like to get some tests at Bombay, and I suggested to him I was afraid we would rather demur to having any tests carried out in Bombay, or any guarantee in Bombay. I said: "However, you can discuss that." He proposed going down to Renfrew in order that he would be able to discuss it with all our people there, and all the staff, the heads of departments and the principals so as to go into the thing thoroughly, as he said. He wanted to discuss the thing thoroughly at Renfrew. He told me something (I do not remember the exact words) about a guarantee or tests at Bombay, and I told him that I thought they would demur at Renfrew about giving tests or guarantees at Bombay, and that they would want to be carrying out tests on the Clyde. That actually was what happened when he did go to Renfrew.

Q.—Then the matter was left at your interview, which was a day or two before or on the day of that letter, that he should further discuss the matter with your people at Renfrew?
A.—Yes.

Q.—That is it?
A.—That is it.

Q.—You are quite sure of that?
A.—Well, I am almost certain, as far as my recollection goes. I have nothing to guide me at the moment about it.

Q.—If that is so can you explain the phrase in Sir George Buchanan's letter that you have in your hand on the second page: "As in the case of the dredger 'Pelican' you built to my order, I shall be satisfied with a test in this country"?
A.—Yes. Well, I think that probably he gathered from what was said that there was very little chance of getting any tests in Bombay—any guarantee in Bombay. I think that is the reason.

Q.—That is your explanation?
A.—I think so.

Q.—That although he left your office a day or two before or on the day he wrote that letter saying that he would settle the matter with your people at Renfrew, on the 25th of July he is writing saying he will be satisfied with a test in this country?

Q.—Yes. It was not at my office. I was at his office, I believe; but it does not matter. It was then—at any rate, before he went to Renfrew to discuss the thing with them.

Q.—I suppose it is part of your duty to communicate with your people at Renfrew when clients are wanting dredgers and are having interviews with you?
A.—That is right.

Q.—I suppose you write to them almost daily?
A.—I write to them nearly every day, I think, when I am in town. I do not write to them some days, but nearly every day I write to them.

Q.—Did you report to them the interview that you had had with Sir George Buchanan?
A.—Yes; I am pretty certain that I must have reported that.

Q.—You must have?
A.—I must have reported that, but sometimes I might run up to Glasgow, and if I have an interview with somebody I do not sit down to write about it, but I go up and tell them about it.

Q.—This interview with Sir George Buchanan foreshadowed the possibility that you might have work amounting to nearly £1.000,000?
A.—Well, there was no estimate then. We made it afterwards.

Q.—Sir George Buchanan was discussing with you the likelihood of your being given a very considerable amount of work?
A.—Yes; we afterwards had in our minds that we would be in competition with other people.

Q.—Never mind about that. That is not my point. My point is that therefore must you not have reported to your people at Renfrew exactly what Sir George Buchanan said to you when you called at his office?

A.—I certainly must have told our people at Renfrew what Sir George Buchanan was saying. I may not have told them everything because, as you see from his letter, he was going to thrash the matter out at Renfrew.

Q.—Have you any letter, any entry in any diary, any writing record at all of Sir George Buchanan's ever making the request to you that the dredger should be tested in Bombay?

A.—That is a question I could not answer offhand. I would have to look it up and try and find it out.

Q.—I suppose you keep your correspondence in order in your office?

A.—Yes.

Q.—There would be no difficulty in seeing whether in July of 1919 you reported your interview with Sir George Buchanan to your people at Renfrew?

A.—I do not think there would be any difficulty in finding out what I said to our people at Renfrew.

Q.—Do you keep a diary?

A.—Yes; I do. It is a small thing. It is only to make appointments.

Q.—I meant an office diary.

A.—No.

Q.—Do you make notes of your interviews, or do you rely on your recollection when you are reporting to the people at Renfrew?

A.—I make notes always when there is anything of importance, don't you know; but ordinary things I do not make notes of. I rely on my memory.

Q.—Do you make notes in any bound books or on slips of paper?

A.—I make notes the same as I made a note yesterday on the back of a sheet of the hour of this meeting. When I get to my office I transcribe or alter that note into a letter, or something of that sort, and send it to Renfrew.

Q.—The reason why I am pressing you a little about this matter is this. You are the first person who has ever indicated to us that Sir George Buchanan ever had in his mind a test at Bombay.

A.—Yes; he did. I know he did want that in the first instance.

Q.—Will you be good enough to go through the files of your correspondence and to write a letter to Mr. Ewbank, the Secretary, to tell him whether or not you have in your office any contemporary written record of that request?

A.—Yes; I will with pleasure.*

Q.—Thank you very much. Did Sir George Buchanan press very hard for a test at Bombay?

A.—Well, I do not know about pressing very hard, but he was told very definitely that he could not get it, in any case.

Q.—Who told him that?

A.—Mr. William Brown, our Chairman, told him at Renfrew.

Q.—Were you present?

A.—Yes; I was. There were six people present.

Q.—You were present at some interview subsequent to the letter of the 25th July?

A.—That is right.

Q.—That is the first we have heard about that. What date was that interview?

A.—Sir George Buchanan was at Renfrew, but the date is omitted here; but we can find that out. It is some time between the 25th July, 1919, and the 12th September, 1919, when we submitted a tender to Sir George Buchanan. It was almost immediately after the 25th July—probably the beginning of August, or something like that; but I will get you the exact date if you like.

Q.—That is near enough. You say there was an interview at which you were present?

A.—I was.

Q.—And Sir George Buchanan?

A.—Yes.

Q.—Who else?

A.—I think the late Colonel Walter Brown was there, and our Chairman, Mr. William Brown, and the whole of the staff—six or seven people were there.

Q.—I would like you to tell me their names as far as you can remember them?

A.—There was Mr. John Stephens, I think Mr. Macgregor was there—I am almost certain Mr. Macgregor was there—and I think Mr. Andrew Brown was there; I do not

* See Mr. McMurray's letter of October 9th, 1926. Appendix IV.

know whether Mr. John Brown was there or not; I think Mr. Gray, our Secretary, was there.

Q.—Did you forward the letter of the 25th July to your firm at Renfrew?

A.—Yes, they got that letter rightaway. They got it either by hand from me, or it was sent with an accompanying letter—one or the other.

Q.—Can you understand Sir George Buchanan re-opening, at what we will call the August interview, this question when on the 25th July he had written to you: "I shall be satisfied with the test in this country"?

A.—Yes. He has explained to Mr. Brown that he had discussed this with Mr. McMurray, and Mr. McMurray was against any trial in Bombay, or something of that sort was said, that he thought he would be against any trial. It would open in that way. I cannot say definitely that it did, but it seems to me that it is quite likely that it did. That was in 1919 we are speaking of.

Q.—A quarter of an hour ago you told me that he left your office in London saying that he would discuss the matter?

A.—The whole matter.

Q.—With the Renfrew people?

A.—Yes, and so he did.

Q.—Again I ask you can you understand his writing to you within 48 hours that he would be satisfied with a test in this country?

A.—I presume that he really wanted to get that, and when I said I was afraid we would not have anything to do with it, then he wrote this under the impression that he would not get anything more so far as that was concerned.

Q.—Did he at the interview at Renfrew make a definite request that the dredger should be tested at Bombay?

A.—Well, so far as my recollection goes I do not know the words he put it in, but I do know Mr. William Brown told him very definitely that he would not have anything to do with any guarantee or trials at Bombay.

Q.—Is Mr. William Brown available?

A.—I believe he is.

Q.—Where is he at the present moment?

A.—I think he is in Glasgow at the present moment. He has been trying to recruit his health round on the East Coast somewhere. He is an elderly man.

Q.—In the ordinary routine practice of the Renfrew office would somebody make a note of the interview. The Secretary was present, was he not?

A.—Yes.

Q.—Whilst the interview was going on the Secretary would note down the particulars, would he not?

A.—No, he did not.

Q.—After the interview had concluded would it be the duty of the Secretary to make a record of the interview?

A.—No.

Q.—It would not?

A.—No.

Q.—Have you ever seen in the records of the Renfrew office any statement in writing that Sir George Buchanan at that interview in August mentioned his desire that the dredger should be tested in Bombay?

A.—No.

Q.—The position was this, was it not? Your firm could have given two alternative figures. They could have said: "We will build the 'Sir George Lloyd' and the 'Colaba' and supply the requisite plant for £850,000, tests on the Clyde." That is one offer, is it not?

A.—Yes.

Q.—Or they could have said: "We will build the 'Sir George Lloyd' and the 'Colaba' and supply the necessary plant, tested at Bombay, for £900,000"?

A.—Quite so.

Q.—Did Sir George Buchanan ever ask for an alternative offer?

A.—No. I suppose the fact that he was told that we would not undertake a trial at Bombay prevented him from asking that.

Q.—Sir John Biles was giving evidence the other day, and he was being asked by the Committee whether there should not have been a test at Bombay?

A.—Yes.

Q.—If Sir George Buchanan had made the request is not it extraordinary that Sir John Biles did not appear to know anything about it?

A.—I do not know that I can say whether it is extraordinary or not, really.

Q.—Let us examine it a little. Sir John Biles was associated with Sir George Buchanan, and each was to share the half of 2 per cent. Did you know that?

A.—I have only known that now through it being told me the other day.

Q.—That was so?

A.—I was told about it, but I did not know.

Q.—Sir John Biles is the naval architect?

A.—Yes.

Q.—Sir John Biles and Sir George Buchanan, in collaboration possibly with some assistance from your firm, were to get out the designs of a dredger adequate to do this work?

A.—Yes.

Q.—One of the important matters for which they had to provide was a test of the dredger, was it not?

A.—I should say that they had a test of the dredger.

Q.—You are not following my question. One of the important matters that Sir John Biles and Sir George Buchanan would have to decide between themselves would be as to the tests which the dredger should undergo?

A.—That is quite right.

Q.—We are quite agreed about this matter, I think. A very important consideration would be whether the dredger was to be tested on the Clyde or whether the dredger was to be tested, as were the " Kalu " and the " Jinga," at Bombay?

A.—That they would determine in their own mind.

Q.—Undoubtedly. Now we come to the point. If there ever was such a conversation as you have put with regard to Sir George Buchanan asking for a test at Bombay, must not he in his conversations with Sir John Biles have told him about that matter?

A.—That is a thing I do not know anything about.

Q.—I am asking you as an ordinary reasonable man. Two men are sitting down to decide where £850,000 worth of plant shall be tested, and the question is the Clyde or Bombay. Is not it perfectly certain as a reasonable business proposition that Sir George Buchanan would have told Sir John Biles: " I tried to get a test at Bombay, and the Renfrew firm and Mr. McMurray turned it down "?

A.—You know as well as I do that I cannot be certain of anything they did. I do not know anything at all about what they said or did to each other.

Q.—I am not asking you what you knew. I am asking is not it as morally certain as anything can be that this question of a test in Bombay must have been discussed between Sir John Biles and Sir George Buchanan if what you are stating is the fact, that Sir George Buchanan wished to test the dredger in Bombay?

A.—I should think it is very likely that they spoke about it. I should think it is in that way, but I do not know whether they did or whether they did not.

Q.—I am not asking you if you know. This letter of the 25th July, from its first paragraph, is clearly the first letter that Sir George Buchanan wrote to your Renfrew people?

A.—Absolutely, about this. That is the beginning of this thing so far as we are concerned.

Q.—" I have been asked by the Government of Bombay to report on the proposed Back Bay Reclamation Scheme, and I shall be obliged if you will give me an estimate accompanied by plans for the dredging plant required. I have already had the advantage of discussing the matter with Mr. McMurray and I think we are in general agreement as to the type of plant necessary." This letter contains no indication whatever that Sir George Buchanan had ever made a request to you that the dredger should be tested in Bombay?

A.—None whatever, so far as I know.

Q.—If he was going, as you say, to discuss the matter with your firm at Renfrew, would not you have expected him in this letter to say that he had put the request before you that the dredger should be tested in Bombay and you had demurred to it?

A.—Well, I do not know that he would. I had not a very strong word in saying whether the firm would or would not. I had no final decision as to whether they would or would not.

Q.—Then the more open it was left for the decision of your Renfrew firm the less reason there is for Sir George Buchanan to say: " I should be satisfied with a test in this country "?

A.—Yes, on that line of argument it is.

Q.—It is quite right, is it not?
A.—Yes.

Q.—What I am putting to you broadly is that does it not strike one as improbable that he had ever made that request to you, when you consider the terms of this letter of the 25th July. You see the point?

A.—Yes, I see the point you are making now. I did not know what you were driving at before. As I explained in the first instance, I have tried to recollect to the best of my ability, and I feel pretty certain that he did say that, and I told him that we could not agree to such a thing. That is my humble belief at the present moment.

Q.—We know from other documents that the first interview that Sir John Biles the Naval Architect had with Sir George Buchanan was on the 16th April, 1920?
A.—Yes.

Q.—By this letter Sir George Buchanan, acting alone, had to a large extent bound himself to be satisfied with a test in this country, had he not?
A.—I did not quite catch the question.

Q.—By this letter of 25th July Sir George Buchanan, acting alone, not in conjunction with Sir John Biles, had told you that he would be satisfied with a test in this country?
A.—The evidence is there.

Q.—It is there?
A.—Yes.

Q.—I only want to emphasise it. Therefore it would have made the position more difficult for Sir John Biles if later he had said: "I will not be satisfied with anything except a test in Bombay"?
A.—Yes, I suppose it would.

Q.—Have you seen Sir George Buchanan in the past few weeks?
A.—Yes, I saw him in the street the other day.

Q.—Have you seen him to talk to?
A.—Yes, I have spoken to him in the street.

Q.—Have you talked to him about the evidence in this matter?
A.—Naturally he spoke about it, this and the newspaper reports of the thing, and one thing and another like that.

Q.—Apart from meeting him in the street, have you been to his office or has he been to your office about this Inquiry?
A.—I have not been to his office about this Inquiry.

Q.—Has he been to yours?
A.—He called one day when I was out.

Q.—Have you seen Mr. Halcrow?
A.—I have seen Mr. Halcrow several times about other work.

Q.—Did you give Sir George Buchanan some sort of general outline of the evidence you were prepared to give?
A.—None whatever. We found great difficulty in writing anything because we did not know in what way our evidence was wanted. There are all these documents. They are recording the actual facts and it seemed to be rather difficult to find out what might be of use to the Committee. That is the reason for the short answers.

Q.—The short answers are sufficient for our purpose. The only quarrel I had with you yesterday was your answer to Question 18?
A.—Yes.

Q.—You rather stuck at the word "guarantee"?
A.—Yes, I hope that is made clear now.

Q.—Now I point out to you that in that letter of 25th July Sir George Buchanan used that very word. Would you turn to it. "I shall be satisfied with a test in this country and your guarantee that the plant will do the work required." There is the word, is it not?
A.—That is so.

Q.—On the 12th September, 1919, your firm wrote a letter which was in answer to the one of the 25th July?
A.—That is right.

Q.—Will you turn to that part of the letter which suggests the terms of payment; the scheme of instalments. You see 20 per cent., 20 per cent., and so on?
A.—Yes.

Q.—"10 per cent. at the expiry of the three month's period of guarantee"?
A.—Yes. We had then a three months period of guarantee against defective workmanship and materials.

Q.—I follow your point.

A.—We have always had a guarantee against that.

Q.—You say that the word " guarantee " there is limited to defective workmanship and materials?

A.—Absolutely.

Q.—But it does not do away with the fact that at the outset of this letter the rotary-cutter suction dredger was described as designed for dredging to depths up to 70 feet below water level and to be capable of discharging at the rate of 2,000 cubic yards of soft clay per hour through a floating pipe-line to a distance of 5,000 feet?

A.—I think that is practically the same as what is put in the specification.

Q.—It is. The word " guarantee " in the document which has been handed to me you limit to workmanship and materials?

A.—Absolutely.

Q.—But the letter says: " and your guarantee that the plant will do the work required "?

A.—That is right. That is what Sir George Buchanan put in his letter to us.

Q.—I do not think I need ask you anything further on that because we have your evidence on record yesterday with regard to that particular passage. Sir Lawless Hepper, who is the Director of Development, has given us a preliminary statement. I do not suppose you happen to have seen that?

A.—I have seen nothing at all except these odd newspaper reports—nothing whatever. I have had no evidence given to me until this thing started here.

Q.—Sir Lawless Hepper made a very great point of this. He showed that in the specification all that you were required to design was a dredger capable of dealing with soft clay?

A.—That is so. According to our contract that is the sole point.

Q.—The point Sir Lawless Hepper made was this. He referred to the report of Lowther & Kidd of 1912 and he called our attention to this, that Mr. Kidd spoke of the clay as being " stiff and unctuous." He also called our attention to Sir George Buchanan's own report, in which he spoke of the clay in the harbour as being " hard." I want you to keep those three descriptions in mind for the moment. First your own specification of a dredger designed to work in soft clay?

A.—Yes.

Q.—Next the statement of Mr. Kidd that as a result of some 1,159 recorded borings he found the clay to be stiff.

A.—Yes.

Q.—Always a bed of mud superimposed upon what he described as " stiff clay "?

A.—Yes.

Q.—Then the statement of Sir George Buchanan himself that the clay was hard. Those are the three facts I want you to keep in your mind. A firm of dredger builders might, I suppose, build an excellent dredger designed for soft clay which would not give or might not give satisfactory results in stiff, hard clay?

A.—That is right. It might not be able to dredge it at all.

Q.—It is a question of degree?

A.—Absolutely.

Q.—If a dredger designed to work in soft clay was put to work on stiff or hard clay, while she might be able to cut it, you would not expect the same output as if she were working in soft clay?

A.—Certainly not.

Q.—Do you happen to know how the description " soft clay " got into the specification?

A.—Well, I know we put it in the original specification. You see from this letter of Sir George Buchanan he speaks about it as " clay," if my recollection is aright.

Q.—The letter of the 25th July, 1919?

A.—Yes.

Q.—" The dredger must work to a depth of 70 feet and have a minimum capacity of 2,000 cubic yards of clay per hour discharging through the whole length of the pipe-line."

A.—That is the first proposal he put to us. Our tender is " soft clay," not " clay."

Q.—Sir George Buchanan having referred to " clay " in the letter of July 25th, your firm's letter in reply of the 12th September uses the phrase " soft clay "?

A.—That is quite true. We did that. I will tell you the reason if you wish to know.

Q.—I will put a question or two for a moment. Therefore I suppose the contention of your firm is that you having contracted to design a dredger for working in soft clay, that is the limit of your responsibility?

A.—Absolutely, so far as that is concerned. We give that output in soft clay, not harder material.

Q.—We know that there has been a very great failure of output in the dredging operations—I am not using the phrase, failure of the dredger?

A.—I observe that, thank you.

Q.—It is a failure of output in the dredging operations. As an expert will you give me your view of the various causes. Let us have them one after the other.

A.—I think the first and most important is this question of the material. That is the first and most important thing of the whole lot.

Q.—A dredger designed for soft clay is put to work in stiff clay—is that the point?

A.—Taking everything right down to the rock, as far as I understand it, or moorum.

Q.—That is your first point?

A.—Yes.

Q.—That means unsuitability of material for the work the dredger was designed to do—is that it?

A.—I am not quite clear if that is truly correct.

Q.—Then put it in your own way?

A.—The dredger has been designed for this output in soft clay. She will take anything that is in the harbour, practically speaking, down to the rock, at a very much less rate according as it differs in consistency and hardness.

Q.—Is that right?

A.—That is the whole thing.

Q.—That in itself would be one cause for a greatly diminished output?

A.—Absolutely.

Q.—You will forgive me putting several questions on the same point but I want to get it clear beyond doubt. Does any other cause occur to you?

A.—Well, I have only seen this vessel working for a short time at the beginning when she started working there and I have not seen her since unfortunately. I had intended seeing her, but through illness I have not been out there these last two cold weathers, otherwise I should have been out every cold weather having a look at the boat and seeing anything that I thought I ought to see or hearing what they had got to say about it and speaking with them over it. But it seemed to me when I saw it starting first there, that they did not have quite enough supervision for the work. When I spoke to one of the men who was in charge there, looking after it, about not having this thing more or less looked after properly, he rather complained at the time that he had most of his time taken up in the office filling up forms. Well, that is all very well, but I said at the time: " Look here, this is a powerful, big plant, and a man who is going to look after this will have to be on this plant morning, noon and night. You cannot sit in the office and look after a plant of this kind. You cannot do it in a motor car and you cannot do it by sitting in an office or anywhere else." He has to be on the plant morning, noon and night, going all over the place, if he is supervising this plant properly. That is what I said at the time. I do not know how far that position was altered after I left, but I did think at that time they did not have such efficient supervision as they might have and as they ought to have. That is what I think. The man tells me that a lot of his time was taken up with office work and he had not time to go round all the plant all the time as he must be in the office to do all these things. Well, I take his word for it.

Q.—When you say " a man," do you happen to know who he was?

A.—Mr. Brims.

Q.—The actual dredging master was nominated by your firm, was he not?

A.—That is right.

Q.—Mr. Spiers has given evidence, and he says that as dredging master he was in charge morning, noon and night.

A.—Yes; I believe that is so. He probably was as dredging master.

Q.—Had you confidence in Mr. Spiers?

A.—Yes; I think Mr. Spiers is a very good dredging master.

Q.—A very good dredging master is a man who can get results?

A.—That is so.

Q.—That is what you want him for?

A.—Yes. The term " dredging master " may be a little unfortunate. He is really the dredger operator sent out by Simons and Company.

Q.—But he was the man who was to take control of the dredging operations?
A.—Of the dredger.

Q.—Of the dredger?
A.—Of the dredger alone.

Q.—The dredger?
A.—The dredger alone, and nothing else.

Q.—Surely he was the man who was directing the dredging operations?
A.—On the dredger; the dredger itself. He had nothing to do, in the first instance, as far as I know, with the pipe line, or anything of that sort.

Q.—He was in charge of the dredging operations?
A.—The actual dredging.

Q.—And in charge of the "Colaba" when she was acting as the intermediate pumping station?
A.—Our view was that he ought to be in charge of the "Colaba." Whether he was, or whether he was not, I do not know. He ought to be in charge of the "Colaba," and he ought to intimate to the man on the "Colaba" when he wanted him to work and when he wanted him to stop.

Q.—I am putting to you the position of Mr. Spiers was that, being sent out with the approval of your firm, he was the actual dredging master, and a very good dredging master, too.
A.—I should say so.

Q.—Is there any other cause which you can suggest?
A.—Yes; I think one rather important cause is that in all these dredging problems they ought to pay the men on some system of output.

Q.—Some system of bonus for output?
A.—I think so. It is not a very nice climate. It is a worrying job working on a dredger that is rattling away morning, noon, and night, and that sort of thing. If they have only got fixed pay there is very little incentive to excel themselves in anything. I think every contractor has found that they get much more work out of the men and the machine if they are put on some system of bonus on the results obtained.

Q.—Does any other cause occur to you for the low output of the dredging operations?
A.—Are you speaking of the low output per hour or for the whole time, because you see the difference?

Q.—She started working on December 8th, 1923, and she want on till the monsoon. The history is that instead of pumping 2,000 cubic yards per hour, she did 1,020.
A.—That is the average, is it?

Q.—Yes; that is 50 per cent. The next year she did 856 instead of 2,000.
A.—I cannot contradict those figures because I have not all the operations.

Q.—I am not asking you to contradict the figures. I am asking you if you can help us to say what was the cause of the undoubtedly low output of the dredging operations?
A.—Well, I have given you three reasons.

Q.—Does anything else occur to you?
A.—I do not know that it does at the moment.

Q.—You have given us three reasons. A fourth one might be the insufficiency of material as apart from its consistency being stiff and hard?
A.—I see what you mean.

Q.—Those are matters which have to be examined into?
A.—Quite so.

Q.—Unless you get a good depth of material it is uneconomical working a dredger like the "Sir George Lloyd" because you cannot get your results?
A.—No; you must get a fair depth of material to work on.

Q.—The last point, the actual failure of the dredger "Sir George Lloyd" even to deliver soft clay to the extent of 2,000 cubic yards per hour is a possibility which you have rejected. You maintain that the "Sir George Lloyd" when delivered was a vessel perfectly capable of delivering 2,000 cubic yards of soft clay per hour through a pipe line 5,000 feet in length?
A.—That is the position.

Q.—Then about the "Colaba." The "Colaba" has given a good deal of trouble, as I daresay you know, with regard to vibration.
A.—Yes; I believe she has.

Q.—Sir John Biles said in his report when tests were taking place that at the lower speeds there was no vibration whatever, but at the upper speeds it was observable, but

not to any serious extent. That is one reference. Then when the vessel was steaming full speed astern there was considerable vibration; but that is not very unusual, he says.

A.—No.

Q.—Then he says he can give no satisfactory explanation of the vibration on the "Colaba." You have seen her, of course?

A.—I have not seen her at work.

Q.—You saw her?

A.—Yes; but not at work.

Q.—Can you give any satisfactory explanation of the vibration?

A.—I am afraid I cannot. The vibration seems to have rather puzzled everybody. You see, the vessel is relatively stiffer than the "Sir George Lloyd." She is a much shorter boat. She has got the same depth, and that sort of thing. They do not have the same trouble in the "Sir George Lloyd."

Q.—We called Captain Phillips, of the Royal Indian Marine. He had reported on the "Colaba," and he explains that examination of the engine seating and bed plate showed that a number of rivets, all securing angle brackets, had worked loose, which permitted considerable vertical movement of the engine, which was a serious defect which could develop to a dangerous extent, due to the excessive vibration which is set up. When asked if he could account for the cause he said this: He was asked if the movement which he spoke of in a main pump was a serious matter, and he said it was: "and unless cured would have very serious consequences?—(A.) Yes. (Q.) What do you think the vibration is caused by?—(A.) My personal opinion is that the pumping engine should have been amidships in the centre of the fore and aft displacement." What do you say to that?

A.—I do not think there is anything in that point at all. That is my opinion.

Q.—In point of fact, the pumping engine is not in the centre of the fore and aft displacement of the "Colaba." It is on one side.

A.—Is *not* it in the centre line of the ship? If my recollection is right, it is.

Q.—But not in the centre of the fore and aft displacement?

A.—No; it is not. The boilers are. So far as I recollect, we nearly always try to put the boilers in the centre because of the draft and the loading bunkers and the coal bunkers. It is better not to have the bunkers at one end. They trim it up and down.

Q.—If Captain Phillips' view is right, that is a structural defect which cannot be remedied?

A.—Yes; but I do not think there is any possibility of its being right. We have built so many dredgers that I do not think there is any possibility of that being right.

Q.—Will you just bear in mind your promise to go through your files in the office and see if you can produce any letter written by your firm stating that Sir George Buchanan made a request to have the vessel tested in Bombay?

A.—I will, with pleasure.

Q.—And also if you have got any written note—any contemporary written evidence?

A.—Yes.

Sir M. Visvesvaraya.—You have given several reasons for the failure of the dredger to give the required output?

A.—I have given some suggestions.

Q.—Now that things have gone wrong, whatever the reason may be, and the dredger is giving less than 50 per cent. of what was promised, what remedies do you suggest to improve its working efficiency?

A.—I would not give any remedy at all until I found out what was the exact position.

Q.—You have not attempted to find out the exact position?

A.—We have not had an opportunity. There has been nobody out there to look into the matter and see for themselves.

Q.—Did the Bombay authorities approach you in the matter?

A.—My recollection is that they did through Sir George Buchanan, and we offered to send somebody out there, I think. There has always been this sort of thing, that these records that were given might not be correct.

Q.—The records that were given of the output of the dredger?

A.—Yes. It seems a very strange thing that at the end of May when the "Sir George Lloyd" is working all by herself she is delivering through 6,000 odd feet of pipe, or something of that sort; and according to the figures that we got home from the dredging master and chief engineer on the boat, she was then doing over 1,700 yards an hour. That is the last week in May, or something like that, just before the monsoon after she started. Then there has always been the suggestion that there may have been a big loss of material, of softer stuff before they backed it in to prevent it from going out into Back Bay.

Q.—That happened in two seasons.

A.—Are those figures all correct? Does it show what loss they had, or anything of that sort?

Chairman.—The figures I gave you of 1,020 and 856 were figures ascertained by the soundings taken immediately after the dredging, not the amount deposited in the reclaimed area.

A.—I see.

Q.—I have not dealt with the figures of loss.

A.—Quite so.

Sir M. Visvesvaraya.—You cannot place dependence on the records given to you, so you cannot suggest any remedy?

A.—I will qualify that now in view of what the Chairman says. He says that those records are the records in excavation.

Chairman.—That is right.

A.—Of course we must accept those records.

Sir M. Visvesvaraya.—Have you any remedies to suggest now? You have now clearly stated what the faults were or what was wrong with the operation. Have you any remedies to suggest to improve matters?

A.—No; I do not know that we have any remedies to suggest. If it is the fact that it is the material that is wrong, if it is very substantially wrong, and the material is so stiff that we could not possibly hope to get 2,000 cubic yards, then there is very little that can be done. I do not think you will alter the dredger much to get much more output from her.

Q.—You cannot alter the dredger?

A.—Not very much. You can alter and improve her—you can improve everything, but I do not think you will get 100 per cent. improvement.

Q.—You might improve it to some extent?

A.—Yes; but I do not think you will get 100 per cent. improvement, or any possibility of getting anywhere near that.

Q.—Would not an improvement in the blades of the cutter do some good?

A.—It would not do very much good, but it would be a simple thing for them to try half a dozen cutters if they liked. It does not take long to remove one and put another on.

Q.—You were going to explain to the Chairman why you put in the words "soft clay" in the tender, or in the agreement. Would you do that now?

A.—Yes. "Clay" seemed to us to be a very indefinite term; it might be soft or stiff or hard or anything. We must reasonably expect to have some more concrete definition of the consistency of the material. We put it as soft clay, and we said at the time that this dredger, as designed, would cut, practically speaking, all the kinds of clay there are in the harbour there. It would not dig rock, but it would dig the different kinds of clay at different capacities.

Q.—The capacity would alter?

A.—Absolutely. It would go smaller as the material got stiffer.

Q.—Did you happen to read Sir George Buchanan's printed report?

A.—Report on what?

Q.—On the reclamation scheme?

A.—No, I never saw it.

Q.—Were not all the local circumstances communicated to you, together with an account of the reclamation work proposed?

A.—No. We never received any report of Sir George Buchanan.

Q.—Did you ask for it in order to keep yourselves informed of the circumstances under which your dredger had to work?

A.—No, we did not.

Q.—You did not think it worth while?

A.—We have never in our lives asked for an engineer's report of any scheme.

Q.—Did you ever advise the working of the dredger in three shifts?

A.—No. I never advised it working in three shifts. I would have liked very much to have done it, if it had been possible, but I always observed the very likely difficulty in working three shifts there.

Q.—What was the difficulty?

A.—As originally arranged, I believe it was 15 hours a day in two shifts. That left nine hours clear for moving anchors or wires, or anything else; that is to say, they were really going to make use of the 24 hours somehow or other, but with the actual shifts, having a full and complete crew on for duty, there would only be the 15 hours worked.

They would be working more than 7½ hours each, and they might work a little overtime where necessary. At any rate, it left about 60 per cent. for working time.

Q.—For pumping?

A.—No, there were 15 hours out of the 24, which left 9 to take the opportunity of filling up losses of time, as it were, laying out moorings, or shifting wires, or something of that sort. We could not expect to pump the whole 24 hours throughout the day.

Q.—You would be pumping throughout the 24 hours, but leaving intervals for shifting and for other arrangements?

A.—The idea was to aim at doing 15 hours' actual dredging work. For the rest of the 9 hours they did what they liked in the way of shifting moorings and anchors; and if they had had some delay in the middle of a shift, and they wanted to try and make it up, they would make it up then.

Q.—I understood that at night time they did not work, even if they could do so?

A.—There is a good deal more difficulty in working a big powerful suction dredger like that in the night time than there is in working a bucket dredger. My view was that they should start at the first sign of daylight and work right through the daylight hours into the night in order to make up 15 hours. I thought that that was a very good arrangement, because it is very much easier working into the darkness than it is starting in the darkness. Daylight is very much better for operations of that kind than the night time. A bucket dredger is absolutely different.

Q.—Several dredger contractors who have done dredging work say that three shifts are absolutely necessary in order to save the interest on capital.

A.—Everybody would like to work as many shifts as they could. They would like to work the whole 24 hours of the day in order to save interest on the capital if they could. That is the whole point. If it is possible to do it, then it should certainly be done.

Q.—Would you not have consented to guarantee tests at site if you had been offered a higher price?

A.—No.

Q.—Why were you so determined in this case ?

A.—What on earth could we have put in as a price? If we had been given an area to dredge upon there we might have had all kinds of obstructions and delays during the trial.

Q.—But your own firm had experience in the case of the " Kalu " and " Jinga "?

A.—Yes; that is one of the reasons.

Q.—You tested those two dredgers in Bombay?

A.—We did.

Q.—Then why did you make an exception in this case?

A.—I think I said yesterday that when the scheme was first discussed with us everybody seemed to think the material there was very soft. I believe, as a matter of fact in one instance they thought they would not need a cutter for a good deal of the material, and that it was all very easy and simple dredging. When we dredged at Bombay we had to dredge first of all for the trenches for the walls. We had to dredge down to hard, and to take everything which was coming in our way. On the top of that there were spread all over that area huge quarried stones, which I suppose had been dropped out of the country boats. We could not do anything else but pick them up. They were lying there. Sometimes we would get them on the top of the mud, or a few feet below it, or down at the bottom. Those things had to pass through the pipe.

Q.—Did you take any special steps to keep yourself informed whether or not the plant was working satisfactorily, or, in other words, was doing its job?

A.—We got the dredging master and the chief engineer to fill up and send us every week a form which we have for telling us what the dredger is doing, and they did that, I think, for the whole of the first season.

Q.—Were you sending to Bombay weekly any comments or advice on such reports as you received?

A.—Not with regard to the output of the dredger; only with regard to little things. One was a beastly little water pump which gave some trouble. Eventually we took it out and put in another one.

Q.—Mechanical details?

A.—Yes.

Q.—When you manufactured the plant, did you feel quite sure that it would do its work?

A.—We felt quite sure that it would do its work in soft clay, and also that it would dredge practically all the stuff in Bombay harbour, except the rock, but at a very much lower rate according as the stuff got stiffer.

Q.—Were you confident it would do its appointed task; that is the point?

A.—The specified task, yes—2,000 yards of soft clay an hour through 5,000 feet of pipe.

Q.—You were sure that in clay of any kind it could do 2,000 cubic yards as a regular average?

A.—No, not at all.

Q.—You said so yourself?

A.—As the material grew harder it would be less. In some of that very hard clay at the bottom it would not do 500 yards an hour.

Q.—But on the average, it would do 2,000 cubic yards?

A.—Not on the average of all the stuff in the harbour, no; only on the soft clay.

Q.—You say if it were only soft clay. The soft clay was on the surface. How did you expect it would do 2,000 cubic yards per hour?

A.—The soft clay is below the mud, as far as I understand it.

Q.—You did expect hard clay, and you did expect that in hard clay the output would be smaller?

A.—Absolutely.

Q.—On an average you expected 2,000 cubic yards per hour?

A.—Not that average on all the material.

Chairman.—You assume, Sir Mokshagundum, that this witness expected hard clay. From where do you get that? I do not know. He specified for soft clay. You must bear that in mind.

Sir M. Visvesvaraya.—He specified for soft clay, and he said he expected there would be stiffer clay and then the output would be smaller. He said that in reply to you.

Witness.—I said the output would be smaller in stiffer clay or in hard clay.

Q.—On an average you did not expect 2,000 cubic yards an hour?

A.—Only on the soft clay.

Q.—In Sir George Buchanan's letter which the Chairman read some time ago, it is stated: "The dredger must work to a depth of 70 feet and have a minimum capacity of 2,000 cubic yards." Minimum capacity is mentioned there?

A.—Yes, that is right, in soft clay.

Q.—As the Chairman has pointed out, one of the statements in Sir George Buchanan's letter to you is that you guaranteed the plant would do the work required?

A.—That is what he said he would be satisfied with.

Q.—He wanted your guarantee at the time to do the work required?

A.—Quite right. He never got any guarantee from us except this thing about the soft clay

Q.—Was there any room for doubt that you intended to give a serviceable plant?

A.—I do not think so.

Q.—Then when you accepted the specification, were you not confident that the dredger would perform its appointed task?

A.—That is right—at 2,000 yards of soft clay per hour through 5,000 feet of pipe.

Q.—You are satisfied that it is capable of doing that even now?

A.—Yes.

Q.—Who communicated to you the fact that the dredger was not working satisfactorily—the first time?

A.—I think it was Meik and Buchanan.

Q.—Is it not usual, when you accept an order of this magnitude, to examine the material which the dredger has to work upon?

A.—No, I would not say it was usual.

Q.—It was a very big order—perhaps one of the biggest orders you have had. I understand it is the usual thing among dredger builders to examine the material which the dredger has to work upon?

A.—It often happens that we get samples of material sent home to us, but by the time they reach us it is very difficult to say what the thing was like when it came out of its bed. It gets dried up and is in quite a different state from what it was on the site.

Q.—Are not careful studies and tests made on this point before preparing specifications?

A.—By whom?

Q.—In the case of such a dredger as this, by the engineers or by the builders?

A.—The builders quote for what they are asked to quote for, if they can do it. If they cannot do it, then they say they will do something else.

Q.—Is it usual for a manufacturer to accept a specification to which he is not able to conform?

A.—I do not know that we ever do that.

Q.—If you do not examine the material, as has not been done in this case, do not you think there is a risk of the dredger not doing its work?

A.—We stated quite clearly in our tender that the capacity of the dredger would be measured by the standpoint of 2,000 yards an hour of soft clay through 5,000 feet of pipe.

Q.—Usually, when a design is prepared for a dredger, do not the engineers partly depend upon the manufacturers for their data and for their advice?

A.—Not usually. We get any number of engineers who give us designs and specifications for a dredger.

Q.—But, from your experience you suggest to them many details, do you not?

A.—We oftentimes suggest details to them.

Q.—You are as much interested as they are in seeing that the article you give is serviceable?

A.—We always are very anxious to see that everything we build is a success.

Q.—The principal has a moral claim on you for a serviceable article, has he not?

A.—The contract was to construct a vessel of certain dimensions, size and power.

Q.—To do a certain job; to give a certain output. That is more important than anything else?

A.—It says it is to be capable of doing 2,000 yards an hour of soft clay and, in our humble opinion, the vessel is capable of so doing.

Chairman.—She was to be capable of dredging 2,000 cubic yards of soft clay per hour?

A.—That is all. That is what is put in the specification for the vessel. The dimensions and everything else are there. We tendered for that, and we built it according to that. In the first instance we ourselves put forward a specification and design with our tender showing what it was we offered, and what was the capacity of the vessel, and the price. We did that.

Sir M. Visvesvaraya.—You are not responsible for the soft clay, and you are not responsible for not testing in Bombay?

A.—I do not quite know what you mean by " not responsible for the soft clay "?

Q.—You did not suggest these conditions yourselves?

A.—We put forward the condition of soft clay.

Chairman.—Messrs. Simons were the people who first used the words " soft clay," and the position this witness takes up is, " We contracted to build a dredger that would dredge in soft clay, and we have done it. If you put the dredger on to dealing with something which is not soft clay, that is your own look out." (*To the Witness*): That is the way you put it, is it not?

A.—Yes.

Sir M. Visvesvaraya.—Was there any disagreement between you and the staff on the spot?

A.—No.

Q.—Or between you and Sir George Buchanan at any time?

A.—I do not know there was ever any disagreement at all about the point.

Q.—Not even in Bombay, when you visited the place?

A.—In Bombay everybody seemed to be rather pleased at getting such good stuff. What they called good stuff was good, stiff clay. They had been rather afraid that they would be obliged to fill this reclamation with slurry, and that sort of thing.

Sir Frederick Hopkinson.—You told us yesterday that you had been asked to build a dredger and guarantee its working for twelve months, paying all expenses; and you said also that you were poor dredger builders and that only rich contractors could afford to do that sort of thing. That is so, is it not?

A.—I believe I did use that expression.

Q.—I want to look at the measure of your poverty. In 1918-1919 and in 1922 your Company paid 20 per cent. dividend free of tax, did it not?

A.—Yes.

Q.—In 1922-23 it paid 20 per cent. again. In 1923-24 it paid 10 per cent., a cash bonus of 2½ per cent. and a capitalised bonus of 33⅓ per cent. In 1924-25 it paid 10 per cent. I may take that as the measure of your poverty?

A.—Yes, you may take that, Sir.

Q.—Can you tell me when the profits of this dredging plant for Back Bay were brought into your balance sheet?

A.—No, I cannot.

Q.—Do you think it is possible that they were brought into the year when you paid 33⅓ per cent. capitalised bonus?

A.—I could not tell you.

Q.—Is there anyone in the world who ought to know more about the clay in Bombay than your firm?

A.—That is a big question to answer.

Q.—You have built several dredgers for Bombay, have you not?

A.—Yes. We have built quite a number for Bombay.

Q.—Is Mr. William Brown the Managing Director of your Company?

A.—He is the present Chairman.

Q.—I see that in the Proceedings of the Institution of Civil Engineers, Volume 203, he says: "The vessels selected for the purpose of illustration have not been chosen because of any phenomenal dredging done by them, but because they have all had particular attention devoted to their design to meet the conditions of their intended employment"?

A.—Yes.

Q.—On the next page he speaks about the "Silurus," a bucket dredger built by your Company for the Bombay Port Trust, and he says, with regard to the various engineers under whom the "Silurus" was constructed, that their intimate knowledge of the conditions prevailing at Bombay "has been invaluable to the builders in preparing the designs"?

A.—Yes.

Q.—So that in addition to your own knowledge you have the knowledge of all those engineers?

A.—That is right—the Bombay engineers.

Q.—You also built a powerful bucket barge loading dredger, the "Octopus" for Bombay?

A.—We did.

Q.—Mr. William Brown goes on to say: "These dredgers give satisfactory results in all kinds of clay, as well as in free material, and on occasion cutter dredgers have been employed on stiff blue clay and on hard chalk, which have been found to test severely the capabilities of powerful bucket dredgers. In the case of a cutter dredger owned by the Admiralty, it was found that the results obtained in stiff blue clay and in chalk were quite double the quantities that had been raised by powerful bucket dredgers." So there is nothing new about a cutter dealing with stiff blue clay, is there?

A.—Nothing whatever, as far as that goes.

Q.—Then two pages further on he says "The system of dredging decided upon"—this was for somewhere near Rangoon on the Twante Canal—"was the employment of suction cutter dredgers to cut the hard clay that formed the bank and bed of the canal, suck up the material thus disintegrated, and pump it through a floating pipe line to alongside of wherever it was desirable to deposit it upon the bank." Then a page further on he says "The averages for the last year in cubic yards per hour are: "Oswald," 845; "Campbell," 1430; "Lees," 1480; these comparing favourably with the guarantee specifications of 780, 780 and 1200 respectively." In the case of the "Campbell," she apparently gave double what she was guaranteed to give. So there apparently was a case where you did give a guarantee?

A.—Oh, yes. We have given many guarantees.

Q.—You built the "Jinga" and the "Kalu," and you gave a guarantee there?

A.—We did.

Q.—It has been shown that in the one case the dredger, working under ordinary working conditions, only gave 50 per cent. of its output; and in the other case the other dredger gave 70 per cent.

A.—That is the average, I believe.

Q.—The average under ordinary working conditions?

A.—The whole time they were working there.

Q.—Yes. Would you consider that a satisfactory output?

A.—I do not know that I would consider it quite satisfactory in the one case. The one ought to have done as much as the other, very nearly—unless there was very difficult material in the one case compared with the other

Q.—The material I am told was mostly mud.

A.—Whoever told you that told you an untruth.

Q.—This was finished in 1913, and I believe right up to the present time they still have to put mattresses down before they can lay a railway line on this reclamation?

A.—There are certain spots where it is like a blancmange still. They were filling from the sea side, and they could not properly drain the water out of those beds.

Q.—It would drive the water in front of it?

A.—Yes, and the clay puddled the whole thing so that it could not get back and get out, and it was a question of drainage.

Q.—Are you sure that a large proportion of that material was clay?

A.—I saw it.

Q.—You saw it for how long?

A.—For the whole five years it was there. I was always twice a year in Bombay.

Q.—And you saw it?

A.—And I was there for about six months at the very beginning.

Q.—The test of the "Kalu" and "Jinga" occupied, I believe, 80 pumping hours, did it not?

A.—I think it was something like that.

Q.—During that time, did it do the specified 2,000 yards an hour?

A.—According to the Bombay peoples' own figures——

Q.—I am asking you if it did the specified 2,000 yards an hour?

A.—Yes.

Q.—How was the material measured?

A.—In excavation.

Q.—You are quite sure about that?

A.—Yes.

Q.—Then how do you account for the output falling off? Was this a special crew for the 80 hours?

A.—No.

Q.—Or special coal?

A.—No.

Q.—Or special attention?

A.—I do not know whether you would call it special attention or not.

Q.—Were you there?

A.—Yes, I was there.

Q.—You gave it special attention?

A.—I did. I gave both dredgers special attention. I was starting those vessels to work.

Q.—Did you pay any special bonus for it?

A.—I have always endeavoured to pay the men a bonus.

Q.—I am not complaining about it, but you did on that occasion?

A.—Yes.

Q.—You got the very best out of the dredger which you could get?

A.—I would not say that. It was a clean start. None of the men aboard those dredgers had ever handled a suction cutter dredger before they went on board the "Kalu" and "Jinga."

Q.—But you were there to direct, so that did not matter much, as long as you had plenty of steam and kept your pump running?

A.—We had difficulty in getting going with the bad coal which we had in the first instance.

Q.—Can you tell me what bonus you paid for those 80 pumping hours?

A.—It was just the ordinary bonus which dredging men were paid. I could not tell you the figure offhand.

Q.—You say just the ordinary bonus; but there could not have been any ordinary bonus when the dredger had just started work. This was her trial?

A.—Yes. Oftentimes, when men go abroad, we pay them a bonus when they come back if they work well.

Q.—That is a general remark. You say you did pay a particular bonus in this particular case for this particular work?

A.—Yes, we did.

Q.—Do you know what it was?

A.—I do not know. It was not very much. I think that probably——

Q.—I do not want "probably." That will not help me. Was it a handsome bonus?

A.—I do not know that you would call it a handsome bonus.

Q.—By how much did you exceed the stipulated output of 2,000 yards an hour?

A.—The first trial we had was 2,750 yards an hour.

Q.—That is under special conditions of test. How do you account for the output being so very much lower afterwards, working under ordinary conditions?

A.—It is very difficult for anybody to answer such a question as that. I was not directing operations all over the five years of work.

Q.—But it is unfortunate, because this low output has occurred with three dredgers which you have built for Bombay?

A.—That is right, according to your interpretation of the position.

Q.—Surely your reputation is involved in this, is it not?

A.—Sir, we cannot go until the end of our days running every dredger which we build for every scheme that comes along.

Q.—Just answer my question. You have stipulated that these dredgers would do 2,000 yards an hour under ordinary working conditions. They have all three failed very badly under those conditions Do not you think your reputation suffers a great deal by that?

A.—No. There was not one single one of those three dredgers which was working according to the contract. We were dealing with material that it never was intended we should deal with.

Q.—Stop a moment. Take the "Kalu" and the "Jinga." What was specified for them?

A.—Soft clay.

Q.—You say they did 2,700 yards an hour?

A.—I say they did, and they were dealing with more than soft clay then.

Q.—Then why did not they continue to do it?

A.—I will tell you one reason why. They were putting it all over the place, with pipe-lines of sometimes as much as 5,700 feet instead of 4,500 feet, and there were all kinds of kinks and bends.

Q.—That would only be occasionally?

A.—It was altering all the time.

Q.—Surely there was some straightforward pumping in four years?

A.—It was altering all the time, because they had to go over the whole area.

Q.—But you knew all about that before you built the dredger. You knew the district. You knew what it was called upon to do?

A.—Sir, all we were asked to do was to build this boat with this output and to test it, and we did that output through 4,500 feet of pipe.

Q.—I am asking you to try to explain to the Committee why your three dredgers, which you say have done so magnificently on test, have failed so utterly when they have been called upon to work under ordinary working conditions?

A.—But not under the contract conditions.

Q.—Under the ordinary working conditions. Tell me this. You said just now that the clay varied very much in quality. What experience have you of that?

A.—The actual experience of seeing the clay when it came out of the end of the pipes.

Q.—We had a gentleman here yesterday who told us he had made 1,300 borings there, and that, with the exception of a foot or so at the bottom, the clay was practically homogenous. In addition to making those 1,300 borings, he has seen the "Kalu" and the "Jinga" at work for months; he went into the bottom of the docks at Bombay while they were being made, and he saw the material in bulk; and he says that it is all soft clay—or, rather, his description was "stiff clay." It was so soft that a hand pump —an ordinary semi-rotary pump put on to a 2-inch pipe—would wash the clay away at the bottom of the pipe, and he could sink that pipe through 30 feet of clay. Would you call that hard clay?

A.—No, I would not.

Q.—It is soft clay?

A.—Absolutely.

Q.—Soft clay which you, knowing the conditions in Bombay, specified for your dredger to do?

A.—We did not want to be tied up to do an output at that rate in any other material than soft clay.

Q.—I am suggesting to you that the material, with the exception of a foot at the bottom, was soft clay?

A.—In Bombay?

Q.—In Sewri.

A.—We had all kinds of material.

Q.—I am giving you the experience of a man who has made 1,300 borings and who has seen the clay on many occasions, and who has also been in the bottom of the docks and seen it in bulk?

A.—He told you, I think, he saw the strata of the clay going down.

Q.—He did not say anything of the kind. He said it was practically homogeneous clay.

A.—He told you, I think, that he saw this thing cut right down, and that he saw the different strata right down to the bottom.

Chairman: He saw the mud on top.

Sir Frederick Hopkinson: He saw the mud on top and then the clay. He did not say anything about different qualities and hardnesses of clay.

A.—If he said there was only one hardness of clay at Sewri, then I must contradict it.

Q.—With the exception of a foot at the bottom.

A.—I must contradict him. It is not so.

Q.—The Committee have seen the clay. Whatever the clay was, you knew all about it before you tendered for this dredger, did you not? No one knew better?

A.—I cannot say we knew all about it.

Q.—But you had had two dredgers working at Sewri. You had built bucket dredgers for there. Therefore obviously you must have known all about the clay?

A.—Generally speaking, we took the view that the material would be much the same.

Q.—In a position like that clay does not vary in small areas, does it?

A.—I do not think it is likely that it does vary much in small areas, but I do not agree there was only one consistency of clay there.

Q.—At any rate, whatever it was you knew more about it, or were in a position to know more about it than anybody else, from your long experience of it?

A.—We were in a position to know a good deal about it.

Q.—Therefore you were in a position to provide your dredging pump with sufficient power to deal with it?

A.—Yes. We were in a position to say also that we would only give that capacity in soft clay.

Q.—You knew before you designed the dredger that it was for Bombay, did you not?

A.—We did.

Q.—Therefore you knew the clay, and therefore you were putting your own description on the clay. You called it soft clay, with all your long experience of the clay in Bombay?

A.—Yes, and I think it is quite evident that the object of that was to arrive at a standard of output.

Q.—No, it was not a standard of output. It was to do the actual output on this particular work. The whole work depended upon this output. I say that you have given a definition of the clay, and you decided what your dredger was to do from your knowledge of the clay. Is not that so?

A.—Sir, it was stated, I think in one of the reports, that there was three times as much material as was required for the filling on the Bombay Back Bay reclamation, and about one-third is mud, which would make very good filling.

Q.—That would not trouble your dredger?

A.—Then I believe it goes on to say that there is some other kind of clay which is easy to get and discharge through the pipe.

Chairman.—The witness is referring, I think, to Mr. Kidd's report and to Sir George Buchanan's report. He is mixing them up.

Sir Frederick Hopkinson.—You said just now that you had not seen Sir George Buchanan's report?

A.—No, I have not seen Sir George Buchanan's report.

Q.—I do not know where you get that definition of the clay from. I have not seen it. You said you got it from some report?

A.—I believe it is in one of the reports. I am not sure that you may not find it in Mr. Kidd's report. Probably it is there.

Q.—He calls it stiff and unctuous clay?

A.—I believe he does use that phrase, but I have not seen it myself. I have never seen his report.

Q.—To come to another point, the bulk of the material dredged up to the present time in the harbour for Back Bay reclamation has been mud. Is there any reason why the " Sir George Lloyd " should not do 2,000 yards of that an hour?

A.—She could not fail to do 2,000 yards of that an hour.

Q.—But I say she has failed. The figures given to us show that she has failed utterly.

A.—You are relying entirely on the reports which you have got from somebody else.

Q.—Certainly—the official reports of the measurements taken from the cross-sections; exactly the same as you rely upon the Sewri. You say she did 2,700 yards an hour measured from the soundings. These are the engineer's figures. Do you dispute them?

A.—Well, I dispute this—I saw the clay myself——

Q.—No, no, do you dispute the engineer's figures?

A.—How can I dispute them. I do not know anything about the thing.

Q.—I do not see how you can dispute them either.

A.—I never took any measurements to check them.

Q.—I am giving you the result of the figures, and I am asking you now how it was that the " Sir George Lloyd " could not do 2,000 yards of mud an hour, because there is no question of clay there.

A.—There is no possibility of her not doing 2,000 yards an hour of mud.

Q.—What is the good of saying that when we have records, extending over three seasons, which show that she has not done 50 per cent. of it?

A.—She might have done nothing.

Q.—And still worked?

A.—And still worked, yes.

Q.—What do you mean by that? Do you mean to suggest that they had not been trying to dredge the material at all?

A.—Yes, Sir. I believe they had been trying to dredge the material.

Q.—Why do you say she might have done nothing?

A.—Quite so; that is a possibility. I understand you to put the possibility that she cannot do the mud.

Q.—There is no possibility at all. I ask you if she could do it, and you say there is no possibility of her not doing it?

A.—That is right.

Q.—Then I ask you why she did not do it?

A.—I do not know why she did not do it.

Q.—You cannot complain that the mud is too hard, as you apparently do in the case of the clay. The mud is not too hard, is it?

A.—Mud is not too hard and soft clay is not too hard.

Q.—You know all about the clay in Bombay better than anybody else?

A.—Yes, and I know we can get hard clay.

Q.—And you designed the dredger?

A.—Yes, we built the dredger.

Q.—I want you to bear in mind that the description " soft clay " does not appear anywhere in any of the documents we have seen until it appears in your offer to build the dredger?

A.—I quite believe that.

Q.—Therefore may I take it that possibly it was left to you to describe the clay, knowing, as you did, so much about the Bombay harbour?

A.—We stated definitely the only kind of material in which we would undertake to do that output.

Q.—Surely not. You designed this dredger for a particular purpose—which was to dredge the clay in Bombay harbour. What is the good of sending a dredger out there if it is designed to do something else?

A.—Sir, I may tell you that we offered to build a dredger in the first instance to do that quantity of soft clay, and that was the standard of output for the dredger. If she had to do harder stuff she would have done less.

Q.—You decided on the definition of the clay. It is your definition of the clay which appears in your offer?

A.—Because it is to form the standard of output.

Q.—It was left to you, was it not, to design a dredger to dig the clay which you knew existed there?

A.—I do not know about anything of the kind. I do know we were asked to do what is suggested in this letter.

Q.—No, no. They only say " clay " in the letter, and you gave the definition of " soft clay "?

A.—We did.

Q.—Would not you make that definition after using your knowledge and experience of Bombay?

A.—Certainly. I have said so already several times.

Q.—You define the material——

A.—On which we were going to give this output—soft clay. That is right.

Sir Frederick Hopkinson.—Then I do not think I need carry it any further, need I?

Chairman.—He does not quite accept the position as you put it, Sir Frederick.

Sir Frederick Hopkinson.—Yes, he does.

Witness.—What is the real point, Sir? Will you kindly inform me, because I am doing my utmost to get the thing clear.

Chairman.—Putting it in another way I think Sir Frederick's question is this. In as much as you knew what was the character of the material, there was a duty on you when writing the letter of 12th September, accurately and truly to describe it, and that you did describe it as soft clay?

A.—Yes.

Q.—And that Sir George Buchanan and Sir John Biles, and other persons, knowing the extent of your experience in Bombay, might well take the expression " soft clay " to be the true description of the material in Bombay harbour. That is your point, is it not, Sir Frederick?

Sir Frederick Hopkinson.—That is my point.

Witness.—Would you think that point remained when you are told, as I have told you, that we explained that we would make this as a standard for the output, and that when she was dealing with harder stuff she would do so much less?

Chairman.—Where do you ever say that in any letters at all—that when she is dealing with harder material than soft clay she will do proportionately less. Where do you ever say that?

A.—We have not said it in writing. That was discussed at Renfrew. There were six or seven people there when we were discussing this thing.

Sir Frederick Hopkinson.—Even then, assuming you had got plenty of power in the cutter engine, why should the dredger do less in hard clay than in soft clay?

A.—Because hard clay is more difficult to dredge.

Q.—It all depends on the cutter. If it is solid clay, such as that at Bombay, or the stuff you call clay near Renfrew, I say there is a great difference between the two, and that your pumps will discharge everything which your cutters will cut, and that if your cutters have sufficient power they will cut hard clay as readily as a weaker engine would cut soft clay. Is that not so?

A.—If our cutters have sufficient power they will do that, and we will have to get the moorings and everything else that will be strong enough to resist that cutting power in the same proportion.

Q.—It is a downward cut, is it not?

A.—No, it is a side cut.

Q.—There is no difficulty in getting your moorings strong enough, is there?

A.—I suppose there are limits. If we had been asked in the first instance to build a dredger to do 2,000 yards an hour of hard clay, we should have had to put forward a very much bigger and unworkable dredger on account of its size——

Sir Frederick Hopkinson.—Why?

Chairman.—Let him continue.

A. ——or we should have had to put forward two dredgers of the same size as this one. We did not want to undertake 2,000 yards an hour of hard material in one dredger, because we saw that everything was going to get so very big and unwieldy—the moorings and everything else—that we thought it was a much more reasonable thing to have the vessel this size; and it was indicated to us that there was sufficient soft material to make the reclamation without touching the harder, and that it would cost so much less money. If that were so, and if you could make this reclamation with the softer material, and if it would cost you only half the price of the harder, why have the more expensive one?

Sir Frederick Hopkinson.—Who gave you that information?

A.—This was all discussed at Renfrew.

Q.—Who gave you the information about the harder material? You are speaking about discussing whether you would have a dredger that would cut hard material. Who gave you the information about hard material?

A.—We are assuming there will be hard material down below.

Chairman.—I do not follow all this. You say that at some interview you were told that there was enough soft material to complete the reclamation?

A.—Yes.

Q.—Who told you that?

A.—Sir George Buchanan.

Q.—Have you got it in writing anywhere?

A.—No. I understand it is in one of these reports, or something.

Q.—No. I will read you the passage in a moment. Mr. Kidd says there was three times the quantity of material required.

A.—That is what I mean.

Q.—But he describes part of the material at all events as being stiff clay?

A.—I do not doubt that for a single moment.

Sir Frederick Hopkinson.—There are two materials—mud and stiff clay—referred to in Mr. Kidd's report, and no others.

A.—I think I would have described some others which are there.

Q.—Your knowledge of the clay and mud in Bombay was so intimate that no description was really necessary to you. You had been there for years and had made several dredgers to deal with it?

A.—We know, generally speaking, the clay that is there.

Q.—I go further than that and say that you had a most intimate knowledge of the material likely to be met with?

A.—Put it that way if you like.

Q.—What margin do you allow, in designing a dredger, between the tests made in a selected place, with selected material, selected coal, selected staff and selected superintendence, and the ordinary working conditions? What margin do you allow over ordinary working conditions? That is to say, supposing you got 2,000 cubic yards an hour under the conditions I have first described, how much would you expect to get under ordinary working conditions when the pumps had worn a bit?

A.—I do not know, because we have never worked under all those selected conditions.

Q.—I suggest to you that you never make a test under any other conditions?

A.—Sir, I am sorry to say you are wrong in that.

Q.—Why did you take this clay at Renfrew as being anything like the clay which the dredger would have to do in Bombay?

A.—Because I think it can be said to be the nearest approach, on the whole, to soft clay which one can get about our place.

Q.—But is it solid clay?

A.—It has to be cut.

Q.—Has it not been dredged over and over again?

A.—Oh, no.

Q.—Are not all dredgers tried near there?

A.—I think most dredgers are tried round about there—all the dredgers that are built on the Clyde. They are not all tried in one hole.

Q.—But in the immediate vicinity?

A.—There is a big area to go over.

Q.—But all the dredgers built on the Clyde are tried in that vicinity, are they not?

A.—Yes. Generally speaking, they are.

Q.—I have a letter from the Admiralty here which says, " According to information available, the surface material at the point indicated by the bearings "—those are the bearings given in the report of the trials—" is mud, and it appears probable that this is of considerable thickness." That is the view of the Admiralty?

A.—Mud on the surface? I think that is right.

Q.—A considerable depth of mud. Your tests were made in that mud, were they not?

A.—They went down. I do not know what depth they did go down to.

Q.—Largely in that mud?

A.—I do not think it was largely in that mud. We took away the surface mud and we went down further than the mud.

Q.—But your measurement was taken over the whole quantity dredged?

A.—Yes, that may be so.

Q.—Therefore it would include this mud?

A.—It would include this mud.

Q.—I put it to you that the test was farcical?

A.—No. I do not think any person can say that at all.

Q.—In the original report of the tests made by the Naval Architect he described it as black clayey silt—not clay at all?

A.—You get many people who say they see the stuff on the surface, they say it is simply silt, but it is cohesive.

Q.—You would not call black clayey silt material you would have to cut, would you?

A.—No, I do not think you would in the first instance, but that is only on the surface, as far as I understand it.

Q.—For several feet down—or, rather, I will not say that, but "is of considerable thickness." That is what the Admiralty say. I do not think you have yet answered the question which I put just now as to what margin you would allow between working under test conditions and working under ordinary working conditions when the pumps had worn.

A.—No, I did not answer that question. You put a lot of selected conditions, and I told you we never do work under those conditions.

Q.—What margin do you allow?

A.—We allow a fair margin, as a rule. I think probably in most cases it is round about 40 or 50 per cent.

Q.—Another thing that occurs to me at the moment is that your tests on the Clyde gave a percentage of volume of solid matter in the pipe of 39 to 41.

A.—Yes.

Q.—Does not that go to show that the test was a farce?

A.—No.

Q.—What do you usually expect to get with a suction dredger—what percentage of solid matter?

A.—We get very varying percentages of solid matter. In clay we have had them up to about 30 per cent.

Q.—What do you normally get? What would you be satisfied with?

A.—I think, as a rule, most people take the round figure of 10 per cent.

Q.—That is what Sir John Biles reckoned. Do not you think it is an extraordinary state of affairs when a dredger does four times her specified output on trials, and yet, when she comes to work, only does half her specified output. Is not there something wrong somewhere?

A.—I do not know which dredger did four times the specified output on trial.

Q.—Well, 40 per cent. You have just spoken of the dredger doing 40 per cent. on the Clyde, whereas 10 is the normal; and 10 per cent. would give you your 2,000 yards an hour.

A.—I beg your pardon; I am sorry. I thought you meant the maximum percentage you might work with.

Q.—You said 30. You said you had had 30, and then you said that normally you would be satisfied with 10 per cent.?

A.—I said that, in the ordinary way, most people took the round figure of 10 per cent.

Q.—That is what Sir John Biles said. I say that that 10 per cent. would give you 2,000 yards an hour?

A.—Yes.

Q.—Is it not so?

A.—I will accept that.

Q.—Therefore 40 per cent. would give you 8,000 yards an hour?

A.—Yes, if we had 40 per cent. going at the same rate.

Q.—You say you had?

A.—No, I do not say we had.

Q.—You say it went up to 39 and 41 per cent.?

A.—I said we can pump——

Sir Frederick Hopkinson.—No, no, it is not what you said; it is what the report said of the trials.

Chairman.—You had better read him the passage.

Sir Frederick Hopkinson.—"Samples of the dredgings delivered through the stern pipe were taken, and those tested varied between 39 and 41 per cent. of solid matter. The material dredged was a black clayey silt." That is 8,000 yards an hour?

A.—I do not think that says they were dealing with that percentage the whole time of the trial.

Q.—At some part of the time?
A.—Yes. At some part of the time.

Q.—If it could do it at some part of the time under those conditions of discharging through the back of the ship, it could do it the whole time?
A.—Sometimes in ordinary working they would be getting nothing at some moment.

Q.—At some moment, but generally speaking?
A.—Well, the test is made in a moment.

Q.—I presume that when you build a dredging plant of this kind you are anxious that it should be a success?
A.—Always.

Q.—Can you tell me whether the failure of this dredging plant has been reported to you from time to time in the last three years?
A.—It has been reported. I do not remember when it was first reported.

Q.—Can you tell me why your anxiety about your " children " did not extend so far as to do something to help to get the proper output?
A.—We were wishful to do something.

Q.—Wishful? Is that all? Did it end there? Did you do anything?
A.—No, we have done nothing so far.

Q.—And all the time the dredgers which you built and guaranteed (because you did guarantee them)——
A.—I think we have discussed that point already.

Chairman.—The " Kalu " and " Jinga."

Sir Frederick Hopkinson: And the " Sir George Lloyd " was guaranteed. They have been lying under the stigma of only doing less than half their specified output?
A.—I think I have already explained to you that we cannot be responsible. We have no authority to go and do anything there at all.

Q.—You said you were asked. You did not want authority; that is your authority. You were asked, you said?
A.—I do not think I said anything of the kind.

Q.—I understood you to say you had been asked several times. It had been reported to you several times?
A.—Yes.

Q.—Very well; is not that asking you?
A.—No, it is a different thing altogether.

Q.—Did not they ask you to make any suggestions for improving the output?
A.—All we got, I think, came through Meik and Buchanan. I am speaking from memory. They occasionally told us (I forgot when they first told us) that the results were not satisfactory. For a long time they themselves could not give us any figures as to the output, for some reason or other, and we asked for them. They said they had asked for them and they had not got them.

Q.—As you know, as a practical dredging man, there is no reason why you should not have your figures the same night, is there?
A.—No, I do not know that there is—none whatever.

Q.—I am asking you now what you did to remedy the poor outputs of your dredgers? Did you make any suggestions?
A.—How could we? We did not know exactly what was the matter.

Q.—You knew they had failed to deliver the output. Did you make any suggestions by which they might deliver the specified output?
A.—We never knew—and I do not know now—that they had ever failed to do the output in soft clay.

Q.—In mud then?
A.—Nor in mud.

Q.—You say you do not know they have failed, although you have been told?
A.—We have been told that they have, but we do not know it.

Q.—I do not think I can carry that any further: I think it is waste of time. I want you to bear particularly in mind that your specification of the work to be done by the dredger does not specify Clyde clay. It is a soft clay.
A.—Soft clay; that is right.

Q.—You said, in answer to a question, that it was not usual for you to examine the material that you were going to design your dredgers to work upon?
A.—No, Sir, I cannot say that it is usual to do that.

Q.—If anybody came to you to have a dredger designed, and he said " I do not know what the material is " would you take that as sufficient?
A.—No. We would tell him that he had better find out.

Q.—What would you do in that case, supposing he said it was clay?
A.—We would tell him that that was not a sufficiently clear description of it.

Q.—You would want to know whether it was soft or hard?
A.—Yes.

Q.—Therefore, to get at the facts, you would want to have samples, because " soft " and " hard " are both relative terms, are they not?
A.—Yes, but at any rate, soft can never be hard.

Q.—Hard clay may be " hard " and " very hard "?
A.—That is so.

Q.—For instance, you would call London clay in the dry very hard, would you not?
A.—We have got nothing to do with the hard stuff. We have only the soft.

Q.—You know Mr. Spiers, the dredging superintendent, I believe?
A.—Yes.

Q.—You have known him for many years?
A.—Yes.

Q.—In fact, I believe you originally selected him?
A.—I believe that is true.

Q.—You know he is a good dredging master?
A.—I have said so to-day already. I think he is.

Q.—Therefore, we know from Sir George Buchanan, in a statement he has made, that nothing human has been left undone in Bombay to make this dredger a success. Have you heard that phrase?
A.—I have not heard that statement.

Q.—At any rate, they have a dredging master with whom you are perfectly satisfied?
A.—Yes, I think he is a very good dredging master.

(*Adjourned for a short time.*)

Sir Frederick Hopkinson.—I presume that when Sir George Buchanan wrote to you that letter of the 25th July, 1919, in which he said: " I shall be satisfied with a test in this country and your guarantee that the plant would do the work required," he was aware that you had an extensive experience of the material to be dredged in Bombay?
A.—I believe he understood so.

Q.—He says: " You have given me a price, and you guarantee, knowing the material as well as you do, that the plant you build will do the work required."
A.—That is so—you tell me what you will do. That is what he says.

Q.—No; he says: " You guarantee, knowing the material as well as you do, that the plant you are offering will do the work required."
A.—We did not give him any guarantee except that which he has got there in our tender.

Q.—I am trying to put before you what was in Sir George Buchanan's mind at the time he wrote this letter. You are going to quote him for a dredging plant. You know the material to be dredged. He says: " I shall be satisfied with the test plus your guarantee that the plant you design will do the work required," That is what he puts in the letter.
A.—That is quite clear.

Q.—Presumably you would have that before you before you quoted?
A.—Absolutely. We read that very carefully before we quoted and before he came there.

Q.—Therefore in your quotation there is an implied guarantee on the basis of this letter?
A.—I do not agree at all.

Q.—You do not?
A.—No.

Q.—That is the condition.
A.—That is what he asked for.

Q.—That is the condition on which he asked you to quote. In your quotation afterwards there was nothing saying you were not going to comply with that condition.

A.—The specification and the offer state clearly what we proposed and put forward.

Q.—To put it brutally, might not it be said that your offer to dredge soft clay, knowing, as you have said, that there were some hard bands of clay in it, might be taken now as a way of evading your responsibility to build a dredger to do the work required in Bombay?

A.—If that was all to say about it, it might be taken so; but it was not so. We stated to Sir George Buchanan our objection to dealing with anything but soft clay in the output.

Q.—That was verbal?

A.—Yes; it was all discussed with him at Renfrew.

Q.—There is nothing in any correspondence to show that you limited yourself to dealing with only a portion of the clay?

A.—I believe that is quite true.

Q.—You said previously that the quality of the clay was indefinite—there were different accounts—and therefore the capacity of the dredger would vary. Is there anything in any letter you have ever written which puts that point forward?

A.—I do not know that there is. It was explained very clearly.

Q.—We shall get on much quicker if you would try to give us yes or no. I do not think you have given us once a plain yes or no to any question.

A.—Sometimes the question is so put that it is almost impossible to give a plain yes or no.

Chairman.—Just take this question Sir Frederick has asked you: Is there any letter that mentions the fact that whilst the dredger would do 2,000 cubic yards per hour of soft clay her output would be reduced when she got into a clay of a hard description?

A.—I do not believe there is.

Sir Frederick Hopkinson.—Then the answer is a simple no. So far as we have got up to the present the word " soft " was put into the contract by Simons, I believe?

A.—By William Simons & Co. They explained the reason.

Q.—Who really designed the dredger?

A.—Well, Sir John Biles designed that dredger. We put forward, in the first instance, the plans and specifications to Sir George Buchanan. He got those. I do not know, but I think that he probably would pass them on to Sir John Biles as based on what he was wanting.

Q.—Is *not* it the fact that the " Sir George Lloyd " and the " Kalu " are almost identical vessels, the " Sir George Lloyd " being 25 feet longer than the " Kalu "?

A.—They are the same type of vessel.

Q.—Almost identical vessels, I suggest?

A.—There are some differences in the arrangement and the machinery, and one or two other things like that.

Q.—But the frames are all the same?

A.—I do not think the frames are all the same.

Q.—We can have the plans and look at them?

A.—You can have the sections and see them.

Q.—The difference in engines is simply a matter of that you make the cylinder of the " Sir George Lloyd " and the " Colaba " 2 inches bigger than the " Kalu," the stroke remaining the same.

A.—If that is so according to the figures and specification, it would be correct.

Q.—The " Sir George Lloyd " was built for 3,000 horse power and the " Kalu " for 2,700?

A.—I believe that is what they developed—something like that.

Q.—There is a difference of approximately 10 per cent. between them which would be accounted for by the slightly increased cylinder diameter in the " Sir George Lloyd "?

A.—I think it is a little more than 10 per cent.

Q.—I say it is approximately 10 per cent. 10 per cent. off would be 2,700, and 10 per cent. would be 300 from 3,000.

A.—I think we put on another 20 or 25 for 3,300 horse power.

Q.—No; it is 27 and 30. The " Sir George Lloyd " is 3,000, and the " Kalu " is 2,700. That is a difference of approximately 10 per cent.

A.—All the horse powers are indicated. Your 2,700 and 3,300 are indicated, and it comes back really to the basis of 25 and 30.

Q.—Who designed the engines?

A.—We prepared the plans and submitted them for approval.

Q.—You actually designed the engines?

A.—I suppose you would say so. We designed these things under the supervision of the Naval Architect.

Q.—You would send him the complete designs of both the dredgers?

A.—Yes, but his men would probably be about the designing department, making comments while the thing is under preparation. He has a staff in Glasgow that are always going about looking after the work.

Q.—Did he send draughtsmen down to Renfrew?

A.—He would not send draughtsmen, but he would send very competent men.

Q.—You say their men would be about while you are designing them?

A.—Yes, they are always in and out to see what is going on. It saves time when we are preparing plans if they come in and indicate whether we are on the way to something that they will approve of. If they waited until the last moment and we sent the plans and we had to go and re-design the whole thing, it would be an awful waste of time.

Q.—I suggest to you there is practically no difference between the " Sir George Lloyd " and the " Kalu," except one is a little bit bigger than the other?

A.—One is a little bit bigger than the other.

Q.—It is a standard design for that class of thing?

A.—We have no standard. That is the wrong word to use.

Q.—Not for this class of ship?

A.—No.

Q.—It is a standard so far as the " Kalu " and the " Jinga " are concerned?

A.—The two vessels are alike. They are built on the same lines and patterns.

Q.—Who designed the cutter?

A.—We put forward the design for the cutter in the same way as the other detailed plans. We put forward detailed plans. They come and see them in preparation and then they are sent to them for final approval.

Q.—Is not the cutter a patented design?

A.—Not at all.

Q.—Is not Mr. Robinson's name on the actual cutter?

A.—Robinson's—it is not.

Q.—Are you sure?

A.—Yes.

Q.—Are you quite positive about that?

A.—Absolutely certain.

Q.—We are told that it is?

A.—Well, I think I ought to ask you who told you such a thing.

Q.—The engineers in Bombay?

A.—Told you that Robinson's name is on that cutter?

Q.—Yes.

A.—Well, I do not know how it got there because William Simons & Company never put it on.

Q.—Did you supply a spare cutter?

A.—We sent out one spare cutter with the ship. I do not know whether they have got a spare cutter from anybody else since or not—I do not know that.

Q.—There was one sent out to replace the broken one, was not there?

A.—I think so.

Q.—Was not that the same as the one you put on the ship?

A.—That is the same as the one we put on the ship. There is no name of anybody on it.

Chairman.— We will cable to India about that. They say positively you can see the name on it.

Sir Frederick Hopkinson.—There is a direct conflict there. Is not the " Sir George Lloyd " the most powerful dredger you have ever built in the shape of a suction dredger?

A.—So far as pumping power is concerned I think that is so, in one pump. That 3,300 or whatever it is that is spoken of as the power is the power of the pump alone. A great many foreign firms add to that, when they are speaking about power, all the other things, like the cutter engines, the winches and everything, and they make it a massed thing.

Q.—It is the power of the pump?

A.—That is right.

Q.—It is the ordinary power you would speak of in speaking of a pumping dredger?
A.—Yes, but some people in speaking of a dredger add the whole lot.

Q.—Was this dredger and the "Colaba" designed altogether between 25th July and 9th or 10th September when you put your proposals forward to Sir George Buchanan?
A.—We prepared a general arrangement plan in the first instance and a specification, and so soon as we got the order to go ahead with the work we started to work out the detailed plans. Sometimes we anticipate this and take the risk and prepare the designs before we actually get the order.

Q.—You would have to have some sort of designs before you before you quoted for such a big dredger as this?
A.—We had the design of the "Jinga" and the "Kalu" to guide us.

Q.—Their construction, as I said before, was almost identical with the "Sir George Lloyd"?
A.—The general arrangement and appearance of the thing.

Q.—Otherwise you could not have given a reasonably close price unless you had something to go upon?
A.—No, we had the experience of the "Jinga" and the "Kalu" to estimate on.

Q.—Can you tell me what was the specified test in the contract for the "Kalu" and the "Jinga"?
A.—2,000 cubic yards.

Q.—Was the specified test of the "Kalu" and the "Jinga" 2,000 cubic yards per hour?
A.—Yes.

Q.—For how long?
A.—That is what I would call a guarantee—for a certain number of hours.

Q.—That is what I want?
A.—We gave a certain number of hours—78 it was.

Q.—78 hours or days?
A.—78 hours. We worked 10 hours a day, and six of them must be dredging, so that we were bound down to at least 12,000 yards per day.

Q.—That would be mud, would it not?
A.—Soft clay, as specified.

Q.—But the clay in Bombay Harbour is always covered with a deposit of mud 12 to 15 feet thick?
A.—No, it varies a little. Up at Sewri you may only get 3 or 4 feet of mud and then you come on stiffer stuff. At other places it will go deeper. It varies considerably.

Q.—Were your tests made in the first days of the "Kalu's" working?
A.—No.

Q.—Do you know when they were made?
A.—Yes, we have the dates.

Q.—Do you know them?
A.—I do not know them now. I could not give you that off-hand.

Q.—You were out there?
A.—Yes.

Q.—How much dredging had it done before you proceeded with the official tests?
A.—It was only about a week or so—something like that. It was not very long.

Q.—After the dredger had been running for a week you made your official tests?
A.—It might have been a couple of weeks. I cannot say.

Q.—I am suggesting to you that those tests would be made very largely on mud?
A.—Nothing of the kind. We took everything we had down to the hard.

Q.—You may have taken everything you had, but everything you had may have been mud?
A.—But it was not so.

Q.—It was not?
A.—No. I can give you photographs showing lumps of clay which were discharged out of the pipe-line.

Q.—During that test?
A.—Yes.

Q.—That would not affect my remark, which I said was mainly on mud. You might be dredging for 99 per cent. of your time on mud and still be able to show me photographs of lumps of clay?
A.—But there was a very considerable amount of clay there.

Q.—Can you tell me the speed of the cutter of the " Sir George Lloyd " dredger —how many revolutions a minute?

A.—No, I think it is 116.

Q.—Not the engine but the cutter?

A.—I think it is 116.

Q.—Is not it 12?

A.—Yes, the cutter engine you are speaking of.

Q.—The cutter itself?

A.—I think it is about 12 or something like that.

Q.—We were told in Bombay there was a superfluity of power in the cutter engines. She is not working up to 50 per cent. of her possible power. Do you think it would be safe to run that cutter at an increased speed?

A.—You can run her up to the full power.

Q.—That is not what I asked you. We know you can run the engine up to the full power, but I was saying they are not using half the power of the cutter?

A.—Why not use the other half?

Q.—Because I presume the cutter is designed to cut at 12 revolutions a minute and they do not want to exceed that. I am asking you now, would it be safe to run the cutter at an increased number of revolutions?

A.—They can run that cutter as fast as the engine can drive it.

Q.—That can be done?

A.—Yes.

Q.—Perfectly safely?

A.—Yes.

Sir Frederick Hopkinson.—Will you bear that in mind, Mr. Elgee.

Mr. Elgee.—Yes.

Sir Frederick Hopkinson.—Would not it be possible if you ran the cutter faster to get a bigger output of mud and material?

A.—Under certain conditions it would. The only difficulty you might have there would be the moorings, because, of course, when you are running the cutter faster you put on a greater resistance.

Q.—You run your winch faster?

A.—Yes.

Q.—There is no greater resistance but you run your winch faster?

A.—There is greater resistance surely on the wire.

Q.—You run your winch faster?

A.—There is a bigger pull on that wire and you may bring the anchor home.

Q.—Not if it is properly anchored and properly secured?

A.—That is so. The point about that is that with all dredging work it is a troublesome business to keep the anchors in the ground.

Q.—It all depends on the holding character of the ground?

A.—A great deal, I agree, depends on that.

Q.—Altogether? I want to press the point once more about your definition of the clay. In your letter of the 12th September, 1919, to Sir George Buchanan,* you say : " Referring to your esteemed communication of the 25th July, we have now had an opportunity of very carefully considering the plant required for this work and have pleasure in putting before you the following particulars of the plant which in our opinion may be expected to meet your requirements." His requirements were to dredge the clay lying in the bottom of the harbour, were they not?

A.—His requirements, as stated to us, when we explained we could not deal with hard clay, was that it was going to——

Q.—His requirements were dealing with the clay in Bombay Harbour?

A.—Sir George Buchanan told us that he was willing to take this mud and soft clay and to leave the other. I do not know anything about it.

Q.—Were not his requirements to dredge the clay and mud in Bombay Harbour?

A.—He was to take——

Chairman.—Answer the question. You are put a perfectly simple question. Were not the requirements of Sir George Buchanan to dredge the mud and clay in Bombay Harbour?

A.—Yes, to dredge the mud and clay.

Sir Frederick Hopkinson.—That is a simple answer. You then were quoting for a vessel according to his requirements which did not say " soft clay "?

* Sir George Buchanan's published report of September, 1919, page 17.

A.—We put it clearly in our letter that what we offered for was for dealing with " soft clay."

Q.—You must answer this question with a plain yes or a plain no. Did you know that his requirements called for a dredger to dredge clay only?

A.—We knew nothing of the kind.

Q.—You had his letter but you say you did not know. He says in his letter " the clay." He does not say " soft clay "?

A.—No, but we told him we could not do with the plain " clay." We did not accept that.

Q.—You did not tell him that in your letter of the 12th September?

A.—I recognise that. I have said so already. We did not tell him that in that letter.

Q.—His requirements I put to you were to dredge the clay as it existed in Bombay?

A.—That may be so. It does not really matter. The point is that we did not tender to do that.

Q.—I do not want to use an offensive word, but it looks to me as if you are trying to make the Committee understand that you were playing a trick on Sir George Buchanan?

A.—No, we were playing no trick whatever. The whole thing is quite clear.

Q.—Is not that the obvious inference?

A.—The whole thing is perfectly clear. We explained to him we could not deal with this word " clay," because it might mean soft clay or stiff clay or hard clay or anything of the sort.

Q.—You knew that better than he did. You knew the quality of the clay better than he did?

A.—He told us we should get enough of soft clay to do the filling.

Q.—He does not say " soft clay." He says " clay "?

A.—I know he does not say " soft clay " in his letter, but he did say it.

Q.—When?

A.—At this meeting, when we discussed it.

Q.—Do you know why he did not put it in his letter?

A.—He just used the ordinary words.

Q.—His requirements were to dredge clay from the harbour. He does not say " My requirements are to dredge soft clay "?

A.—No; he does not say anything of the kind. It is only when we pointed out that we cannot touch the thing if it is to deal with hard clay at this rate—

Q.—Did he alter his requirements then?

A.—We told him we would make this offer to him on this basis, and we did so make it.

Q.—At this interview did you say to Sir George Buchanan: " Our offer will be based upon dredging soft clay only "?

A.—Yes.

Q.—You did?

A.—Yes.

Q.—We cannot have anything more definite than that. The fact of testing a dredger in Bombay was not an unknown thing to you? You had already had an order for building dredgers to be tested in Bombay?

A.—Yes.

Q.—Do you know why you refused to do it in the case of the " Sir George Lloyd "?

A.—Well, I have already given the reasons twice, I think. One of the reasons was because from the experience that we had had already in Bombay we saw that there were some very uncertain elements in connection with this thing on account of the material. We might be put into a position where we could not get sufficient soft clay. We might have to dredge a lot of hard stuff. We might come on stone. We might do anything, and it did not appears to us to be the sort of risk that a dredger-builder should take. It was much more a risk for a contractor or for the Government.

Q.—Were you afraid, knowing the output of the " Kalu " and the " Jinga " at Sewri for their several years' work, that you would not be able to get 2,000 yards from the " Sir George Lloyd " and the " Colaba "?

A.—We should not get it in hard stuff, and with the soft stuff we did not know what was happening there; whether it would be satisfactory or whether there would be anything else there which would prevent our getting that output.

Q.—You had been working on the Sewri reclamation for years. You told us you were out there twice a year?

A.—Yes.

Q.—Therefore you would know everything these dredgers were doing?
A.—That is so.

Q.—In addition to that you had weekly reports from the dredging masters and the chief engineers?
A.—That is so.*

Q.—So that you would be in close touch with all the work done on the Sewri reclamation?
A.—Quite so.

Q.—In fact, you know almost as much as the people out there who were doing the work?
A.—Yes; I believe so, because they were always telling me about what they were doing.

Q.—Can you tell me when you first heard of the poor output of the " Sir George Lloyd " dredger?
A.—I am afraid I cannot tell you exactly, but it was some time after the first season's work, I think.

Q.—Have you ever had a similar case of vibration in any other dredger or booster that you have had on the " Colaba "?
A.—No.

Q.—I understood you to say this morning that you could not give any reason for that.
A.—No; I cannot say definitely that I have got any definite reason to put forward.

Q.—I suppose no one in this country is likely to know more than your firm about the building of these dredgers?
A.—I think we have built more dredgers than any other firm.

Q.—Therefore there is some unexplained and unexplainable cause?
A.—I do not say it is unexplainable. I rather think it will be explainable. I do not see why it should not be explainable.

Q.—Have not you thought any time in the last three years that you owed a duty to the Bombay Government who bought this dredging plant from you, to do everything in your power to make this machinery a success?
A.—Yes; we have felt that all along.

Q.—Tell us what you did in connection with the " Colaba "?
A.—I will tell you what we did in connection with the " Colaba." In the first place, they wrote and told us that they thought it was because there was not a bracing above the main deck. The " Sir George Lloyd " had a cross-bracing between the main deck and the upper deck.

Q.—They told you that?
A.—Yes.

Q.—Did you agree with it?
A.—No; we did not agree. We told them that the vessel was built without that because it was very much stiffer than the other one, and we did not think it was necessary. We said: " At the same time, if you think we are wrong in this matter we are quite willing to send out material to put that bracing in, provided you put it in at your own expense." We sent the material out, and I believe they put it in. I think I am right in saying that they reported afterwards that it was worse when it was in than before it was put in.

Q.—It did not really make any difference?
A.—It did not make any difference.

Q.—What else did you advise them to do, because you must remember all this time you are more or less in the nature of an expert adviser to the Bombay Government, and that you had great moral liabilities in India, having built so much dredging plant for Bombay?
A.—We were always anxious to help them; we are now.

Q.—I have heard you say that. I want you to tell me what you did actually?
A.—That is one thing we did, as far as the " Colaba " is concerned.

Q.—That is something which you say you knew was going to be no good before you did it. What did you do really to help them out of this difficulty?
A.—I think we made the suggestion—it may have been indirectly—that they should try to find out whether the fitting of an automatic valve near the pump would help it.

* Mr. McMurray notes that this answer relates to the "Sir George Lloyd's" first season and not to Sewri. He had no weekly reports from the men on the "Jinga" and "Kalu."

Q.—That was done and sent out, I believe?

A.—Well, no; it was not done and sent out, if I may say so. They had a valve there already in the ship. They opened it a little to see whether the opening of this valve would do any good, and they wrote home and said it did no good at all.

Q.—It took 20 minutes to open?

A.—It took 20 minutes to open.

Q.—You cannot stop a dredger for 20 minutes to open a valve?

A.—No.

Q.—It would be ridiculous; you cannot do it.

A.—It was not put in for that purpose.

Q.—What else did you do?

A.—We suggested then, as I say, some sort of automatic valve that would open.

Q.—We have got past the valve stage. That was useless and impossible to use.

A.—After that, or, it may be, at the same time, they said they thought it was not that at all, but that it was the bottom of the ship that wanted stiffening. I believe, I do not know, that they started to stiffen it. I do not know whether they finished it or not, but they put additional stiffening in the bottom of the ship.

Q.—I know they did that, but my question to you was: What did your firm do to help the Bombay Government in this difficulty?

A.—That is all they have done so far.

Q.—I am asking you what you have done?

A.—That is all we have done so far.

Q.—You have done nothing else?

A.—Nothing else than that.

Q.—Therefore, if we are in an insoluble mystery you, with your anxiety to do anything for the Government, should have done it before now—is not that it?

A.—Well, we are waiting for an opportunity to do something.

Q.—This is three years ago?

A.—I know it is three years ago, but we cannot always get somebody to go out there at once and see what is the matter.

Q.—You think you will be complying with your moral obligation to the Bombay Government if you do something some time in the future? That is all it boils down to?

A.—No. If they could have indicated to us——

Q.—No; that is not my point at all. It is not what they are to do, but it is what you are to do?

A.—You think that we should have gone out at once?

Q.—I am putting to you that you should?

A.—Very good.

Q.—You think you should not, except when it is quite convenient, after a lapse of some years?

A.—No. We will do it at the first opportunity that is rendered.

Q.—You will, or you have done it?

A.—We have not done it.

Q.—It happened some two years ago?

A.—Yes; I believe it is some time ago since the thing began. There has been a great deal of controversy about it.

Q.—When are you going to send out?

A.—If they decide to give this matter any further consideration, and they wish us to take part in it, I have not the slightest doubt we shall do it.

Q.—I cannot get a plain answer from you. The engineer of the Indian Marine who examined the " Colaba " told us in evidence that the vibration was so great that the funnels worked like *that*, three inches each way, so that they came nearer at the top by six inches, and that a very large number of rivets in the framing of the ship near the keel were loose, and that they put certain stiffeners in. Since then they have taken the engines right down. The engine seating was loose on its bed. We do not know what has been found. I am going to try you once more as to what was your moral duty under the circumstances of having supplied this expensive dredging plant to Bombay. I will put it quite plainly also—your duty to your own reputation. In view of both those things, why have you not done something to get this dredger put into working order?

A.—You are speaking now all the time of the " Colaba," and you are speaking as if we were entirely responsible for this vibration.

Q.—I am not saying anything of the kind. I am asking you what you consider your duty to the Bombay Government should be under the circumstances?

A.—If we have no responsibilities we have no duty.

Q.—You have no duties?

A.—If we have no responsibilities.

Q.—It is like this question of clay?

A.—The question of clay is quite clear, in my humble opinion.

Q.—You have no responsibility?

A.—We made clear what we were offering.

Q.—You have no responsibility, moral or material?

A.—We stated definitely what we were offering, and that offer was accepted.

Chairman.—The position is this. Your firm has had some £855,000 for the goods supplied by you?

A.—Yes.

Q.—There is no controversy, as you put it a moment ago, about the output of the "Sir George Lloyd." From 8th December, 1923, until the monsoon period of 1924, the dredger was turning out 1,020 cubic yards per hour. There is no controversy that in the next year she turned out 856 cubic yards an hour. That, in your view, is a serious state of things, is not it?

A.—It all depends on what the material is.

Q.—Never mind the cause for the moment. It is a serious state of things when that happens, is it not?

A.—For which we are not responsible.

Q.—Never mind that, but answer the question. Is not it, in your view, a serious state of things?

A.—That is so, from their point of view.

Q.—A serious state of things?

A.—Yes.

Q.—If that state of things got no better it would mean that the reclamation would take at least twice as long as was estimated for. That follows, does it not?

A.—Quite.

Q.—If it takes twice as long when you have a million pounds of plant lying about and a very expensive sea wall, the whole enterprise is going to be swamped in interest, is it not?

A.—That follows.

Q.—Now the "Colaba" on her trials showed a vibration, and Sir John Biles stated that he could not give the cause. I read you the exact words a few moments ago. Sir John Biles said there was no satisfactory explanation of the vibration?

A.—Vibration out at Bombay, I believe.

Q.—I think you will find this is not Bombay at all. This is the written statement of Sir John Biles: "As far as can be ascertained from the evidence or other source available there seems to be no satisfactory explanation forthcoming of the cause of this vibration. Apparently it is the vibration that has done the damage."

A.—The vibration out at Bombay, yes.

Q.—These matters having been brought to your notice some two years ago, did not it occur to you that the natural thing to be done was for you, or some other member of your firm of high position, to go straight out to Bombay?

A.—I do not see that we were obliged to go out there.

Q.—I am not putting it as a question of legal obligation.

A.—All right.

Q.—I am putting it on a much higher plane than that. Was not there, in the circumstances, a duty upon you, or on somebody highly qualified, to go straight cut to Bombay and say: "Let us help you"?

A.—Well, that may be your view.

Q.—Is not it your view?

A.—No; I do not think so. If they had shown that we were responsible for this, then I should have said Yes at once. We cannot be responsible for this.

Sir Frederick Hopkinson.—Then the law would have said Yes?

A.—Of course it would.

Q.—But, as the Chairman said, he was putting it on a much higher plane than that. Perhaps you do not know what that means?

A.—Yes; I do.

Q.—You have not answered the question as if you did. Can you tell me the capacity of the " Sir George Lloyd " to pump water in cubic yards per hour?

A.—No; I cannot tell you that offhand.

Q.—Surely it is a matter you would know?

A.—Well, we have so many pumps that I could not carry them all in my head.

Q.—Could you let us have it to-morrow?

A.—I will endeavour to let you have it to-morrow.

Q.—Its capacity under working conditions to pump water per hour?

A.—Yes.

Q.—I take it you were not personally responsible for the trials on the Clyde?

A.—I was never near them. I believe I was in India at the time.

Q.—Then I need not ask you anything about it. I presume you would expect to get better results when the pumps and apparatus were new than after they had been working for a year?

A.—No; I do not know that I would say that.

Q.—Does not wear quickly affect the output of a centrifugal pump?

A.—If you are dealing with very gritty material it does.

Q.—With any material?

A.—No.

Q.—Than if you are only pumping water?

A.—No.

Q.—You tell me, as an expert, that the wear on the impeller does not make any appreciable difference?

A.—No substantial difference on a year's work.*

Q.—It does not?

A.—No.

Q.—That is a most extraordinary statement. Did you give this price of September, 1919, in competition with other dredger-builders?

A.—Well, we do not know for certain about that, but we had a sort of notion that other people were tendering at the same time.

Q.—You had?

A.—Yes.

Q.—What was the first you knew about the acceptance of your offer?

A.—We got it from the Director General of Stores, I suppose.

Q.—You only suppose that?

A.—Yes. I am pretty certain. We could not get it in any other way so far as I know. Many things happened in between in the way of altering the price. The prices were going up all the time.

Q.—Did the specification say where the trials were to be carried out?

A.—The trials were to be carried out in this country.

Q.—Did the specification say so?

A.—I believe so.

Sir Frederick Hopkinson.—I have my doubts about it.

Chairman.—The letter of September 12th said so, but here is the specification and it does not say so.

Sir Frederick Hopkinson.—I thought it did not say so. Have you a copy of the specification?

A.—I was under the impression it said so.

Chairman.—There is no reference to the Clyde in the specification, but the test is to be to the satisfaction of the Naval Architect?

A.—I think that is right. It is at the foot of page 2.

Q.—Your letter of September 12th says: " If ordered within three months of this date we could have the dredger ready for trial on the Clyde within 12 months "?

A.—Yes, that was the first offer.

Q.—Then in the specification all that is said is that the vessel is to be tested for dredging to the satisfaction of the Naval Architect?

A.—I think that is right.

Sir Frederick Hopkinson.—In your written replies to our questions you said that before you could give a guarantee as to output in Bombay you would require a guarantee as to the class of material to be dredged?

A.—Quite.

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* Mr. McMurray notes that he was referring to an engine pumping water only.

Q.—Can you tell me what that means?

A.—It means that we should not have any quibbling like we are having now about the nature of the material.

Q.—How could anyone give you a guarantee when you say the clay varies?

A.—How could they expect us to give a guarantee?

Q.—Answer my question. How could anyone give you a guarantee as to the nature of the material when you say it varies?

A.—I do not know that they could.

Q.—They could not?

A.—Just in the same way we could not give a guarantee.

Q.—Therefore what does your answer mean—it does not mean anything?

A.—It means we could not be expected to give a guarantee if they could not give a guarantee of what it was we were to give a guarantee of. That is perfectly clear.

Q.—Unless they guaranteed something which you know it was impossible for them to guarantee, in other words?

A.—They are asking us.

Q.—Can you remember if you gave a guarantee in the case of the " Oswald " and the " Campbell "?

A.—I believe all those vessels were tried and accepted on the Clyde.

Q.—They were designed to cut and pump hard clay?

A.—That may be so in the specification.

Q.—They accepted them with a test on the Clyde?

A.—So far as I recollect that is the position. They are tested on the Clyde. At any rate they went out and did their work very well.

Q.—In the paragraph I read to you from that Institute of Civil Engineer's book this morning it was stated there by your Chairman that your firm devotes particular attention to their designs to meet the conditions of their intended employment?

A.—That is right.

Q.—The intended employment of the " Sir George Lloyd " was to dredge Bombay clay. What particular attention did you devote to the design of the ship to do that work?

A.—We went very carefully into the whole thing and we put forward an offer to dredge this soft clay.

Q.—That is to say you did not pay any attention to the intended employment of the dredger?

A.—Yes, we did.

Q.—But you say the clay is not soft?

A.—Down below, but I say stiff also. We designed a thing so that it can dredge all the clay in the harbour but the rate of output is based on soft clay.

Q.—I am going to put a final question to you and it is this. When your firm constructed the "Sir George Lloyd," they knew and you knew intimately the conditions prevailing at Bombay and required no further information to enable you to design a dredger to meet the requirements?

A.—We knew as well as anybody and we made that dredger to do everything in the harbour short of the rock, and she will do that.

Q.—Short of the rock?

A.—Yes.

Chairman.—But not at the rate of 2,000 cubic yards an hour?

A.—No.

Sir Frederick Hopkinson.—There is no question of any other rate. It is not mentioned in the correspondence from beginning to end. No other rate than 2,000 yards is ever referred to from start to finish?

A.—I know, and that is the only plant we could give them, a plant to do soft clay which would reach that rate.

Chairman.—Let me see if I clearly understand the position you are taking up. You say : " We contracted to give you a dredger which would dredge 2,000 cubic yards per hour of soft clay "?

A.—That is right.

Q.—But we knew perfectly well that the moment you got into anything like stiff clay the dredger would slow up and would not give an output of 2,000 cubic yards an hour." Is that right?

A.—That is so. If that was the maximum output, 2,000 yards, she would do less in stiffer material.

Q.—Did you ever tell Sir George Buchanan the fact that when the dredger was employed on anything except soft clay her output would diminish?

A.—Yes, we explained it quite clearly to him.

Q.—You explained it quite clearly?

A.—That they were 2,000 yards an hour of soft clay.

Q.—When was that?

A.—At this discussion.

Q.—At this interview that you place in August?

A.—That is right.

Q.—If you explained that to him clearly can you understand his basing the whole of his calculations on the fact that the dredger that you were going to supply would turn out 2,000 cubic yards for 15 hours a day for 170 days of the working year?

A.—Yes, in soft stuff.

Q.—He says nothing about "soft stuff." He describes the clay as hard in his own report?

A.—We explained to him that this machine will do soft, and he says he is going to make the reclamation with soft stuff.

Q.—Where?

A.—He said so to us—that he was going to use the soft stuff.

Mr. Billimoria.—He could not have said that.

A.—Why not?

Chairman.—Do you assert that Sir George Buchanan told you that the Reclamation was going to be made with soft stuff?

A.—He was going to take all the mud and all the soft clay and make that Reclamation. There is more than enough according to the figures to fill that Reclamation.

Q.—We know that he was working on Mr. Kidd's report?

A.—Yes.

Q.—This is what Mr. Kidd says: "The clay, which is stiff and unctuous, hardens into perfectly solid ground in a very short time. As far as possible in the course of the execution of the work the clay would be preferred, not only because of its greater suitability for making land, but also because for dredging purposes its stiffer and more tangible character enables a higher percentage of solid material to be transported by the pumps." That is directly opposite to everything you have been telling us, is it not? There he was relying upon the stiff clay for the Reclamation?

A.—That may be so. I do not know what he is relying on.

Q.—At all events have you got anything in writing to indicate that you ever told Sir George Buchanan that this dredger once it got into anything beyond soft clay was going to slow up in its work?

A.—I do not know that we have.

Mr. Billimoria.—I shall follow up the Chairman's questions. Where did you get the indication that the clay was soft?

A.—We understood that one-third of the material was mud. We had three times as much material as was required for filling in from that area that was to be dredged, and that about one-third of that was mud and about 50 per cent. was soft material. The other was harder materials.

Q.—Except in your letter of the 12th September there is nothing on the record, in any letter, document or paper before us, where any indication has been given with regard to this clay being soft?

A.—I believe that is so. I gather that from what the Chairman has said.

Q.—You gave that indication and nobody else?

A.—We gave that indication of soft clay as the capacity.

Q.—I am not asking you about the capacity. I am only asking you with regard to the clay for the moment?

A —Yes.

Q.—You gave that indication that the clay was soft?

A.—Yes.

Q.—And that indication you gave was from your own personal experience and knowledge of the material that was to be found in Bombay Harbour?

A.—There is plenty of soft stuff in Bombay Harbour.

Q.—You based your estimates on the basis of your own personal experience and knowledge?

A.—If he had told me he wanted to take all the stuff down at the bottom of the harbour, to use the whole of that at 2,000 yards an hour, we should have been obliged to give him something else—two dredgers.

Q.—That is not an answer to my question. Perhaps you will kindly confine your attention to the question and be so good as to reply for we shall be saving a lot of time. There are other witnesses to be examined and we do not want to waste our time.

A.—Yes.

Q.—You need take no offence at my remarks, but this is the position. There was nothing except in your letter of 12th September which indicated that this was soft clay, and that indication was based on your own personal experience and knowledge of the material to be found in Bombay Harbour?

A.—We used the words "soft clay" ourselves to indicate the capacity of the dredger we were offering.

Q.—You also told us in the course of this examination that you mentioned this fact to Sir George Buchanan?

A.—Yes, we did.

Q.—Are you absolutely positive about that?

A.—Yes.

Q.—Do you mean to suggest that Sir George Buchanan's memory was so very failing that within a month of this interview between you and him, he should go and write this report without mentioning a word about soft clay. Is that your suggestion?

A.—I do not know anything about it. I never saw his report.

Q.—Would you expect an engineer in a report to which he has put his signature in regard to a scheme of this magnitude to mention the important fact that he was dealing with soft clay, and yet in fact he describes in the report the material to be "hard clay which lies below the mud over the area," and so on?

A.—I do not know anything about that. I know nothing about it.

Q.—How could an expert engineer have given that report if there was a discussion of the kind you have stated?

A.—I have told you exactly what happened.

Q.—Can you produce any document, any record, or any note of the interview?

A.—The only record we can produce is the tender we offered.

Q.—You rely on the tender?

A.—Yes.

Q.—In which you have put the words "soft clay"?

A.—Yes.

Q.—But that tender is in response to the letter of Sir George Buchanan of July?

A.—Yes.

Q.—In which Sir George Buchanan gives no indication whatever of that, but simply talks of "clay"?

A.—That is right.

Q.—Therefore, any indication that has been given is your own indication, is it not?

A.—We indicated clearly, as a result of this interview we had, what we were offering—a dredger to do soft clay. Nothing else but soft clay was the basis of the output.

Q.—Would the dredger have been otherwise if it was stiff and unctuous clay?

A.—The dredger would have been practically no different if it had been stiff and unctuous clay except the output. The output would have been half, or something less than that.

Chairman.—You are not quite following Mr. Billimoria's question. The question is: Would you have constructed a dredger of a different character if you had guaranteed it to work 2,000 cubic yards per hour in stiff clay?

A.—No; we would not have constructed one of a different character. It would have been much the same, but there would have been two of them.

Q.—Again you are not following the question. What Mr. Billimoria wants to find out is this. Supposing you had been told this dredger has to work in stiff clay and also in hard clay, would you, in writing the letter of 12th September and in giving the specification, have put in a totally different specification for a dredger that had to do work of that kind?

A.—This specification would have been, practically speaking, the same. The only difference would have been that this dredger would have been doing, say, 1,000 instead of 2,000. That is all.

Q.—You do not follow the question. Mr. Billimoria was taking the case of a man who says: "I must have a dredger capable of dredging 2,000 cubic yards per hour of stiff and hard clay." Would you or would you not have provided the same specification, or a totally different one, and at a totally different price?

A.—A totally different one at a totally different price—absolutely.

Chairman.—That is your point?

Mr. Billimoria.—Yes. You would have suggested a totally different plant?

A.—Yes; it would have been much bigger and more powerful.

Q.—Do you suggest now that that matter was discussed with Sir George Buchanan at the interview?

A.—We told him that this was all we could put forward to do 2,000 yards an hour, and if that was not sufficient they would have to get two dredgers.

Q.—Did you tell him that?

A.—Yes.

Q.—It could not have been so because when the order was placed it was distinctly understood that plant was to be built such as would be capable of producing 2,000 cubic yards an hour.

A.—Of soft clay.

Q.—I am asking you whether that point was discussed with him—where does the question of the two dredgers come in? It was a question of a plant capable of producing 2,000 cubic yards an hour. That was the whole point that was discussed, and nothing more.

A.—Well, I explained that. I have explained that that was all we could do if he wanted one dredger for this.

Q.—Did you indicate in your letter of the 12th September that this matter was discussed—that if the clay was otherwise there would be two dredgers required? Do not you think any manufacturer would do it?

A.—The thing was all thrashed out, and this dredger would fit the bill. This dredger would do 2,000 yards an hour of soft clay. It would take any hard stuff there was in the harbour, but its capacity was based on the soft clay.

Q.—If this was going to make a material difference with regard to the output to the extent of cent. per cent., do you want me to believe that a manufacturer would not go and record that in the correspondence or in the agreement or document that he is entering into?

A.—It is quite clearly in writing what we were offering—what we put forward as an offer.

Q.—You have given no indication of that.

A.—It is all there in the tender, what we offered.

Q.—You are relying only upon one word, the word " soft " clay. I want to know whether in the letter of the 12th September you have given any indication to say if the material was otherwise there will be double the plant required, and the cost will be so much more.

A.—You know yourself it is not there. You have read it. It is not in that letter.

Q.—If this matter had been discussed it would have been there. That is what I suggest.

A.—Well.

Q.—If I was placing an order with you surely you would bind me by saying that if you want plant of this description my cost will be double?

A.—It was not done. It was discussed there, and the result of the discussion is that tender of ours.

Q.—You see that whatever transpired between you and Sir George Buchanan was not known to the outside world—and was not recorded on a scrap of paper, or a scrap of writing in your office or outside it.

A.—I do not know anything about that. I only know what we did ourselves.

Q.—When you passed your specification did you call for any material or sample?

A.—No; we did not.

Q.—Because you had your own experience of the material, and you relied on it?

A.—We know what soft clay is. That is what we relied upon.

Q.—You knew what material there was in that harbour, and therefore you did not call for any sample. That is how I put it to you as a plain question. Is not that so?

A.—I am sorry I do not quite follow the question you are putting.

Q.—You did not call for any sample from Bombay?

A.—We did not.

Q.—Because you knew what material this dredger was built for?

A.—We knew what material we offered for. That is the whole point.

Q.—How could you offer for anything which does not exist? I might want to say a gold mine should come out of Bombay harbour. Would you say: " Here is something that I offer, but it is not a gold mine "?

A.—There is soft material in Bombay harbour. There is soft clay.

Q.—So that you need not call for a sample because you knew there was soft material there?

A.—There is soft material there.

Q.—It was your own inference, your own belief, and your own knowledge.

A.—There is soft material.

Q.—How long have you known Sir George Buchanan?

A.—I cannot recollect. It is a number of years now since we first met him.

Q.—How many?

A.—I really could not say. The War is a little bit of blank—ten years or something shoved in there. I really do not remember when I first saw the gentleman.

Q.—Would it be 10, 15, or 20 years ago?

A.—I think it would be about 15 years.

Q.—When did he first approach you in respect of placing an order for a dredger in connection with the Bombay development scheme?

A.—I am trying to remember that this morning.

Q.—Well?

A.—I could not quite remember what it was. It was shortly before he sent the letter to us of the 25th July.

Q.—A little before that?

A.—Shortly before that.

Q.—You discussed very freely with him the whole situation?

A.—Yes; there was a sort of broken discussion one way or another, because at that time nobody was quite sure whether the scheme was going on or whether it was not going on.

Q.—How many interviews had you with him?

A.—I really could not tell you how many. We had interviews one way or another, but the first substantial interview took place at Renfrew.

Q.—At that interview was it practically fixed up that you were to get this order for the dredger if the scheme went through?

A.—No; nothing of the kind. We were tendering for the job. We were going to submit a tender later on. He came there to explain clearly to us the type of plant that he wanted.

Q.—Did you submit any tender or tenders?

A.—We did submit a tender.

Q.—When?

A.—I think you have got it. You have quoted from it several times. It is the 12th September, 1919.

Q.—So Sir George Buchanan discussed with you all the details with regard to the specification of the dredger and what was practically required for Bombay harbour before you submitted a tender?

A.—Yes; he came up and explained to us the type of plant he wanted, and showed us how the pipe lines were to go across the land, and discussed the general question of the dredger. He gave us an indication of the size of boat he wanted, the same as he did in his letter. It is on the basis of that. His letter was really the basis of the discussion.

Q.—In that letter he has given an indication that if there is any material variation he would accept your advice. Did you ever offer him any advice?

A.—I do not quite follow what you are meaning.

Q.—" The proposals I have outlined above are subject to modification if your experts can suggest improvement, and I should like to meet you at Renfrew and discuss details personally at a later date when you are ready for me to do it."

A.—That is quite right. He came and discussed this business and asked us to put forward an offer for a dredger which would do 2,000 yards an hour. That is the basis of what he wanted to do. That is the nearest we got to it.

Q.—Did you give him any indication of any improvement on what he suggested. You prepared the specification and you carried out the thing?

A.—We prepared the design and specification and sent it to him with our tender.

Q.—So that there was no improvement necessary on that?

A.—Well, that is just like giving outlined particulars of what he wants. We made out a specification and tracings and sent it on with our tender.

Q.—Does not that letter indicate that he depended on you materially with regard to expert advice in a matter like this?

A.—Well, you cannot throw the responsibility of the scheme on to us, the dredger builders.

Q.—I am throwing no responsibility on you. There may be something at the back of your mind which I want to get at. Perhaps it is the prickings of conscience?

A.—Nothing of the kind.

Q.—No member of the Committee has ever suggested there is any responsibility on you for the scheme.

A.—What is it you are suggesting now?

Q.—I am suggesting when Sir George Buchanan wrote that letter he depended upon your knowledge and experience and solicited your advice?

A.—We gave him our advice.

Q.—Did you, in September, 1919, agree to build the plant at a cost of about £500,000?

A.—Yes, you have got all these figures.

Q.—About £499,000?

A.—Yes.

Q.—So that before he submitted his report the question of placing the order was practically settled between yourselves?

A.—Nothing of the kind. We submitted a tender.

Q.—What was the arrangement between you?

A.—The only arrangement arrived at was that we should submit a tender. We rather guessed that we should be in competition with other people. That was the beginning and end of it so far as that is concerned. We sent in our tender and then a long time elapsed before we heard anything about it.

Q.—Did you sleep over it after you submitted your tender or were you keen on getting the order?

A.—It may help you an enormous amount, I think, when I tell you when the official order came to be placed we had stipulated for a conditional price, and when I saw Sir John Steevens, who was Acting Director-General of Stores, about the placing of this order he was rather keen on getting a fixed price. We did not know where prices were going to and we did not want to have anything to do with a fixed price. We wanted a conditional price. If the rates of wages and materials went up they would pay us more, and if they went down we would pay them back something, whatever the difference in the rate. He pressed this point, so far as I recollect, and I told him that we really did not care whether we got the order or not if it was going to be a question of fixed price, because we felt we could not take the risk of that fixed price.

Q.—Were prices varying very materially?

A.—Yes, nobody knew where they were going to.

Q.—To what extent?

A.—I could not tell you off-hand to what extent, but everybody knows they were varying very considerably, and we did not accept the fixed price.

Q.—I would like to know what the percentage was?

A.—Percentage of what?

Q.—Of the variation in the prices?

A.—Between certain dates. What dates do you want, and I will endeavour to get it.

Q.—The order was placed on the 15th June, 1920?

A.—What dates do you want the information from?

Q.—Between September, 1919, and June, 1920, I want to know was there any material variation in prices and to what extent?

A.—I will make a note of that and try and get the information if you want it.

Q.—You know that you quoted for this plant less than £500,000 in the beginning, and subsequently when the order was placed it went up to £850,000?

A.—You want the difference between those two?

Sir Frederick Hopkinson.—That is not quite right. £855,000 is the total cost of the dredging plant and covers the "Kalu" and "Jinga."

Chairman.—And the extra pipe-line.

Sir Frederick Hopkinson.—Made in Bombay.

Mr. Billimoria.—Even then there has been a very substantial advance.

Sir Frederick Hopkinson.—I believe it was first £615,000.

Mr. Billimoria.—We will take it at £615,000. Had prices advanced by £100,000 in respect of the plant within this short period?

A.—The prices had advanced so greatly that we could not see our way to take the risk of having a fixed price and we had a conditional price. As it happened, the prices did not go up as we expected them to, and we eventually paid back to the India Office a sum which was round about £30,000, because the rates of wages and materials had gone down.

Q.—I take it that you are a Limited Liability Company?

A.—Yes.

Q.—Or is it a private concern?

A.—We are a Limited Company.

Q.—Private or public?

A.—We are a public Limited Company

Q.—What is your total paid up capital?

A.—The total paid up capital, I think, at the present moment is £325,000- it may be £375,000, but I forget.

Sir Frederick Hopkinson.—I think it is £375,000.

A.—Yes.

Mr. Billimoria.—You have declared dividends to the tune of 30 per cent., as was read out by Sir Frederick this morning, just about this period?

A.—Yes. We do not get all our money from building dredgers.

Q.—There are other sources of income also?

A.—Yes.

Q.—How long were you busy on building these dredgers?

A.—Well, I think they took about a year to build.

Q.—What profit did you make on them?

A.—On the dredgers?

Q.—Yes?

A.—I could not tell you.

Q.—You could not tell me?

A.—No.

Q.—But you had given an indication to the Director-General of Stores that you were prepared to accept the cost plus 10 per cent.?

A.—I believe that was one of the offers we made for something in connection with this.

Mr. Billimoria.—That is why I am asking you what profit you made on this bargain which enabled you to pay 30 per cent. dividend.

Sir Frederick Hopkinson.—It was 46 per cent. one year.

Mr. Billimoria.—It could not have been 10 per cent. on this order which would enable you to declare a dividend of 46 per cent.?

A.—That is quite evident.

Q.—So that you made much more than 10 per cent.?

A.—No.

Q.—Therefore you have not morally carried out your contract with the Director-General of Stores?

A.—Nothing of the kind.

Q.—Will you please explain if it is nothing of the kind what else is the kind?

A.—The kind is this, that we had a price at which we offered to build this dredger with the condition that if the prices went up so much they would pay us so much more and if they came down we would give them the rate of difference. That is it.

Sir Frederick Hopkinson.—It was not a contract to build the entire dredger at 10 per cent. on the cost?

A.—No, nothing of the kind.

Mr. Billimoria.—In one of the letters that indication has been given.

Chairman.—It was altered.

A.—I have already explained to you that it was a conditional price. We put in a sum there and we had this condition, that if the price rose up we should get more.

Mr. Billimoria.—You made a very handsome profit on this transaction?

A.—I do not know that we did.

Q.—At any rate, you have made more than 10 per cent.?

A.—I tell you already I do not know actually and honestly what profit we did make out of it.

Q.—This order helped your company to make some substantial profit?

A.—I should be sorry to learn that it did not.

Q.—Therefore, you had a moral obligation towards the Government of Bombay who had favoured you with the placing of this order?

A.—We always reckon that we endeavour to look after anybody who does anything for us in the way of placing an order.

Q.—How have you shown that gratitude—by sleeping over it and by not taking any care when you learnt that the plant was not working satisfactorily? That is your gratitude?

A.—I do not think that you are doing rightly here in saying all these things to me.

Q.—I am asking you a plain question.

A.—No. You are putting most insinuating remarks to me.

Mr. Billimoria.—It is not an insinuating remark at all. I am asking you if you made a handsome profit on a transaction is not it your moral duty to help them when they are in difficulties? It is not an insinuation.

Chairman.—What do you say to that? Whether you made a profit or not, you having undertaken the work, when they got into difficulties, Mr. Billimoria wants to know whether you were not under a moral obligation to go to the assistance of the Government of Bombay and try to put things right. That is the question.

A.—We have been always willing to do it.

Chairman.—You had better leave it, I think. The facts are quite clear.

Mr. Billimoria.—Were you very busy at the time these orders were placed with you?

A.—I think nearly everybody was busy.

Q.—If you were so busy, were you absolutely safe in taking this work in hand at that time? You were not so busy that you could have taken on this additional responsibility: May I put it in that way?

A.—I suppose we made room for it. If we had other responsibilities at the time, we made room for this—if we had them. At any rate, we took it on.

Q.—In the course of your evidence this morning you said that the men who were working on the dredgers complained that they wanted more money; that when you went out to Bombay somebody complained to you they were not doing satisfactory work because they were out for more money?

A.—I said nothing of the kind.

Q.—Will you kindly try to recollect?

A.—We were speaking about the "Kalu" and the "Jinga" at the time. Sir Frederick Hopkinson asked why one boat had done so much more than the other.

Sir Frederick Hopkinson.—It was in answer to a question from the Chairman as to why the output was unsatisfactory, and whether it was the fault of the dredgers or not. You said it was not the fault of the dredgers but that the men were not doing the work properly, and they actually complained to you that they wanted more money.

Mr. Billimoria.—I did not interrupt then, but I wanted to know whom you meant by "they"?

A.—Pardon me. I do not think I ever said that in connection with this boat at all. You will see it from the shorthand note. Do you remember my saying it, Sir?

Chairman.—My belief is that you were referring to the "Kalu" or the "Jinga" when you were there some time ago?

A.—That is my impression.

Q.—You were speaking about the "Kalu" and "Jinga." There is no suggestion that you had been on board the "Sir George Lloyd" in Bombay seeing her at work, is there?

A.—I have been on board the "Sir George Lloyd"—the first season she worked.

Mr. Billimoria.—Did anybody complain to you at the time that the output was not satisfactory?

A.—No. There was no complaint to me about the output while I was there. Nobody ever complained to me in Bombay about the output.

Q.—When did you know about it?

A.—Afterwards.

Q.—Through Meik and Buchanan?

A.—Yes.

Q.—How often have you been on the "Sir George Lloyd"?

A.—I do not know; perhaps half-a-dozen times.

Q.—During one visit, or several visits to Bombay?

A.—I think it was two visits to Bombay.

Q.—During both your visits you had no knowledge that she was not doing the work satisfactorily?

A.—No.

Q.—Nobody ever mentioned it to you?

A.—I said at the time that the material we saw there was stiff—some hard bits, and I pointed out that they would not do so much in that stuff as they would do in the lighter stuff.

Q.—You knew very well that you were to give evidence before this Committee some days ago?

A.—Yes, it is a few days ago now since it was arranged that I should come here.

Q.—And you have refreshed your memory by going through all the relevant papers and documents in order to answer any questions that might be asked you in connection with the dredgers that you have built?

A.—I have read through all these *here*.

Q.—And through your own papers as well?

A.— I have endeavoured to find replies to these four questions.

Q.—You have read through all your papers as well to refresh your memory?

A.—I could not read through all my papers; it would take me some time to do it.

Q.—But you know all the material facts concerning the matter?

A.—I think I do.

Q.—So when you definitely and persistently assert that Sir George Buchanan wanted a test in Bombay, on what do you base your persistent assertion?

A.—Sir, I have explained so often here that, as far as I can remember, he did want that. I feel almost certain that he wanted a test in Bombay. That is the position I have taken up.

Q.—When was that—at the very first interview?

A.—I would not say that it was at the first or the second; but, at any rate, it was before he went to Renfrew.

Q.—Did he insist on it that it should be so?

A.—Mr. William Brown tackled him right away, and said: "Of course, we could not agree to any guarantee out in Bombay—to trials out there."

Q.—Would not you expect any ordinary business man coming to your firm and placing an order——

A.—He was not placing an order.

Q.—Anticipating placing an order?

A.—Nor anticipating. He came there in order to ask us to submit a tender.

Q.—You would not take the trouble of preparing a tender and specification without being sure that you were going to get some work, would you? You would not waste all your energies for nothing?

A.—We are doing that every week. We submit hundreds and thousands of tenders, and we never get a penny for it, or any job, or anything.

Q.—When this matter was discussed, as you say, did not he persist that the test should be in Bombay? I want to get at whether he persisted?

A.—I do not know what you call "persist," but we told him we could not do it; we were not going to do it.

Q.—Would not he have given an indication in his letter when he wrote to you that, since it was not possible for a test to be given in Bombay, he would be satisfied with a test on the Clyde? Would not you think that would be the ordinary sequence of events if that had transpired between you and him?

A.—I have already explained to you, as far as I can, that this question about the test or guarantee at Bombay arose before he went to Renfrew—if such a thing arose at all; I think it did. I think my memory is right.

Q.—Did he discuss that with your other partners?

A.—When he went up there I believe what happened was that he was tackled at once by Mr. William Brown, who said he would not agree, under any circumstances, to any test in Bombay.

Q.—Why not?

A.—I have already explained two or three times the reason why we did not consider it was a right thing for us to do—to take on the responsibilities of a guarantee and test in Bombay. At that time we were perfectly willing that somebody else should do the work, as far as that was concerned, rather than we should do it.

Q.—You have told us in the course of your evidence that you did come across Sir George Buchanan in the street, and you met Mr. Halcrow at some time?

A.—Yes, I have.

Q.—Before you came here to give evidence?

A.—Not to-day.

Q.—But before you came to give evidence?

A.—Yes.

Q.—Was the matter ever discussed or talked over between yourself and Sir George, or between yourself and Mr. Halcrow?

A.—Mr. Halcrow and Sir George have frequently discussed in the past this question about the dredger—the reports about the dredger failing to give this output.

Q.—I mean anything about your evidence—as to what you were to say?

A.—Nothing of the kind.

Q.—Did you tell them you were going to give any evidence?

A.—I told them I did not know whether I was going to give evidence or whether I was not. That was the last time I saw them.

Q.—You told them you were either going to give evidence or that you were not?

A.—I told them I did not know whether I was going to give evidence or whether I was not.

Q.—If you were to give evidence, was any suggestion made?

A.—None whatever.

Q.—Did you indicate the nature of the evidence you were to give?

A.—How could I? I could not. I did not know what was going to be asked me here.

Q.—You will not take any affront, or again assume that I am suggesting anything, when I ask you this very plain question. It is an every-day affair. We are living in a world of competition, as you know, and anybody who influences an order, I suppose, expects a remuneration from you, does he not, in the ordinary course of business?

A.—I am very glad you have put that question to me, because I saw the other day—and I was very shocked to see it—in the London "Times," an indication that some suggestion had been made that a commission had been paid to someone who had influenced this order, and that that suggestion had come from Bombay. If you had not given me the opportunity of answering it, I was going to ask the Chairman to give me this opportunity of denying it absolutely, as far as we are concerned. The suggestion in the paper seemed to be that the successful tenderer had paid some commission to somebody for hurrying this thing on and getting the order placed with him.

Q.—Your firm never gave any commission?

A.—No. As far as I know we have never done it, I feel perfectly certain.

Q.—Not in this instance?

A.—Not in this instance, nor in the past, have we ever paid a penny to anybody to influence an order our way.

Q.—I am very glad to hear that.

A.—I absolutely deny it. If you will excuse my saying so, I think you ought to tell me the source of that information.

Chairman.—Mr. Billimoria is not responsible for what appears in the local papers in Bombay. In point of fact, I can tell you what it was. The probability is that it was a speech of Mr. Nariman, who is a member of the Legislative Council, who on 3rd March, 1925, stated that there was a general belief that some commissions had been paid by manufacturers to high officials of the Development Directorate. That is the way in which he put it. That, at all events, is one concrete statement publicly made by Mr. Nariman in the Legislative Council. No particulars or names were given by him.

Mr. Billimoria.—I am glad to hear you have not offered any commission.

A.—Absolutely. We will give you an absolute denial of it.

Sir M. Visvesvaraya.—I have not yet got to the true meaning of your statement about soft clay. Was the dredger designed to dredge soft clay only, or material of average quality found in the harbour?

A.—It was designed to deal with 2,000 cubic yards per hour of soft clay.

Q.—You added a reservation that you attained the average on soft clay, and that when it went on to stiffer clay it would produce a lesser output?

A.—We do not take the average through the different degrees of consistency.

Q.—You only designed it for the rate of 2,000 cubic yards per hour for soft clay on the top?

A.—Soft clay. Anything which is harder than that the dredger will cut, short of rock, of course, but the harder stuff will be at a lesser rate.

Q.—Was the 2,000 cubic yards per hour the average capacity of the dredger in soft clay, or the maximum capacity or the minimum capacity. In soft clay was it the average capacity which you had in view?

A.—My recollection of the matter is that 2,000 yards an hour is the minimum amount you may do, is it not? I think that is what it is.

Q.—Was it the minimum?

A.—I think so.

Q.—In soft clay? Was it the average of the maximum? You said maximum at one time during the course of your evidence. You said the maximum was 2,000 cubic yards?

A.—If it were doing less than that it would not be doing the amount they wanted. It must do the 2,000 yards an hour.

Q.—Sir George Buchanan, in his letter of the 20th July, refers to a minimum capacity of 2,000 cubic yards?

A.—This is minimum here, as far I can read it also.

Chairman.—The " Kalu " and " Jinga " dredged down to a depth of 40 feet, did they not?

A.—Yes.

Q.—That was the extent to which they could go—40 feet below the surface?

A.—Yes.

Sir Frederick Hopkinson.—Below low water level actually.

A.—It does not matter, low or high. It dredged 40 feet below flotation level.

Chairman.—And they cut on some stiffish clay in the harbour, did they not?

A.—Yes.

Q.—The " Sir George Lloyd " was designed to dredge down to 70 feet?

A.—Yes.

Q.—Was not that an indication to you that the " Sir George Lloyd " was wanted to cut right down deep into the clay?

A.—Oh, no. She might go out into deep water.

Q.—Was not it known perfectly well that the area was to be within the harbour?

A.—That is so. She has got to go down to 70 feet; it does not matter where it is.

Supplementary Note put in by Messrs. William Simons & Co., dated 23rd October, 1926.

DEAR SIR,

Replying to your letter of 21st inst., addressed to our Mr. McMurray, the increase in cost of steel between September, 1919, and June, 1920, may be taken at about 46 per cent., and the rise in the cost of construction as between these dates could also be taken at the same percentage.

Yours faithfully,

for WM. SIMONS & CO., LTD.,

A. BROWN,

Managing Director.

(The Witness withdrew).

50th Witness, Lt.-Col. S. S. W. Paddon, C.I.E., C.I.M.E., I.A. (retired), Director-General of Stores, Office of the High Commissioner for India.

WRITTEN STATEMENT.

The connection of the India Store Department with the matter under investigation by the Committee would appear to be confined to the action taken for purchase and inspection of the dredger " Sir George Lloyd," the intermediate pumping station " Colaba " and the pipe line.

So far as this Department is concerned the history of the case is as follows :—

In February, 1920, instructions were given by the Secretary of State in Council to the then Acting Director-General of Stores, Sir John Steevens, that preliminary enquiries were to be instituted as to the design and cost of the dredger, etc. The Government of Bombay asked that, subject to the advice of experts in England, the dredger, etc., described on page 17 of Sir G. Buchanan's report on the Bombay Back Bay Reclamation Scheme should be purchased from Messrs. Simons & Co.

For technical advice on work of this kind, the Department employs Sir J. H. Biles & Co., an eminent firm of Naval Architects. The duties of the firm include the preparation of designs and specifications, examination and recommendation of tenders, inspection during construction and approval on completion. In this instance the intimate connection of Sir G. Buchanan with the scheme necessitated some alteration of the normal procedure. The attached copy of a memorandum, dated 16th April, 1920, by Sir G. Buchanan, details his views on the subject, and the suggestions indicated therein were agreed to. The arrangement was that the work should be carried out under the supervision of Sir J. H. Biles & Co., who were to act in consultation with Sir G. Buchanan, and give effect to the latter's engineering requirements.

Messrs. Simons' quotation for the dredger, etc., was submitted on 4th June, 1920, and on the recommendation of Sir J. H. Biles & Co. the dredger and pipe line were ordered on 15th June, 1920. The price, subject to variations in wages and/or cost of materials was £424,345. The intermediate pumping station was ordered on 15th July, 1920, cost £194,970.

On 12th June, 1920, the Government of India telegraphed (copy annexed) that they concurred in the opinion of the Government of Bombay that Messrs. Meik & Buchanan should be solely responsible for the design and construction of the plant. The Secretary of State, however, was not prepared to agree to this proposal, vide attached copy of despatch to Government of India, dated 16th September, 1920, and the arrangement by which the vessels were to be built under the joint supervision of Sir J. H. Biles & Co. and Messrs. Meik & Buchanan remained in force.

On 28th January, 1922, the Naval Architects reported that the trials of the " Sir George Lloyd " had been completed and that the vessel in all respects completely fulfilled the contract. The vessel was therefore accepted.

On 1st March, 1922, the Naval Architects certified that the pumping trials of the "Colaba" had been satisfactorily completed, and subsequent reports, dated 10th and 13th March, 1922, certified that the vessel had been completed and was in order.

I would mention that the purchase and despatch of the vessels took place some time before I assumed charge of the Department, and that elucidation of the details is rendered difficult by the fact that the contract was arranged under the orders of the Secretary of State and in consultation with various departments of the India Office. The Store Department is now under the direct control of the High Commissioner for India, and is completely divorced from the India Office.

MEMORANDUM IN RESPECT TO DREDGER FOR BACK BAY RECLAMATION SCHEME.

At my meeting with Sir John Steevens on the 25th March he informed me that orders had been passed that no contract for the dredger was to be placed until the whole scheme had been sanctioned, but that he, along with his expert, was to go into the question of the dredger with special reference to Messrs. Simons & Co.'s tender. He also stated that Sir John Biles—Consulting Naval Architect to the India Office—would, if the scheme were sanctioned, prepare detailed specification and superintend the construction of the vessel. I replied that I had already discussed this part of the project with the Governor of Bombay, who, I understood, would be averse to any dual control in connection with the scheme because if the dredger failed to do its work we (the Engineers) would naturally say that as we had nothing to do with the dredger we could accept no responsibility. I pointed out that this was not an ordinary dredging proposition, as there was nearly as much work on land as afloat; and that obviously the Engineers to the scheme must have a voice in the construction of the dredger, although Sir John Biles as Naval Architect might reasonably be expected to see that the dredger was a properly built sea-going dredger, and capable of doing the work demanded of her. I said the last thing any of us wanted was friction, and that we were perfectly willing to work jointly and amicably with Sir John Biles, but that we must be given an opportunity of fully discussing and approving all the details.

In a letter from the Director-General of Stores, dated 10th April, Sir John Steevens remarked that the approval of the Secretary of State in Council had been given that all steps short of placing the contract were to be taken in the preparation of the necessary detailed plans and specifications, &c., for the provision of dredger, pumping station, pipe lines, &c., in anticipation of full approval of the execution of the scheme being given at a later date, and the Government of India had requested that the special consideration of experts should be given to the design (or description) and cost of dredger, as put forward in my report, and reference had already been made to Sir John Biles—Naval Architect to the India Office—on the subject.

The dredger, with its pipe line communication with the shore, and the pontoon for intermediate station, would come under the supervision of the Naval Architect; designed generally to meet such requirements as we should wish to see laid down, but the machinery and intermediate pumping plant to be provided on the pontoon would be dealt with by us. Sir John Steevens understood that I had several points in connection with dredger requirements differing from the general description received from Messrs. Simons, and it was desirable that these should be gone into. As a preliminary measure it would be as well for Sir John Biles and myself to meet Sir John Steevens in order that a clear understanding might be arrived at, and any overlapping avoided.

With reference to the preparation of the necessary detailed plans and specifications, the usual custom amongst engineers is to accept the contract on a general specification, thereafter requiring the builders to submit for approval all detailed plans and specifications, and presumably this will be the procedure in the present case. It is therefore clear that the first thing necessary is to place the contract. If, on the other hand, Sir John Biles is himself to prepare complete detailed plans there must be some considerable delay in placing the contract.

With reference to the suggestion that Sir John Biles should be responsible for the whole of the work afloat, and that we should be responsible for the whole of the work ashore, I do not think such an arrangement is practicable, as the whole of the dredger installation must be taken as one complete piece of machinery, and for one engineer to be responsible for the work afloat and another engineer for the work ashore would end in no one being responsible for the proper working of the entire plant.

We welcome the suggestion that there should be a meeting in order that a clear understanding might be arrived at, and any overlapping avoided. We do not wish to interfere with Sir John Biles' prerogative as Naval Architect to the India Office; all we are concerned in is that we as the engineers, and therefore better acquainted than anyone else with the work to be done, and also being entirely responsible for the working of the dredger, should be permitted to express our opinion in respect to the detailed plans and specifications for the whole plant, and that nothing should be done which is seriously

opposed to our views, and further that, although we welcome Sir John Biles' assistance in the inspection of the dredger during construction, we may be permitted to keep in touch and have consultations with him from time to time.

(Signed) GEO. C. BUCHANAN.

16, Victoria Street,
Westminster, S.W.1.
16th April, 1920.

(*Copy of telegram from Viceroy, Public Works Department, to Secretary of State, dated Simla, 12th June, 1920. Received, 14th June, 1920, 3.0 p.m.*)

My telegram dated 19th May. Position of Meik and Buchanan in relation to D.G. of Stores India Office. Government of Bombay consider that engineers of this firm should be responsible for design and construction of dredger. They consider dual responsibility most undesirable and that engineers who will have to work with dredger should be wholly responsible for it. We agree with Government of Bombay.

India Office, London.
16th September, 1920.

Revenue,
No. 108.

To His Excellency the Right Honourable the Governor-General of India in Council.

MY LORD.—In your telegram of the 19th May you informed me that the Government of Bombay had appointed Messrs. Meik & Buchanan as their Consulting Engineers for the Bombay Development Scheme. Their duties were to prepare drawings, estimates, &c., for the whole scheme, and to do all the inspection and supervision work both in India and in England. The payment for them was to be 2 per cent. on the total cost, including (as I understand your telegram) the cost of the dredger and other plant.

Duties and remuneration of Messrs. Meik & Buchanan in relation to the Bombay Development Scheme.

2. Before the receipt of this telegram I had already, in consequence of your telegram of the 23rd December, 1919, consulted my Naval Architect regarding the design and cost of the dredger and dredging plant, and had arranged that their construction should be carried out under the Naval Architect's supervision.

3. Your telegram of the 12th June suggests that it is desirable to give to the engineers of Messrs. Meik & Buchanan full responsibility for the design and construction of the dredger. I have carefully considered this suggestion but for the reasons stated in the enclosed notes[1] by the Director-General of Stores I have decided to adhere to the arrangement under which the construction of the dredger and dredging plant will be done under the supervision of the Naval Architect, who will give full effect to the requirements specified by Messrs. Meik & Buchanan. Messrs. Meik & Buchanan are quite willing to accept this arrangement.

[1]Dated 11th June and 20th June, 1920.

4. It has now to be considered by Your Excellency's Government whether any alteration is required, so far as the work on the dredger and dredging plant is concerned, in the figure of 2 per cent. on the total cost fixed, according to your telegram of the 19th May, as the remuneration of the Consulting Engineers. As the Naval Architect received 1 per cent. on the cost it will probably be thought that 1 per cent. is sufficient for the Consulting Engineers, and I understand that they would be prepared to accept this rate of payment.

[2]From Governor of Bombay, dated 22nd July, 1920.
To Governor of Bombay, dated 24th July, 1920.

5. As regards the method of calculating the percentage to be paid to the Consulting Engineers, reference is invited to the enclosed copy of telegrams[2] exchanged with the Governor of Bombay.

I have the honour to be,
My Lord,
Your Lordship's most obedient humble Servant,

(Signed) EDWIN S. MONTAGU.

ENCLOSURES.

Enclosure No. 1.—Note by the Director-General of Stores.

I note the terms on which Sir G. Buchanan's firm have been appointed.

So far as the dredger pipe line, intermediate station and shore connection are concerned, the construction will be carried out under the supervision of the Naval Architect to this Office.

It has been arranged that Sir J. Biles will act in consultation with Sir G. Buchanan, and give effect to his engineering requirements in connection therewith. The whole of the detail work for this important portion of the supply being undertaken by Sir J. Biles whose remuneration will be at the rate of 1 per cent. of the cost, it would appear that some readjustment of the terms with Sir G. Buchanan, so far as the dredger, &c., is concerned, might properly be made.

The cost of the dredger, &c., will be about £600,000.

I am, &c.

11th June, 1920. J. STEEVENS.

Enclosure No. 2.—Note by the Director-General of Stores.

The Government of India very rightly in their telegram of the 23rd December, 1919, asked us to consult experts to consider design of dredging plant, &c., upon information supplied by Bombay.

The construction of all vessels, dredgers and equipment to meet India's requirements is carried out by the Naval Architect to this Office.

There is no reason for any departure from this course, in fact, I have no hesitation in saying that any departure would only be attended by delays and difficulties of supply.

The designs now prepared will comply with all the requirements of the Consulting Engineers, Messrs. Meik and Buchanan, and the provision is proceeding to give full effect to requirements put forward by them. No ill-effects from this arrangement may be anticipated, but on the other hand the efficiency is likely to be strengthened.

It is seen from the previous telegram of the 19th May that payment of 2 per cent. was to be made to Messrs. Meik and Buchanan in connection with the provision of dredger and plant. It is proposed that this be divided between the Naval Architect and that firm 1 per cent to eact . I feel confident that this arrangement will produce the best results.

The construction of all steel products is a matter of much difficulty, and with the number of dredgers now under construction by the Naval Architect, places him in the better position for carrying out work of this description.

I am, &c.,

29th June, 1920. J. STEEVENS.

Enclosure No. 3.—Telegram from Governor of Bombay, dated 22nd July, 1920.

Reclamation of Back Bay. In the calculation of the actual expenditure thereon I am not certain whether in the Consulting Engineer's percentage remuneration should be included in the cost of dredger, or only the net cost after the sale value has eventually been realised. Probably there are many precedents in connection with this technical question. If you would ascertain the usual practice in such cases I should be obliged Having done so, please find out what terms Sir George Buchanan will accept in this respect.

Enclosure No. 4.—Telegram from Secretary of State to Governor of Bombay, Public Works Department, dated 24th August, 1920.

924. Your telegram dated 22nd July, Buchanan accepts net cost, that is original cost less realisation value Explanatory letter follows.

ORAL EVIDENCE.

Chairman.—What is your official position now?

A.—Director-General, India Store Department, in the office of the High Commissioner for India.

Q.—That Store Department, I think, is now under the direct control of the High Commissioner, and is divorced from the India Office?

A.—That is correct.

Q.—I think, in February, 1920, you had no concern with this matter?

A.—No. I was in the Stores Department, but not on the purchase side. I was head of the technical side of the Store Department then, and I was not in the India Office at all. I never saw these papers.

Q.—But you have collected from the papers the information which is contained in your written statement?

A.—That is correct.

Q.—I need not take you through that in detail, because that can appear in the Appendix. You state, however: "In February, 1920, instructions were given by the Secretary of State in Council to Sir John Steevens, that preliminary enquiries were to be

instituted as to the design and cost of the dredger. The Government of Bombay asked that, subject to the advice of experts in England, the dredger described on page 17 of Sir George Buchanan's report should be purchased from Messrs. Simons & Co." When you say the Government of Bombay asked that the dredger should be purchased from Messrs. Simons & Co., is that in some document?

A.—It is in a despatch from Bombay Castle to the Rt. Hon. Edwin Samuel Montagu, H.M. Secretary of State for India.

Q.—What is the date of that?

A.—The date of that is the 9th January, 1920.

Q.—I do not think you have given us a copy of it?

A.—The documents which are the property of the Secretary of State I have not been able to furnish, because I have only copies on my file. I thought you could get the originals from the India Office.

Q.—Would you kindly read that—just the material portion?

A.—" Purchase of a dredger in connection with scheme. We accordingly forward herewith a copy of report submitted by Sir George Buchanan on the Back Bay reclamation scheme. The dredger which we desire to purchase is the 42-inch dredger with electrically driven intermediate station described on page 17 of the report, and in the specification on pages 20 to 24 thereof. It will be seen that on page 19 of the report Messrs W. Simons & Co. have offered two prices—either a price based on the rates current for wages and material, or a fixed price of £451,500, they taking the risk of further increase in price. We prefer the fixed price offer, which it has been ascertained will be kept open beyond the period usually fixed till the 10th March, 1920, at an advance of 10 per cent." It is not really definitely stated there that the order is to be placed with Messrs. Simons & Co. It appears to be an implication that it should be placed with Messrs. Simons & Co.

Q.—Is there anything in that despatch which speaks of " subject to the advice of experts in England "?

A.—Yes. The despatch begins by saying " subject to the advice of experts in England regarding design and cost."

Q.—So that the Government of Bombay in that despatch did anticipate that experts (in the plural) would be consulted with regard to the design and sufficiency of the dredger?

A.—Yes, it appears so. They say " experts in England."

Q.—In point of fact it happened that it was decided for certain reasons that the expert who should be employed should be Sir John Biles, the Naval Architect?

A.—My predecessor thought it necessary to use Sir John Biles & Co., but he also thought it advisable to employ Sir George Buchanan. They were both employed actually. They had the same fee, each of them—I per cent.

Q.—There was no employment of what I might call independent non-official experts in England, was there?

A.—The firm of Sir John Biles & Co., are independent non-official experts.

Q.—Is he non-official?

A.—Yes. He is not a member of our staff.

Q.—But he is normally employed by the India Office?

A.—Yes, as and when required. He is not paid a retaining fee.

Q.—And it was to him and to him alone that this matter was submitted?

A.—No. Sir John Steevens had a consultation with Sir John Biles and Sir George Buchanan together.

Q.—I accept that, but keeping to the point of " subject to the advice of experts," the only expert was Sir John Biles, leaving Sir George Buchanan out for the moment?

A.—Yes.

Q.—Did not the Government of Bombay and the Government of India take the view that Sir George Buchanan alone should be responsible for the sufficiency of the plant?

A.—Yes. They telegraphed that view.

Q.—But the Secretary of State was not prepared to assent to that, and required that Sir John Biles should come in as a check, and that he should share joint responsibility?

A.—That is correct.

Q.—There is a memorandum of the 16th April, 1920, by Sir George Buchanan, which you have given us, which sets out his views at that time?

A.—Yes.

Q.—We know that the quotation of Messrs. Simons was submitted on the 4th June, 1920, and on the 15th June, on the recommendation of Sir John Biles, the dredger and pipe line were ordered. Then there follow the trials which have been spoken of on the

28th January, 1922—the trials of the "Sir George Lloyd," and the 1st March the trials of the "Colaba"?

A.—Do you wish me to verify the dates?

Chairman.—No, I am taking them from your statement. Having regard to the material in your written evidence I think that is all I want to ask you.

Sir M. Visvesvaraya.—The Government of Bombay requested the Director-General of Stores to purchase the dredgers from Messrs. Simons & Co.?

A.—I would slightly correct that. It is not said in the despatch in so many words that we were to buy it from Messrs. Simons & Co. It appears to be the implication, but it is not clearly put. It says: "The dredger which we desire to purchase is the 42-inch dredger with electrically driven intermediate station, described on page 17 of the report." That is Messrs. Simon's dredger.

Q.—It is usual to invite tenders in a Department, is it not?

A.—Yes. It is certainly usual to get more than one tender. I cannot speak with first-hand knowledge, but apparently in this case four tenders were obtained by Sir George Buchanan. Those four tenders were examined before the Secretary of State was ever asked to do anything in the matter, and after examining the four tenders this one was selected as the best.

Q.—Who selected it?

A.—The Government of Bombay.

Q.—You had nothing to do either with the inviting of the tender or with selecting any of them—I mean the Director-General of Stores?

A.—No, but it was open to the Department to invite fresh tenders, I presume.

Q.—That is merely a formality?

A.—No, it would not have been a formality if the Department had decided to reinvite fresh tenders; but, of course, they had to take the instructions of the Secretary of State.

Q.—Did they invite fresh tenders?

A.—No, they did not.

Sir Frederick Hopkinson.—Actually there were only two tenderers. One declined to quote, and the other said they could not quote without a lot more information.

A.—All this business of the tenders must have been done in India before my Department got any instructions.

Sir M. Visvesvaraya.—The tenders, or copies of them, are in possession of your Department, are they not?

A.—No, not those four tenders.

Q.—They were all sent to Bombay?

A.—Yes.

Q.—Were they sent to the engineers, Messrs. Meik and Buchanan?

A.—I have no first-hand information.

Q.—Practically your office was merely a post office in connection with this transaction?

A.—No, not so much a post office. Prices in those days were rising rapidly, and an entirely new price had to be agreed. Also, of course, it was subject to the advice of experts, and those experts might have required, and did require, certain modifications.

Q.—Did you consult any other experts besides those two?

A.—Only those two.

Q.—There must have been some special circumstances for treating this transaction in this way. Were there any, from the correspondence you have seen? Were there any special circumstances which led to this procedure being adopted—I mean not inviting tenders in the usual course, and examining them?

A.—There is nothing in my collection of papers to show any. May I explain it? If I received now instructions of this nature, the first thing I should do would be to take the High Commissioner's orders; that is, I should see the High Commissioner regarding a big project of this sort, and he would then give me his orders verbally. Then I should proceed to take action. I might give the High Commissioner advice which, if he did not accept, I should consider overruled, and that would end that, and I should carry out his wishes. There is no record on the papers of what advice my predecessor gave the Secretary of State, or if he gave any advice at all; but apparently his orders are quite clear; his orders were to purchase the dredger, and to purchase quickly.

Q.—Will you kindly pursue your argument? You said if you had orders now you would proceed in a certain way. What is the procedure nowadays, bearing in mind that this is a very large order?

A.—Under the present *régime* there is no doubt what we should do. I should go to the High Commissioner and advise him to advertise for fresh tenders. That would be my advice to-day, but the policy of advertising our business has grown up in the last few years

Q.—That is no use to us. I want to know what the practice was in those days.

A.—In those days practically no tenders were advertised. Mr. West will correct me if I am wrong. Comparatively few were advertised. In these days all the big ones are advertised. But in those days the process was to invite tenders from the trade register. That register was a list kept in the Department of firms under each speciality. Any firm in the world could apply to go on to that list, and no applications were refused provided the firms had the facilities and the resources to carry out the business.

Q.—After reviewing tenders, what was the next stage?

A.—Having got the tenders they would be examined technically by the technical advisers (the Department has many technical advisers), the consulting engineers, the consulting naval architects, and so on. If the technical advisers found any fault with the lowest tender, they would have to give convincing reasons why the lowest tender should be passed over from their point of view. If the Director-General was satisfied with those reasons, he would look at the next tender. If there were reasons why that should be passed over, he would go down the list until he arrived at a tender which was, in all respects, satisfactory.

Q.—Do you take any steps to communicate your opinion to the Bombay Government or to the local Government in India?

A.—Do you mean our opinion on this Simons' tender?

Q.—Did not you send those tenders to the local authorities there?

A.—Are you talking about the present time?

Q.—Formerly?

A.—No. We practically never send tenders out to India, or very rarely. We are in the position of purchasing agents to the people in India, who entrust us with their business, within the limits of the funds provided.

Q.—How is it, then, that the engineers themselves were allowed to invite tenders and deal with them direct with you?

A.—I cannot answer that. That seems to have been the arrangement made by the Government of Bombay.

Q.—It is an unusual procedure?

A.—Quite unusual.

Q.—The Government of Bombay recommended that Messrs. Meik and Buchanan should be solely responsible for the design and construction of the plant?

A.—Yes.

Q.—And that the purchase of the dredger should be solely from Messrs. Simons and Co?

A.—I think that is so. I think the despatch implies that, at any rate.

Q.—Then the Secretary of State decided that the dredger should be designed and built under the supervision of both the firms?

A.—Yes; but their respective responsibilities were fairly well defined.

Sir M. Visvesvaraya.—Now that things have gone wrong, who do you think is responsible?

Chairman.—If you are wise, Colonel Paddon, you will turn to us and say that that is for us to decide.

Sir M. Visvesvaraya.—I want the opinion of a gentleman who is dealing with such tenders from time to time.

Chairman.—That is a duty for us, and a matter on which we should not take any evidence.

Sir M. Visvesvaraya.—Do we not require the advice of experts on it?

Chairman.—No. He is not an expert on advising us on whom to place responsibility. He may be an expert on other matters, but not on that.

Sir M. Visvesvaraya.—In the last paragraph of the second page of your memorandum you say: "It is therefore clear that first thing necessary is to place the contract"?

A.—That is not my memorandum.

Q.—I am sorry; it is Sir George Buchanan's. He says in the third paragraph on page 2: "It is therefore clear that the first thing necessary is to place the contract"?

A.—Yes.

Q.—Is it the usual thing to place a contract first and then to draw up the specification and plans?

A.—No, not in that way. The usual procedure with a plant of this nature would be to draft what we should call an outline specification first, which would give the various designers in the trade a broad outline of what was required.

Q.—Would that be the procedure at that period or now?

A.—The procedure is exactly the same. I can talk of 1920 with great confidence on this point. The Department procedure would be exactly the same. Our technical advisers would draft a broad outline specification, tying the trade down in the points which mattered, and leaving latitude for the trade to put in their own details. That would go out to public tender. Then, when the tenders were received and judged, somebody would get the order. After he got the order he would have to satisfy the technical consultants with regard to all the detailed design. He would have to clothe the skeleton.

Q.—Before the contract was signed?

A.—No. The contract would be signed subject to his satisfying our technical advisers on all the details.

Q.—But in this case the suggestion of Sir George Buchanan is that the first thing necessary is to place the contract and then proceed with the preparation of detailed specifications and plans, is it not?

A.—Yes, but as a preliminary to placing the contract you must draw up an outline specification.

Q.—But he says " to place the contract." Was the contract so placed, as recommended by Sir George Buchanan, before the plans were prepared? I want to know whether the contract was placed as recommended by him in that memorandum?

A.—I think so, the details remained to be filled in after the contract was placed.

Q.—Was that not unusual?

A.—I think it was a valid contract—the one which they placed. I have been looking through it very carefully. It is not in the usual form but it was undoubtedly drafted by the Legal Adviser to the India Office.

Q.—He says: " With regard to the preparation of the necessary " (&c., reading to the words " present case ").

A.—That was the procedure.

Q.—Was it safe to do so—to place the contract first and then go in for detailed plans? One can understand working plans, but not detailed plans and specifications?

A.—We have to order all plant and machinery of a large nature in that way. New types of locomotives are ordered in that way. There is no real difficulty.

Q.—Is it subject to the detailed plans being finally approved?

A.—Yes. The contract falls through if your contractor fails to put up detailed plans which you accept. Until these have been approved the contract has not been carried out.

Q.—You are not aware whether that was done in this case or not?

A.—Yes, it was done in this case.

Q.—Do not you usually test machinery and plant ordered on this scale under normal working conditions? This dredger was designed to pump 2,000 cubic yards per hour through a pipe line of a certain length. Do not you usually test machinery and plant ordered under normal working conditions?

A.—Yes. The technical experts test under the nearest they can get to the exact working conditions, but the difficulty is that one cannot always reproduce the exact working conditions at the other end of the world.

Q.—Do dredger manufacturers decline to give guarantees if they are asked to deliver the machinery and plant in working order on site?

A.—I cannot say they always decline, because we have placed an order since this one in which the final inspection was to be on site in India, but we have had an extraordinary amount of difficulty about it owing to the variable factors.

Q.—You probably have to pay a little more in such cases?

A.—Yes, we might have to pay a little more; but apart from that, we have not settled that one yet. There are so many points on which the dredger builder can argue—for instance, that the crew were not handling it right, or the coal was not good enough, or the mud they were digging was not quite to the specification, or the ability of the crew to get the best out of the engine, the length of pipe line, and things like that.

Q.—If one builder is not willing, if there is proper competition others might be willing?

A.—Well, there is very limited competition in the whole of Europe. You could not get more than probably four or five useful tenders for a dredger.

Sir Frederick Hopkinson.—In the whole of Europe?
A.—Yes.

Q.—You mean Great Britain?

A.—No. We have had a good many tenders for dredgers out by advertisements, and we have never got very many useful tenders. We have got some rubbishy ones. The good firms include, I think, two Dutch and one French and about three English.

Q.—The Dutch people lead the world in dredging?

A.—I do not know. We got their tenders. It is not like locomotives where you can get 25 or 30 good tenders.

Sir M. Visvesvaraya.—Your office did not examine the other tenders you received —for instance, that of Messrs. Lobnitz?

A.—I have no first-hand knowledge that there were other tenders, but I have heard so. I have heard that Sir George Buchanan got competitive tenders from four firms.

Mr. Billimoria.—You had no hand in placing the order, and hence you have no personal knowledge of the circumstances under which the order was placed with Messrs. Simons?

A.—No. I am afraid I have no first-hand knowledge. Sir John Steevens is dead, I am sorry to say.

(*The Witness withdrew.*)

51st Witness, Sir Stanley Reed, K.B.E.

Q.—How long were you associated with Bombay?
A.—For 29 years.

Q.—When did that association begin?
A.—In 1897.

Q.—Were you latterly the Editor of "The Times of India"?
A.—For 16 years.

Q.—When did you become the Editor?
A.—1907.

Q.—From 1907 to 1923 you were Editor of "The Times of India"?
A.—Yes.

Q.—You should know something of the social, economic and financial conditions of Bombay?

A.—I think I do.

Q.—The first date we have been dealing with as regards the conditions of living in Bombay has been 1911. In the report of the Bombay Development Committee, 1924, Mr B. W. Kissan gives some figures, and he says: "According to the census of 1911, out of the total population of 929,082 living in 200,308 tenements, 743,247, that is about 80 per cent. of the total population, live in 166,337 one-roomed tenements." He was there quoting from the census of 1911. Can you tell us whether conditions got better after 1911, or did they get worse?

A.—They got infinitely worse. I speak with a little confidence because I was Chairman of two Committees appointed to inquire into the settlement of industrial disputes. One was a semi-private Committee appointed to advise the Governor and the other was a public Committee which made an official report to the Government. All the evidence, given before both Committees, was conclusive and emphatic on one point—that the pressure of housing, the shortage of housing, and the over-crowding and insanitary conditions of the great mass of the people was the greatest social and economic evil with which we had to deal in Bombay, and that without a much more rapid progress in improving housing conditions than was then being made by the Improvement Trust and other bodies, we could not look for any real social or economic health in the population of Bombay.

Q.—What was the date of that report?

A.—I am speaking from memory; but I think the first was in 1919 and the second was in 1921.

Q.—By 1919 we are told there had been a very great immigration of people in the city owing to the prosperity of Bombay?

A.—There undoubtedly was. Although the figures are rough, it is calculated by those who were in touch with conditions (I am speaking particularly of the Health Officer of the Bombay Municipality) that the number ran into hundreds of thousands.

Q.—The figure which has been given to us has been an increase from 929,000 in 1911 to about 1,500,000 in 1919, 1920 and 1921?

A.—Those were approximately the figures given to me by the then Health Officer—. between 1,400,000 and 1,500,000.

Q.—Between 1911 and 1919 had there been any building corresponding in any degree with that increase of population?

A.—None.

Q.—Is that the reason why you told me a few moments ago that the conditions in 1919 and 1920 were infinitely worse than those described in the census of 1911?

A.—Yes.

Q.—At the period, 1918, 1919, 1920, was there great prosperity in Bombay?

A.—Tremendous.

Q.—Was that partly owing to the demand for cotton?

A.—It was partly owing to the demand for cotton, partly owing to the demand for cloth, partly owing to the immense war activities which had been carried on which made Bombay the great embarkation centre for the Indian Forces overseas, and partly due to the world demand for Indian produce at very high rates. In fact, I think it would be true to say that in all the great Bombay staples there was an abnormal demand at an abnormal price with an abnormal profit.

Q.—That, of course, was one of the causes which attracted the immigration to Bombay?

A.—Yes.

Q.—We know that H.E. The Governor announced on the 3rd August, 1920, the creation of a new body, the Development Directorate?

A.—He did.

Q.—One of the objects of the Development Directorate was the reclamation of Back Bay?

A.—It was.

Q.—How did the public receive that announcement?

A.—With surprisingly little manifestation of interest, and such manifestation of interest as there was, was almost entirely favourable. If I may go back for one moment, ever since I have been in Bombay, and long before, this question of the Back Bay reclamation has overshadowed all other questions for the development of the city and its suburbs. It is not on official record, but I believe a private Committee reported to the Military Department of the Government of India in 1898 that a large reclamation at Colaba was imperatively necessary in order to provide for the military requirements of Bombay. Not only that, but in Bombay the position in regard to reclamation has always been very peculiar.

Sir Frederick Hopkinson.—It goes back to 1865, I think.

Chairman.—1863 was the first undertaking.

The Witness.—The one I am speaking of was a private Committee. Bombay exists on reclamations. Take away reclamations and there is no Bombay. There is a mean collection of mean islands, housing a mean city. If it had not been for the beginning of reclamations in the '50's, with the old Elphinstone Company, Bombay would be a mean city to-day, and would not contain any potentialities whatsoever for being the second city of the Empire. Yet at the same time at no period in those 29 years was it possible to mention the word reclamation without bringing down upon you the vials of the wrath of some of those who remembered the collapse of the '60's. They remembered the collapse of the '60's but they did not remember the cause of the collapse, '60's—which was not that the reclamation was a bad thing in itself, or badly carried out, but the bank which held the reclamation money went bankrupt.

Chairman.—The Company had put 90 lakhs of money into the Asiatic Banking Company?

A.—That is what brought it down.

Q.—And the Asiatic Banking Company went into liquidation and away went the 90 lakhs?

A.—But the benefits of the Bombay reclamation of the '60's were incalculable, quite apart from the fact that without it there would have been no Bombay-Baroda Railway into Bombay. The whole of that magnificent foreshore is the free legacy to the people and the Government of the reclamation activities of the '60's.

Q.—They did a certain amount of work?

A.—They did a vast amount of most valuable work, and they laid the foundations, in a very material respect, of modern Bombay. But so little was that remembered that when the Improvement Trust launched their little reclamation at Colaba, the prophets of woe raised loud their voices in the land. You would have thought the Presidency was going to be hurried into bankruptcy. On the contrary the Colaba reclamation brought the Improvement Trust a profit of 15 lakhs.

Q.—We were told that the cost was five lakhs, and that in two days they sold out the land for 24 lakhs?

A.—Then I was within the mark.

Q.—It would be a profit of 19 lakhs?

A.—I think it would also be safe to say that, although there was a period of waiting, every man who built on the Colaba reclamation and retained his property made either cent. per cent. or 200 per cent. on his investment. Then, again, take the Mazagon-Sewri reclamation, of which not so much has been heard. I suppose there was no estimate in connection with that reclamation which was not falsified, and I presume that the cost both of the reclamation and of the development of the reclamation was vastly in excess of the estimates of the Port Trust. Yet the advantage of that reclamation to the trade and commerce and industry of Bombay, now it is developed, has been so tremendous that if a decision had to be taken to-day, with full knowledge of the total cost, I have not the shadow of doubt that there would be an overwhelming demand for it even at that cost.

Q.—I gather from what you say that you would approve of the whole of the reclamation being completed as it was originally proposed?

A.—I would qualify that, if I may, because there is an unknown quantity. After all—you will correct me if I am wrong—it seems to me that certain engineering and constructional works have to be determined in the light of the dominating factor of the rate of sale of the land, and the price at which the land will be sold. That again is dictated by one consideration, and one consideration only, namely, the prosperity of the mill industry.

The price of land in Bombay rises and falls exactly as the profits in the mill industry rise and fall. The textile industry dominates the town to such an extent that the other factors like the cotton trade and the general business, are not sufficient to counteract any marked movement up or down of the mill industry. It is almost true to say that nobody in Bombay who has anything at all is without a share in a mill. Thousands of share transactions are made every year in one, two or three shares at a time. If you get a bunch of share transfers, you will not get 50, but a dozen, of one, a dozen of two and a dozen of three, even of 100 rupee shares. That shows how tremendously wide is the diffusion of the holding in the staple industry of the island. It has been calculated that the difference between profits in a thoroughly lean year in the Bombay mill industry and a good year (I am not taking a boom year) is the difference between 50 lakhs of rupees and 4½ crores (£375,000 and £3,375,000). It stands to reason that when the mills are bringing in profits of 4½ crores, the amount available for the purchase of land is very different from the time when the mills are bringing in 50 lakhs. If there is any revival of the textile trade there will be a great revival in Bombay of the demand for land, but when that revival will be is the unknown quantity.

Mr. Billimoria.—You cannot foresee that.

A.—I am optimist enough to say that when you have a great industry, with the whole of its raw supply at its back, and the whole of its market at its back, if that industry cannot stand in competition with the industry in any other part of the world there must be something radically wrong with the organisation, and the management and the finance of that industry.

Sir Frederick Hopkinson.—Is not the history of industry a series of ups and downs?

A.—It is.

Chairman.—At present you are in the trough?

A.—At present we are in the lowest depths of depression which I have ever known in my 29 years in Bombay. It far transcends the worst days of plague and famine of 1896-97 and 1899-1900.

Sir Frederick Hopkinson.—And in 1919 you were at the greatest height of optimism?

A.—We were absolutely on the crest.

Chairman.—Does not experience suggest that there will come a time when the prosperity of Bombay will be renewed—not perhaps to the height of 1919, but it will be renewed to a normal extent as a city with an immense and increasing volume of trade?

A.—Yes. Unless the whole of our historical readings are inaccurate, we have every right confidently so to expect.

Sir M. Visvesvaraya.—It is the swing of the pendulum?

A.—Yes.

Sir Frederick Hopkinson.—Is it not the same with this country to-day?

A.—Of course it is. In Bombay the present position is abnormal in this way—that, quite apart from the depression in the staple textile trade, Bombay has invested for it enormous sums in other enterprises which are not now bringing in any return whatsoever. I think I could show that this investment is somewhere in the neighbourhood of 20 crores of rupees. All these things have combined to produce in Bombay a depression which is wholly abnormal. I do not want to be extravagant, but it seems to me quite unreasonable.

Q.—And not likely to continue?

A —And not likely to continue.

Mr. Billimoria.—You know the history, perhaps, better than anybody else, because you have edited "*The Times of India.*" Are you of the opinion that the capitalists are opposed to this extension scheme in Bombay?

A.—If I were a large owner of land I should not desire to see other land coming into the market. That is only human nature.

Q.—But have these capitalists much influence in moulding public opinion?

A.—That is rather a wide question to answer. Some of them undoubtedly exercise a considerable influence, not because they are capitalists, but because of their character and their public services.

Q.—I am not opposed to capitalists. I am only asking whether the capitalists in Bombay exercise an excessive influence on public affairs there?

A.—To say that the capitalists in Bombay exercise an excessive influence on public affairs is a proposition which I should not care to accept.

Q.—They are the backbone of Bombay?

A.—They are the backbone of Bombay, and they wield an influence which rightly belongs to their courage and enterprise.

Q.—A good deal of the prosperity of Bombay is due to their courage and enterprise?

A.—Not only the prosperity, but the public and social services. We have a very public-spirited body of wealthy men.

Mr. Billimoria.—What is their attitude towards the reclamation scheme?

Chairman.—Let us have what it was first, and then what it is now?

A.—I should feel inclined to say, in the first place, that, when the scheme was launched, their one attitude was one of tolerant acquiescence. As a matter of fact, you know that so convinced were the business men of Bombay that, not only was the reclamation desirable, but profitable, that two separate syndicates each offered to put up 5 crores (£3,750,000) of rupees to carry out the work on their own responsibility.

Sir Frederick Hopkinson.—The statement was made that this Back Bay reclamation was going to produce enormous profits amounting to as much as 32 crores. Would not that be inclined to make them have a very active acquiescence in the scheme?

A.—There are two ways of looking at it. The 50 crores would go to the Presidency. The lowering of the price of land, if I were a landowner, would come on me.

Sir M. Visvesvaraya.—The value of land would go down?

A.—I would put it the other way : the abnormal and oppressive accretion in the price of land would stop. We know that the price of land in Bombay reached intolerable proportions. I see that in some of the statements put before this Committee land was referred to as selling at the price of 1,000 rupees a yard. Land at 1,000 rupees a yard is almost cheap. Land was sold down in the cloth market years ago at more than 1,000 rupees a yard. I think a site in Hornby Road was bought at 1,400, 1,500 and 1,600 rupees a yard, and a small corner to round off a site was sold at 2,000 rupees a yard. As a matter of fact, about 1919, to attempt to carry on business in Bombay was a nightmare. You never knew when you would be turned out of your accommodation or premises if you did not own them, and, not only that, but you never knew whether you could get any other accommodation. It was not only a question of price; it was a question of getting anything. The pressure which there was on every class of property was almost inconceivable. Flats were at twice the price at which they were in the city of London

Sir Frederick Hopkinson.—We were told that the prices of flats were quite as high in Bombay as they were in the West End of London.

A.—I should say they were almost as high as they were in New York.

Q.—We were told that a small flat would cost about £750 a year?

A.—That is a moderate sized flat. I can tell you of my own experience. Quite moderate flats let at £100 a month.

Q.—Unfurnished?

A.—Yes, but that includes rates and taxes.

Sir M. Visvesvaraya.—Land to the west of Hornby Road sells at about 1,000 rupees per square yard?

A.—About that.

Q.—If you created a large area of reclaimed land, prices would come down very considerably, would they not?

A.—If they did not come down they would not go up any more.

Q.—Property would depreciate to some extent?

A.—Or it would be static. I would not like to say it would depreciate, because if there was prosperity in the Island there would be ample demand for land.

Q.—Do you happen to know why the Government decided in 1919 to carry out the work departmentally?

A.—I do not know. I do not know whether it has been put before this Committee, but I know why the Port Trust decided to carry out their reclamation departmentally. It was this—that reclamation by dredging being a very doubtful proposition, they invited contracts. All the contractors put on a 30 to 45 per cent. margin, and Sir Walter Hughes, the Chairman of the Port Trust, said: "If we have to pay a 45 per cent. margin, we had better carry it out ourselves." That is why the Port Trust did it departmentally, although they had two tenders from very good firms. I imagine the same considerations probably influenced the Bombay Government, but I know nothing personally.

Sir Frederick Hopkinson.—Did the Port Trust do it cheaper than the tenders which were sent in?

A.—I could not give you the actual figures, but I doubt if they gained much of the margin which the contractors put on.

Sir M. Visvesvaraya.—The first estimate was about 367 lakhs (£2,752,500)?

A.—Yes.

Q.—The second estimate was 702 lakhs (£5,265,000).

A.—Yes.

Q.—Now it is likely to cost 1,000 lakhs (£7,500,000).

A.—Yes.

Q.—If, when the original estimate was prepared, they had considered what it would have cost to have done the work by dry filling, they would have found that it could have been done for about 500 lakhs. If they had known that the work could have been done in the ordinary way for 500 lakhs, would they have sanctioned the estimate for 702 lakhs?

A.—I would rather not express any opinion on those matters, because I am not really qualified to do so. I have never gone into the technical side of the scheme. I have confined myself to the social and economic side of the development work.

Q.—It is stated that the 702 lakh project was not submitted to the Government of India. You are aware of that, I suppose? There was a 367 lakh project, which was submitted to the Government of India and to the Secretary of State, and which was sanctioned by those authorities. The 702 lakh project, however, was not submitted to the higher authorities, and it was not submitted to the Legislative Council, but it was sanctioned. Some official witnesses have told us that the question came up at Budget time, and that the Budget, being passed, it was tantamount to an approval of the estimate. Do you think that was a correct procedure, from your knowledge of the Reform scheme?

A.—Without a much closer examination of the details, I would rather express no opinion.

Chairman.—That is neither an economic nor a social matter?

A.—No, and those are the only things on which anything I might have to say might possibly be of any value.

Sir M. Visvesvaraya.—Is it not usual to publish a statement of financial results when any scheme of this magnitude is prepared?

A.—My own experience is that, when estimates are exceeded, it is very hard to get the truth, whatever body is concerned.

Q.—Do you mean to imply that the truth was concealed?

A.—No, I am simply speaking to a general practice.

Q.—The Kay Committee have stated that the completion of this scheme is not a commercial proposition, and that it should be carried out gradually. What is your view of the proposal?

A.—My own view, for what it is worth, is that in this matter we have to throw our heart over the fence. We have to take a very much more robust view of the future of Bombay than has been taken by a good many people in the depressing circumstances of the last two years. There does not seem to me to be any question that Block 8 must be finished, and, if necessary, an application made to the Government of India to pay or to recoup the Bombay Government for any loss thereon; also that Blocks 1 and 2 should be finished without any delay. By the time that is done we shall know a great deal better than we know to-day what are the prospects of a revival of a demand for land in Bombay, and then a further decision may be taken. With that doubt, I would not go beyond that stage to-day, but to fall short of that stage it seems to me would be very unfortunate.

Q.—Do you consider that the work should be under the P.W.D., or should be left under the Development Directorate?

A.—I am strongly of opinion that, under the present circumstances, it would be greatly to the advantage of all concerned if this work were put under a special P.W.D.

organisation. It may be quite unfair to the Directorate (I am not criticising them), but we have to deal with facts, and the fact is that the Directorate has lost public confidence. The first thing to do is to revive public confidence, and I think that if the work were put under a superintending engineer of the P.W.D., with a couple of assistants, and worked on P.W.D. lines, it would go an immense way towards restoring public confidence and securing the scheme's efficient and economic completion to whatever stage may be decided upon on this Committee's advice.

Q.—Would you associate a Committee with it?

A.—I would leave it to the P.W.D. There are no questions of policy to be considered now, and I think if you got a good man in charge, it would be very much better if you let the P.W.D. have a free hand in pushing the constructional work to completion unhampered. When it comes to the utilisation of the land, then unofficial opinion will be of the greatest value.

Q.—Having regard to all these difficulties, do not you think it wise to associate a Committee with the Department?

A.—I have quite an open mind on the matter, but my own confidence would be given ungrudgingly to a P.W.D. organisation.

Sir Frederick Hopkinson.—I like your expression—and I hope it will be remembered—that it is desirable to take a robust view at present. I should like my colleagues to bear that in mind.

Sir M. Visvesvaraya.—But his robustness does not go very far.

Sir Frederick Hopkinson.—It goes far enough for me. I want a robust view. Do you think anyone connected with the P.W.D. at present is cognisant with the work of large dredgers of this kind?

A.—No.

Q.—Therefore I am going to suggest to you that perhaps a better method might be found than putting it under the P.W.D. I would also suggest to you that the P.W.D. officials are not accustomed to have what you describe as a free hand, are they?

A.—No.

Q.—They have not been trained to have a free hand?

A.—That is true.

Q.—Therefore they would be in a very great difficulty, in all probability, if they had to exercise a free hand in connection with large questions. A man has to be trained to take responsibility, has he not? If a man has not been trained to take responsibility, he is generally incompetent to do so. Do you agree?

A.—I agree.

Q.—Therefore I am suggesting that possibly you might get a better organisation than a P.W.D. one?

A.—I am not in the least dogmatic on it.

Q.—You would favour any organisation which would produce the result?

A.—Partly that, but also an organisation which is calculated to establish public confidence. The two things are wanted, I think, and not only the one.

Q.—You want to establish confidence first?

A.—I do.

Q.—Do not you think the surest way to get real confidence would be to tackle the job in the right way?

A.—Undoubtedly.

Q.—And to produce quickly some definite results?

A.—It would.

Q.—You know the configuration of the reclamation? It is, roughly speaking, a parallel strip of land along one side of Bombay for a length of three or four miles?

A.—I have walked over the whole of it.

Q.—Just shut your eyes, and in imagination see that completed and built upon, with recreation grounds, roads, marine drive, delightful sea breezes coming over the parapet. Is not Bombay as a city going to be enormously improved by that?

A.—Beyond words.

Q.—Or beyond any money you could put to it—within reason, of course?

A.—Within reason.

Q.—And is not that a very strong reason for completing the scheme, if it is by any means within the bounds of practicability?

A.—I am certain as night follows day that the scheme will be completed, and I am certain that if I live 10 or 15 years longer, I shall see it completed.

Q.—Not unless they improve on the dredging?

A.—That is a technical point, on which I express no opinion. I am referring to the attitude of the public towards the Scheme. We are a mercurial people, always either on the crest of the wave, when everything is for the best, or in the trough, when ruin stares us in the face. At present we are in the trough, and we are, speaking for the City as a whole, in a state of depression which I venture to describe as unreasonable. But as soon as the staple industry revives and results begin to come in, I feel confident that the Scheme as a whole will be demanded in the interests of the community as a whole.

Q.—Indians or British?

A.—All. I speak of Bombay as a single entity, for there we are all one. Our temperament being what it is, confidence will revive with better trade and definite results. At present the Reclamation is in the most depressing stage. Everything is going out and nothing is coming in; our amenities are being disturbed, and there is no compensating benefit. All great developments work pass through this stage. With an improvement in trade, and with visible proof of the benefits the reclaimed land will confer on the city, I feel confident that there will ultimately arise a demand that the whole Scheme shall be completed.

Mr. Billimoria.—You have mentioned about the acquiescence of the people in the matter when the scheme was first launched. You will remember that with the exception of the Indian Merchants' Chamber, who sounded a note of warning, the rest of the public decidedly acquiesced in the scheme?

A.—That is so.

Q.—But the Indian Merchants' Chamber opposed it from the very start?

A.—They did.

Q. Then you have mentioned about the Improvement Trust's scheme of reclamation at Colaba. That was a very small strip of land. It was a very small area compared with the present reclamation under consideration of 1,145 acres?

A.—Yes.

Q.—It has always been suggested in the past, as we find from Government records, that if a smaller reclamation had been possible it would have been a much more welcome and more productive proposition?

A.—That, of course, as we know from the records, was the subject of a long discussion between the Government of Bombay and the Government of India from 1911 onwards.

Q.—The scheme was launched during a period of boom?

A.—It was.

Q.—The biggest boom which Bombay had ever had in its history probably?

A.—Certainly since the '60's.

Q.—You do not expect, do you, in the near future a repetition of such a boom? We would certainly welcome it most warmly if ever it came off, but you do not expect it, do you?

A.—No, I do not.

Q.—And the prosperity of Bombay, as you very rightly remarked, depends entirely on its textile industry?

A.—It does.

Q.—That is going through a very serious state of depression at present, and there is a committee now sitting to give it some sort of relief if possible?

A.—On the other hand, I heard to-day of one mill which was making a profit of 35,000 rupees a month, which is rather a healthy sign.

Q.—There are always exceptions to the rule, but those exceptions are always few?

A.—I think we have faced the worst.

Q.—The mill industry is not in its previous prosperous condition, nor is it likely to be for some years to come, because of the Japanese competition. Is not that so?

A.—I would like to qualify that a little. When I was in Bombay last January I was discussing this very question with some friends of both of ours, whose competence you will admit with me, and they said "If Japanese exchange goes to 128 Japan is down and out." The Japanese exchange to-day is 133. As a matter of fact, Japanese competition is due to wholly abnormal conditions in the movement of exchange to and fro between the buying and selling points. If Bombay cannot beat Japan to a frazzle, with the cotton at her doors and with a market at her doors, then she is not the Bombay I know.

Sir Frederick Hopkinson.—It means there is something wrong?

A.—It would make me ashamed of the city.

Mr. Billimoria.—Bombay has to find out fresh markets. The Chinese market has been captured by Japan now. It has to go into new fields of venture, and it may take

some time before we see the normal prosperity return to the mill industry in Bombay. That is the view generally held by sound financial people in Bombay?

A.—It will be slow, I think.

Q.—Having regard to that state of depression you would certainly not recommend rushing on with a scheme of this magnitude, because there would not be money flying about, which would bring forward purchasers for land?

A.—I would certainly not rush it—no.

Q.—In your editorials in " The Times of India " at one time you suggested that the congestion could be relieved to a very great extent as far as commercial offices were concerned if they shifted to Apollo Bunder or near the Victoria Terminus. But people are conservative; they confine themselves to that small area near the banks and business houses, and the tendency has still been to cling to that, although some offices have shifted very nearly towards the Apollo Bunder?

A.—We are much less conservative than people think we are. When I went to Bombay they were building the Chartered Bank near the Gymkhana, and everybody said to me " Do they think that anybody is going into the middle of the jungle to do banking business." The whole hub of Bombay was in Elphinstone circle. When we built our own " Times of India " office we went to Bori Bunder station, and men used to say to me " I am not going to take a week off to come and see you." The business quarter has changed again and again and now it is moving towards Ballard Pier. We think we are a conservative people, but we can more quickly adapt ourselves to changed conditions than we give ourselves credit for.

Q.—But those changed conditions come very slowly in Bombay. The people confine their activities within a very small compass do they not?

A.—Look at the changes which you and I have seen in 30 years.

Q.—I am putting the question in reference to your answer in which you quoted the figure of 1,400 rupees and 1,600 rupees being realised for a square yard of land in an important part of Bombay. If you go further up you do not expect to get that price?

A.—No.

Q.—And especially within the reclaimed area you surely can never imagine or hope, for generations to come, to get such a fabulous price?

A.—Nothing like it. On the other hand, there is one question connected with the reclamation which perhaps has not been put before this Committee, and that is the great difference between suburban life in India and in England. In England it is no hardship on me to walk a mile from my house to the station and come to London and then walk half-a-mile to my office. But in India, if I walk five minutes to the station I arrive at the office in such a state that I want a bath and a change. And when I say that I am taking no account of the hot weather and of the monsoon. For that reason it seems to me that land within easy access of the business quarter will always command, for residential purposes, a much higher price than it would command if it were in any other part of the world where those conditions do not obtain. In Bombay it pays you to pay a much larger rent to live within easy driving distance of your office than it would proportionately, in any other country or temperate climate.

Q.—I entirely agree. Compared to the value that one could expect to realise for land in the suburbs, the value in the reclaimed area is bound to be higher, because it is in close proximity to business houses, but is not cost a material factor for the production of the land?

A.—Undoubtedly.

Q.—If the cost itself is going to be exorbitant then it is not a financially sound proposition?

A.—No, that is so.

Chairman.—In December, 1917, were there two syndicates ready to put up very large sums of money for the purpose of having the concession to undertake this Back Bay reclamation scheme?

A.—There were. I was a member of one of the syndicates as representing the Tata Bank. There were two syndicates, composed of the ablest business men in Bombay.

Q.—The one syndicate consisted of the following gentlemen: Sir Sassoon David, Sir Shapurji Broacha, Sir Fazalbhoy Currimbhoy, Sir Vithaldar Thakersey, Mr. (now Sir) Lallubhai Samaldar.

A.—They are amongst the shrewdest business men in Bombay.

Q.—Then there were Tata & Sons, Ltd., who can also fairly be described as shrewd, can they not?

A.—They were then the dominating influence in Bombay.

Q.—Those two syndicates were working at first in opposition to each other, each being of desirous of getting a concession for the reclamation; but did they subsequently join together?

A.—The two syndicates did combine and eventually an answer was given through Sir George Carmichael.

Q.—The answer was given on the 8th April, 1918. Sir George Carmichael wrote a note summarising the position, and the Government of Bombay decided to obtain expert advice before taking any action?

A.—That was so.

Q.—What was the combined capital that these gentlemen were prepared to venture on the Back Bay reclamation scheme?

A.—It was estimated that each syndicate could put up five crores of rupees.

Q.—At 1*s.* 6*d.*, that is £3,750,000?

A.—Yes.

Sir Frederick Hopkinson.—That would more than have completed it under Sir George Buchanan's estimate.

Chairman.—And that £3,750,000 would have been provided by the members of the syndicate?

A.—They were perfectly confident they could raise the money with ease.

Q.—That showed that some business men in Bombay did believe in the ultimate financial success of the scheme?

A.—I think you might put it a little stronger than that and say that all the leading business men in Bombay at that moment were convinced of the financial soundness of the scheme.

Sir Frederick Hopkinson.—I was a little puzzled about your suggestion that the work should be put into the hands of the P.W.D. Do you know any single man in the P.W.D. who has had any experience of reclamation on an open sea front?

A.—No.

Q.—Or any practical work in connection with a rotary suction dredger?

A.—No.

Q.—The P.W.D., as a rule, do their work on land and not on water?

A.—Yes.

Q.—Do not you think it would be a highly risky and dangerous thing suddenly to transfer this work into the hands of men who had had no previous experience of marine dredging operations at all?

A.—It seems to me that it never has been from the very beginning in the hands of anybody who has had any experience of dredging operations on a great scale.

Q.—At all events the scheme has now connected with it engineers and people who have been associated with it for two or three years and who are now running it?

A.—I should like to stress the psychological factor. The psychological factor goes a tremendous way with our people. No matter how competent it may be, an agency which does not inspire confidence will not serve its purpose. What I have at the back of my mind is an agency which will inspire confidence so far as any human agency can. I simply quote the P.W.D. because that is the agency we know best. I have not any dogmatic view, but I do venture to suggest, with all deference and all respect for those who are in charge, that after what has gone on for the last three years, the factor of confidence should be put very high.

Sir Frederick Hopkinson.—I quite agree, and I suggest to you that the only way in which that can be done, in a lasting manner, is to have a thoroughly competent person there directing operations.

A.—I suggest, with all deference, that there are two essentials to be secured, and they are indissolubly associated. They are to set up an agency which will at once command public confidence and secure the efficient and econmical prosecution of whatever work is to be done. I have suggested the P.W.D., because that is an agency which commands public confidence and has carried through most of the great constructional works in India. The alternative is a first-class firm of engineers, whose reputation stands so high as to ensure efficiency and economy.

Q.—Always remember this—that engineers (and I speak of them as a class) are not contractors, and this work can only properly be handled by a contractor.

A.—I quite agree.

Sir M. Visvesvaraya.—What is meant by Public Works supervision in your mind is that you want a very efficient man at the top, and for all special work like running an engine or dredger, you want men who are experienced in that class of work, working under the P.W.D.?

A.—Yes. I think many people misunderstand our P.W.D. system. They think they do everything themselves; they do not; they work through an extensive system of contractors.

Q.—In this case you want one very competent man who has had experience of reclamation work; and for all special work, like working a dredger, or taking soundings, you want specialists in those particular lines?

A.—That is my view.

Sir Frederick Hopkinson.—Is it not the universal experience all over the world that really good and great things are always done by an individual?

A.—It is.

Sir M. Visvesvaraya.—There is a danger of leaving things to one man.

Sir Frederick Hopkinson.—Not if you get the right man.

Sir M. Visvesvaraya.—It is very difficult to know of him beforehand.

A.—I take my hat off to the P.W.D. every time. It is a very eminent service which is, speaking broadly, absolutely above suspicion. It is accustomed to handling Indian conditions and if you could find an outstanding contractor, would still like to see a senior P.W.D. man in charge of the work.

Sir Frederick Hopkinson.—Although he has no experience of that kind of work?

A.—Although he has no experience of that kind of work.

Q.—And is not accustomed, as you said just now, to stand alone?

A.—Give him his technical advisers.

Q.—Then you will destroy the edifice. It is the man at the top who should be the adviser. You cannot give a man a technical adviser. The man at the top should know it himself. He should be his own technical adviser.

A.—If you could find the man.

Q.—I can find the man.

A.—Then I bow; but subject to finding the man I have my affection for the P.W.D., but I am not in the least dogmatic on the point.

Mr. Billimoria.—With reference to the sentence that was referred to just now as to the Tata Syndicate and the other syndicate, everything looked very rosy at that time?

A.—It did.

Q.—You have the personal knowledge and you are positively certain that a large number of concerns were floated during that period to which were subscribed crores and crores of rupees, and shares were sold like hot cakes in Bombay market, jumping to a substantial premium when the Company was only registered?

A.—That was so.

Q.—That was the condition of things, but several of those concerns have come to grief?

A.—They have, unfortunately.

Q.—And during the last few years crores of rupees of capital have had to be wiped off?

A.—That is so.

Q.—Therefore the mere fact that two substantial syndicates came forward to launch a scheme of that description in the year 1919 does not indicate that the scheme should be pushed through and completed in the time of depression?

A.—No. Might I just say one word on that? I do feel this rather strongly. Between 1917 and 1920, as Mr. Billimoria has pointed out, we all made very serious mistakes, and the lucky ones are those who made the fewest. We have all in our various capacities had to go through the painful process of cutting our losses, and, believe me, Sir, they are cut to a degree, or will have to be cut to a degree, which is very drastic. We have to do the same with regard to this reclamation.

Chairman.—Thank you.

(The Witness withdrew.)

The Committee Assembled at 11 a.m., on the 13th October, 1926, all Members being present.

52nd Witness, Sir L. J. Kershaw, K.C.S.I., C.I.E., Assistant Under-Secretary of State for India.

WRITTEN STATEMENT.

I may, perhaps, be able to assist the Committee by explaining the circumstances in which the Secretary of State for India in Council sanctioned the Bombay Housing and Development scheme. I shall explain, first, that the Back Bay scheme was not dealt with as an isolated proposal, but as an integral part of the larger scheme, and, secondly, that the Secretary of State in Council in dealing with the latter had regard tc its administrative and financial aspects. Following the usual practice no part of the scheme was subjected to technical examination.

Throughout the case the governing consideration was the urgent need to improve industrial housing conditions in Bombay, regarding which the Secretary of State had addressed the Government of India by despatch in 1917.

Oral Evidence.

Chairman.—What position were you holding in the year 1920?

A.—I was then Secretary in the Revenue and Statistics Department of the India Office.

Q.—Are you acquainted with the circumstances under which the Secretary of State for India in Council, sanctioned the Bombay Housing and Development schemes?

A.—Yes.

Q.—The Development Directorate, as we have been told frequently, had many other activities besides the Back Bay reclamation?

A.—That is so.

Q.—Was the Back Bay reclamation the principal undertaking in a large number of other undertakings designed to relieve the congestion and to improve the conditions of Bombay?

A.—It depends on what you mean by the "principal" undertaking. It may be considered that the housing scheme was the principal part of the scheme, but it is a matter of opinion.

Q.—That, broadly speaking, is the position?

A.—Yes.

Q.—Will you tell us what were the circumstances under which the scheme was sanctioned?

A.—It is difficult to know where to begin. May I refer to my documents? Perhaps I had better take as the central date the month of February, 1920. In that month we received from the Government of India a letter regarding the Bombay Housing and Development scheme. With that letter the Government of India sent copies of correspondence which had passed between them and the Government of Bombay on the scheme.

Q.—The letter of the 4th February was mainly devoted to finance, was it not?

A.—I am now referring to the letter of the 26th February from the Government of India to the Secretary of State. In that letter the Government of India told us that these proposals had been discussed between the two Governments at Delhi, and they indicated that, broadly speaking, they were in favour of the proposals, but they said that they were then formally before the Government of India, and that we might expect a telegram containing their considered views. That telegram was received the following month, in March. In this letter of February, to which I have referred, the Government of India made it clear that the Back Bay scheme was an integral part of the bigger scheme. We had already received the printed book containing Sir George Buchanan's estimate, and we had also received a telegram from the Government of India on that part of the scheme, in which they said they were satisfied that the scheme was a sound one, both from the technical and financial aspects. On these materials we proceeded to examine the scheme as a whole, and we took advantage of an offer made by the Government of India and consulted Mr. Monie, an officer of the Bombay Government, who was at home at the time. They told us that if there was anything in the scheme which required further explanation, Mr. Monie would be able to supply that information. Accordingly we asked him to come to the India Office to discuss some aspects, especially of the Housing scheme, and those matters were discussed with him. In considering this scheme, the chief matter that seemed to require examination was the adequacy of the Housing scheme. The Housing scheme, as I say (and I want to lay special emphasis on this), overshadowed everything else. It was regarded as a matter of great urgency that the housing conditions in Bombay should be improved. There were also taxation proposals, but we did not altogether accept those proposals. One feature of the scheme involved the taxation of cotton. The Secretary of State did not altogether accept the proposals as sent up by the Bombay Government, and certain suggestions were made. Another important aspect of the scheme was the method of financing it. The scheme involved an expenditure of, I think, 30 crores in the first five years, and it was a matter of great importance to decide the best way of raising the money.

Q.—Thirty crores at 1*s.* 6*d.* is £22,500,000?

A.—Something of that sort; I do not know what the exchange was at that period.

Q.—I am treating it as at 1*s.* 6*d.*?

A.—As the result of this examination of the scheme, a telegram was sent to the Government of India on the 4th May, giving what I might describe as provisional sanction to this scheme. The scheme was sanctioned in principle "subject to a suitable scheme of finance being evolved."

Q.—I think that telegram contained a congratulatory message. Will you read it?

A.—" I desire to acknowledge the admirable work of the Bombay Government in devising the scheme, which is conceived on bold lines, and subject to a suitable scheme of finance being evolved, I am prepared to accept your proposals in principle." Then the telegram proceeds to discuss the question of taxation.

Q.—When the Secretary of State says " in devising the scheme," was that an inclusive reference?

A.—That referred to the scheme as a whole. Just as the Government of India considered that the Back Bay scheme was an integral part of the scheme, so we considered that the Back Bay scheme was an integral part of the scheme—in other words, that housing could not be improved unless the Back Bay scheme was undertaken.

Q.—Is there a reference in the telegram to the sanctioning of the dredging plant?

A.—Not in this telegram. Do you want me to go on to that at once?

Q.—No. Just take the matter in your own way.

A.—That telegram, as I said, contained what I might describe as provisional sanction. Then there followed some correspondence between the Secretary of State and the Government of India regarding the method of financing the scheme, and even though the method of finance was not finally agreed upon, nevertheless in reply to a telegram from the Government of India of the 1st June, in which they represented how exceedingly urgent the scheme was, the Secretary of State gave sanction to the scheme.

Q.—Can you give me the actual date of that? I have a note of it, but I have not the actual date.

A.—The date is the 8th June, 1920. That telegram made some comments on taxation. Have you a copy of it?

Q.—Yes.

A.– The telegram ends by giving " the sanction for which you ask."

Q.—" I give you the sanction for which you ask."

A.—That is general sanction to the scheme. Further discussion on finance followed, and finally, on the 1st September, the Secretary of State sanctioned the issue of a loan on certain terms. That, in outline, is what happened during those few months in 1920.

Q.—So far, the evidence you have given us deals with the administrative and financial aspect?

A.—Yes.

Q.—As regards Back Bay, the technical aspect was a very important matter, was it not?

A.—No doubt, but, following the usual practice in such cases, no technical examination of the scheme was undertaken in the India Office.

Q.—On what is that practice based?

A.—I should say it is based on common sense. I should say that it would be administratively very difficult to adopt any other practice.

Q.—But technical experts exist in England, do they not?

A.—Certainly. May I explain? I say " usual practice." There have been very exceptional cases in which the advice of outside experts has been taken. I have made enquiries and I find that two such cases have occurred. In one case, I believe, the Government of India themselves asked that advice should be taken on the design of a syphon in connection with an irrigation work, and that was done. In another case the papers received (I am now speaking of the Sukkur Barrage scheme) disclosed a very acute difference of opinion between the experts in India, and as the scheme was a very large one, the Secretary of State thought it desirable to set up a special committee of experts to examine the scheme. That was done; their report was sent to India; and another scheme was prepared. Ordinarily, however, no such examination is made. I need hardly say that at the India Office we have not any technical experts on the staff.

Q.—But there would have been no difficulty whatever in submitting the report of Messrs. Lowther & Kidd, the report of Sir George Buchanan, and any other documents to two or three technical experts in this country, would there?

A.—There seemed no necessity to do that.

Q.—My question was that there would have been no difficulty?

A.—Had the Secretary of State thought it desirable to obtain outside advice, he could no doubt have obtained such advice

Q.—Do you know that it was realised by the Government of India that this was a work of a very unusual character?

A.—I am afraid I cannot speak about that.

Q.—Did you realise that the Back Bay reclamation scheme was a work of a highly technical and somewhat unusual character?

A.—No. The scheme seemed a perfectly straightforward one on the papers.

Q.—At all events, it was a very large undertaking to reclaim 1,143 acres on an open sea front?

A.—No doubt, if you take the scheme as a separate scheme; but the point on which I wish particularly to lay stress is that this was only part of a much bigger scheme.

Q.—Yes, but taking it as part of a much bigger scheme, it was most essential that it should not fail?

A.—Certainly.

Q.—Because, as part of a bigger scheme, a failure would damage the whole bigger scheme?

A.—The same consideration applies to practically every project which is sent up.

Q.—What I am suggesting to you is that there was no precedent in the whole world for a reclamation of this extent on an open seafront?

A.—That, of course, I cannot say. I am not aware of that.

Q.—At all events, the Secretary of State did not subject the proposed reclamation to the consideration of any technical experts in this country?

A.—That is so.

Q.—At this time in 1920 was there, in the opinion of the Secretary of State, an urgent need for something to be done in Bombay?

A.—Certainly. He was very deeply concerned with the condition of things in Bombay in regard to industrial housing. I remember that shortly after Mr. Montagu assumed office he sent a despatch to the Government of India on the subject. We understood that the Government of India were equally concerned, and the Government of Bombay also. As I said before, it was the dominant consideration throughout the case—the urgent need of improving industrial housing in Bombay.

Q.—Even as far back as 1911 were the housing conditions, as far as you know, acute? In 1914 there was a report of the Bombay Development Committee, and a member of the Indian Civil Service, Mr. Kissan, giving a statement, said, " According to the census of 1911, out of the total population of 929,082 people living in 200,308 tenements, 743,247 (that is about 80 per cent. of the total population) live in 166,337 one-roomed tenements "?

A.—That, I understood, was the position.

Q.—Accepting those figures, it shows that even in 1911 the condition of Bombay was dreadful as regards housing?

A.—It was. I think the matter attracted a good deal of attention in Parliament here. I remember in Mr. Chamberlain's time, when a Debate took place on the Cotton Duties, there were some references in the Debate to housing; and I think I am right in saying that a despatch was sent to the Government of India then, not exclusively on housing, but on the question of Cotton Duties, but referring also to housing. The leading document, as I have always understood, was the Report of the Industrial Commission.

Q.—Sir Stanley Reed referred to it the other day. We ought to have that report.

A.—Sir Thomas Holland, who was the Chairman of that Commission, spoke very strongly in the Legislative Council on the state of things in Bombay.

Q.—When you said that Mr. Montagu had sent a despatch on this subject, were you referring to a despatch in the year 1917?

A.—Yes.

Q.—Do you happen to have a copy of that?

A.—Yes, I have it in my file.

Q.—Will you summarise it for us?

A.—This is dated 26th October, 1917. He refers to a despatch sent by his predecessor—that is Mr. Chamberlain—asking to be furnished with a full statement of the case regarding the system of Indian Cotton Duties, and he goes on to say that one aspect of the latter question—that regarding the housing of operatives—" is no doubt engaging your attention. I am glad to observe that H.E. the Governor of Bombay and that members of His Excellency's Government have already, in addressing commercial bodies in Bombay, impressed upon mill-owners their obligation in this respect. My information on the subject is not complete, but from published reports I gather that during the 14 years which followed the passing of the City of Bombay Improvement Act of 1898 some of the worst slum areas were swept away and that the Board of Trustees erected model chawls sufficient to provide accommodation for 17,000 odd persons, the population occupying one-roomed dwellings being then estimated to be 800,000." That more or less corresponds with the figure you gave me.

Q.—Yes, that is right.

A.—" The operations of the Board of Trustees under the Act of 1898 were, in the matter of housing, directed primarily to the provision of accommodation for those rendered homeless by the demolition of insanitary dwellings and not specially for mill operatives, but the amendment of the Act effected in 1912 empowered the Board to co-operate with millowners for the provision of accommodation for the poorer classes of their employees. It was hoped that by co-operative effort, accommodation could be provided for a large number of low paid workers at the expense in the first instance of the State, the rent payable by employers being fixed so as to ensure the payment of the capital cost with interest in 28 years. These anticipations do not seem to have been realised, and I understand that up to the end of 1915-16 only one scheme for the erection of eight blocks had been taken up and partially completed, the second scheme having been under consideration for nearly two years. I have not been able to ascertain the causes which have hindered the more effective operation of the Act, nor have I the information as to the extent to which employers may have themselves provided suitable accommodation for their workpeople, but unless this has been done on a large scale the position is highly unsatisfactory and demands immediate and energetic action. The Bombay millowners may have derived considerable advantage from the increase in the Cotton Duties, and if that be the case they have failed to realise their obligations, or the existing legislation being inadequate, it would appear to be necessary that the Government or the local authority should be vested with larger powers than they at present possess on the principle of the Housing Acts in this country. It may be remarked that experience of housing difficulties in this country indicates that private enterprise in itself cannot be relied on to provide an adequate remedy. I request that Your Excellency's Government will obtain from the local authority a report on the housing of mill operatives in Bombay, describing the existing situation and indicating the measures which the local authority propose to adopt. The matter is one in which early action appears to be desirable, and I shall be glad to learn your views and those of the Bombay Government at an early date."

Q.—That shows the serious view which Mr. Montagu took of the matter in 1917. The Governor at that time, 1917, was Lord Willingdon. Sir George Lloyd succeeded Lord Willingdon on the 16th December, 1918. When Lord Lloyd became the Governor-Designate, he would, I suppose, in practice, attend at the India Office so as to acquaint himself with the problems with which he would have to deal?

A.—Ordinarily he would.

Q.—I say, according to the usual practice?

A.—Yes.

Q.—The Governor-Designate goes to the India Office and is told what are the immediate problems with which he will have to deal on becoming the Governor?

A.—Yes.

Q.—Therefore in the ordinary course would it be fair to assume that Lord Lloyd would see that despatch?

A.—I cannot say whether he saw this particular despatch or not.

Q.—Would it be fair to assume that, in conversations with Mr. Montagu, the urgency and importance of dealing with the housing question would be pressed upon him?

A.—That is the case. I have a note in one of our files by Mr. Montagu in which he said, " The land trouble in Bombay is shocking. I charged the Governor on appointment to deal with it urgently."

Q.—What is the date of that?

A.—That is dated April, 1920.

Q.—Is the actual day of the month given?

A.—It was not his practice to put the date, but from internal evidence I think I am safe in saying that it was the 6th April. It is on or about that date.

Q.—I will tell you why I asked the question, Sir Louis. It is because the Government of Bombay had on the 16th October, 1918, sent a telegram to the Secretary of State saying that the re-examination of the Back Bay scheme was urgent and asking that the best man should be sent to Bombay?

A.—Asking the Secretary of State to obtain an expert?

Q.—Yes. That was on the 16th October, 1918. No reply had been sent to that telegram, and on the 8th April, 1919, when Lord Lloyd was Governor, a second telegram was sent.

A.—By whom?

Q.—By the Governor of Bombay.

A.—To what effect?

Q.—Stating that there was no reply to the wire of the 16th October which had been sent by Lord Willingdon—" so wire again. Expert must see the conditions before monsoon as well as after. Government of India agree with Government of Bombay that expert should reach Bombay not later than the third week in May."

A.—Do you want me to go into the details of that?

Q.—No. The only point I wish to make is this. I wish to emphasise that it was Lord Willingdon's Government which, on the 16th October, 1918, had stated that the re-examination of the Back Bay scheme was an urgent matter. Lord Lloyd, before going out in December, 1918, is, as you have shown us by that note, pressed with the urgency of the housing schemes. Then on the 8th April his Government carries on the cabling which had commenced on the 16th October?

A.—That all seems to fit in.

Q.—This Back Bay reclamation scheme cannot, in view of those telegrams, be suggested to be the initiation of Lord Lloyd?

A.—Oh, no. I always understood that the Back Bay scheme had a very long and chequered history behind it.

Sir M. Visvesvaraya.—You have already stated there was an understanding when Lord Lloyd left England that he should proceed with the development schemes?

A.—Yes—well, not with the development scheme, but he was pressed with the importance of the question of industrial housing. Of course, one is connected with the other.

Q.—He was pressed with the importance of pushing on with questions connected with the development of Bombay?

A.—I did not say so.

Q.—That was the object—the development of Bombay?

A.—I should not say so at all. You might develop Bombay for a variety of reasons, but the matter which was pre-eminently in the mind of the Secretary of State was the improvement of industrial housing in Bombay—which, of course, was linked up with the easing of the land congestion in Bombay, which, in its turn, was linked up, I presume, with reclamation.

Q.—There is a letter from the Government of Bombay to the Government of India, dated the 24th May, 1920.

A.—Did the Government of India ever communicate that letter to the Secretary of State? What was it about? Perhaps I may be able to trace it if you tell me that.

Q.—It is about the extreme urgency of the case; but I will not refer to it. There is a telegram from the Viceroy to the Secretary of State dated the 1st June, 1920, at the end of which it says: " Some risk must be run in order to end the present intolerable condition of affairs." There are similar statements made in the other letter.

A.—May I read the whole of that passage: " Some risk must be run in order to end the present intolerable condition of affairs, and we earnestly solicit orders which will enable Sir George Lloyd's Government to commence operations, and assure you that every endeavour will be made," and so on, " which are equally present to our minds." That is the telegram to which I have referred on which final sanction was given to the scheme.

Q.—" I am to emphasise strongly the point that it is essential, if possible, to put an end as early as possible to the misery and hardship caused by the present conditions." That is in the letter to which I first referred. That statement is made by the Government of Bombay. The scheme seems to have been rushed with more than ordinary haste on that occasion, does it not? I presume they considered that the housing conditions were very unsatisfactory?

A.—Are you speaking of the Government of Bombay, or of the Government of India, or of the Secretary of State?

Q.—I am speaking of the Government of Bombay. Were any communications also sent to His Excellency the Viceroy to make things easy for the new Government in this respect?

A.—I do not understand what you mean by " making things easy."

Sir M. Visvesvaraya.—Up to 1917 other schemes of reclamation had been submitted by the Bombay Government one after another, and they had all been turned down by the Government of India.

Chairman.—From 1863.

Sir M. Visvesvaraya.—And it was only on this occasion in 1919, as soon as the proposals from the Government of Bombay went up to the Government of India, that the latter viewed the question favourably and gave every facility to the Government of Bombay. I only want to know whether there is any record of the Viceroy having been influenced by the Secretary of State?

A.—I do not understand. I am not evading the question in any way, but I do not understand what you mean by " giving facilities."

Q.—Did the Secretary of State send any communication to the effect mentioned to the Viceroy?

A.—Privately or officially?

Q.—Privately or unofficially?

A.—I cannot speak as to any private communication. There is no official communication

Q.—You have referred to one note. Is there any similar note or similar reference on your file?

A.—Do you mean after 1919?

Q.—Yes.

A.—No. I think I am right in saying that there is not.

Q.—They changed their usual policy of caution in this respect in 1919?

A.—That, again, is a matter of opinion.

Q.—You have stated that you are concerned only with the administrative and financial aspects of this question?

A.—No. What I said was that in considering the case special regard was had to those aspects

Q.—You do not usually get such schemes independently examined here, I take it?

A.—No, it is very exceptional.

Q.—But this was also an exceptional scheme, was it not? I am only asking for information?

A.—I do not think I have made myself clear. It is only when there is some exceptional circumstance in the scheme, such as the instance I have given in which there was a difference of opinion between experts in India. Obviously then the Secretary of State can hardly take the responsibility of sanctioning without satisfying himself.

Q.—The Government of India approved of the scheme, not by despatches or by official communications, but because an engineer was sent from the Government of Bombay to the Government of India to assist the Public Works Department's engineers and the Government of India, and also Mr. Monie was sent to the Secretary of State to explain matters.

A.—Mr. Monie was not sent specially. He happened to be in England on leave, and it was suggested that he might explain the scheme.

Q.—In another case the Secretary of State wired to the Viceroy on the 4th May: " I have been seriously embarrassed in dealing with this case by the manner in which the proposals have been submitted in a scheme of this magnitude involving many novel features. In the absence of a self-contained description of proposal I have been forced to rely on correspondence passing between you and the Government of Bombay since September last." This is a statement made by the Secretary of State to show that the scheme was pushed on with more than ordinary speed?

A.—A think if it had not been an excessively urgent scheme, a scheme of this kind would have come up in the ordinary way with a long despatch with a self-contained description, but the Government of India explained in their letter that they had discussed the matter with the Government of Bombay and were actually considering it at the time. Therefore it was sent to us in this form, I suppose, on account of the urgency of the case. It made it more difficult for us to examine the scheme, but that was the reason.

Q.—Do you consider, viewing it from the present position of affairs, whether the question was really so very urgent at that time, in regard to housing conditions?

A.—I can only give you my personal opinion, but I certainly think it was very urgent.

Q.—Have things been remedied since in that respect?

A.—You probably know the facts better than I do.

Q.—We want your view from this distance?

A.—At this end we are constantly having to meet criticisms in Parliament and so on. We are able to say that so many chawls have been built under this scheme. I am not in a position to say whether the scheme has been a success or not. I am talking now of the housing scheme; which no doubt has eased the position.

Q.—You have seen a recommendation made that Messrs. Meik and Buchanan should be the sole engineers for ordering the dredgers, for preparing the specifications and so on. You have seen the recommendation made by the Government of Bombay?

A.—Yes.

Q.—There is a telegram from the Viceroy to the Secretary of State dated 12th June, 1920: "Our telegram dated 19th May, position of Meik and Buchanan in relation to Director-General of Stores, India Office," etc. (reads telegram). That was approved, I believe, with modifications, by the Secretary of State?

A.—I am not very familiar with this side of the case.

Chairman.—The Secretary of State refused to accept that, and demanded a joint responsibility?

A.—I think Colonel Paddon has given evidence on this.

Chairman.—Yes. We have had that evidence.

Sir M. Visvesvaraya.—There was another recommendation from the Government of Bombay, viz.: that Messrs. Simons and Company should be entrusted with the order for the dredger. They went into the tenders and they recommended to the Secretary of State that Messrs. Simons and Company's tender should be accepted. You have some reference to that, have you not?

A.—So far as the dredger is concerned the Secretary of State gave sanction for placing the contract. I cannot give you any information about the details.

Chairman.—We have had them from Colonel Paddon; but we shall want you some time this morning to tell us about the sanctioning of the dredging plant, and the order. That was some time in May?

A.—Do you wish me to go into that now?

Sir M. Visvesvaraya.—Yes, if you will.

A.—The dates are important. The telegram of the 4th May to the Government of India said: "In anticipation of sanction to the main scheme for Bombay development I have sanctioned the placing of the contract for the dredger." Although it is quite true that it was in anticipation of the sanction, it is not absolutely true, because if you compare the date of the telegram which conveyed provisional sanction to the scheme, you will find that it was then decided that the scheme would be accepted subject to the settlement of financial details; and, of course, there was no reason to suppose that those details would not be settled.

Chairman.—The finance telegram was on the same day?

A.—The two things were settled at the same time.

Sir Frederick Hopkinson.—But the scheme was sanctioned on June 8th, was it not?

A.—Finally.

Q.—It was provisionally sanctioned on 4th May and finally sanctioned on 8th June?

A.—That is right. You will notice that the date of this telegram relating to the dredger is the 4th May. As a matter of fact, the two telegrams were submitted at the same time after the whole case had been considered, so that although it is technically correct to say it is in anticipation of sanction, in reality the provisional sanction had then been given, or was given on the same day, to the main scheme.

Q.—Because, by sanctioning the purchase of the dredging plant, you sanctioned the scheme. You committed yourself to the scheme?

A.—I am afraid I have not made myself clear. The scheme as a whole was considered from various angles and discussed, and it was decided to sanction it, subject to a suitable scheme of finance being devised. I have already explained that discussions followed on that subject. At the same time as the scheme was sanctioned, and as it was certain that a method of finance would be devised, it was decided to sanction the placing of the contract to get on with the work. That, I think, was the sequence of events as far as I can understand it from the papers.

Chairman.—Sir Frederick Hopkinson's point is that once you had sanctioned the expenditure of £650,000 for the purchase of the dredger you were committed to the scheme?

A.—Yes. We had already committed ourselves. It was simultaneous.

Q.—The scheme was provisionally sanctioned subject to finance, as to which it was anticipated there would be no difficulty?

A.—I think I am right in saying that. The Bombay Government had proposed premium bonds, and the Secretary of State did not feel prepared to accept that. Discussions with Bombay resulted in a loan on certain terms being floated in Bombay.

Sir M. Visvesvaraya.—The Government of Bombay wrote to you that Messrs. William Simons & Co.'s tender should be accepted for the dredger. There is a letter addressed by the Government of Bombay to you?

A.—You are taking me out of my depth now.

Chairman.—Colonel Paddon has produced the letter. It is quite clear in its terms —that the Government of Bombay did indicate Messrs. Simons as the builders of the dredger.

A.—I am afraid I can give no evidence of any value on the details of the purchase of the dredger. I am merely concerned with the sanctioning of the scheme and of the placing of the contract.

Chairman.—There is no controversy about it.

Sir M. Visvesvaraya.—I want to bring out the point that in many respects both the Secretary of State and the Government of Bombay facilitated the transactions.

A.—Undoubtedly. What do you mean by " the transaction "?

Q.—The development scheme.

A.—By " the transaction " I mean the scheme as a whole.

Q.—That would mean facilitating each detail as it came up. On another occasion Messrs. Meik and Buchanan were allowed to submit tenders direct to the Director of Stores, were they not?

A.—I cannot say anything about that.

Q.—There were no instructions to the naval architect to facilitate matters, I take it; or are you not aware of that?

A.—I am not aware of any instructions. I have no doubt that he was aware of the urgency of the work.

Q.—In the course of the evidence we have found that certain formalities which ought to have been gone through were not gone through, due to the urgency of the scheme?

A.—I do not know that I can give any useful evidence on that.

Sir Frederick Hopkinson.—I think you said the shortage of houses was very acute in 1911?

A.—I think the Chairman said that. He read an extract from a report.

Chairman.—I read the conditions mentioned by Mr. Kissan.

Sir Frederick Hopkinson.—I thought the witness gave general concurrence.

Chairman.—The conditions in Bombay were quite serious in 1911, before the war and before the immigration in 1916 onwards.

Sir Frederick Hopkinson.—And presumably that congestion of population and shortage of houses would not get less acute up to 1919?

A.—I presume not. I do not know anything about the conditions in those years.

Q.—We have been told that the population of Bombay nearly doubled itself. There was an immigration of something like 600,000 people. Was not this a very sudden development of the Back Bay scheme early in 1919? Was it not a complete reversal of everything that had gone before in regard to the suddenness with which this scheme was inaugurated?

A.—I should not think so.

Q.—This Back Bay reclamation had been almost a hardy annual since 1863. Time after time it was considered and nothing was done, or very little, up till 1919?

A.—You are more familiar with the history of it than I am, but we understood that a project had been worked out at about 1912 by Mr. Kidd, and that it was then represented, I think by Lord Willingdon's Government, that it was urgently necessary to re-examine it. It seems to me the two things fit in.

Q.—But nothing had happened between 1912 and 1919 apparently?

A.—The war had happened.

Q.—But nothing in the way of going on with the scheme of the Back Bay reclamation?

A.—No. So far as I know nothing was done.

Chairman.—At the same time, Sir Frederick, you would like to include the fact that two syndicates were willing to put up a very considerable sum of money in December, 1917, as evidencing the belief of very hard-headed and very important business people in Bombay that there was money in the reclamation.

Sir Frederick Hopkinson.—Having regard to the present condition of affairs at Bombay—that is, with regard to the Back Bay reclamation—do not you think that if they had made haste a little more slowly things would have been better?

A.—Well, it is always easy to be wise after the event, but we have to look at things as they were at the time and on the materials available at the time.

Q.—You know the old proverb of " More haste less speed "?

A.—True.

Q.—If they had perhaps had a little less haste there would have been more speed and the scheme would be in a better condition than it is in to-day?

A.—It may be so, but I am, and I presume you are also, dealing with conditions as they were round about 1920.

Q.—What I do not quite understand is the suddenness with which the scheme was pushed forward in 1919?

A.—Sudden in what way?

Q.—In every way. The engineer was appointed in May, 1919. He spent a short time in Bombay. He left on 31st May. His report was sent in early in September, 1919. The dredger was ordered in May, 1920, entirely on this one report of Sir George Buchanan. I suggest that that was making haste too rapidly.

A.—Well, I do not think I agree with you, but it is a matter for you yourselves to consider.

Mr. Billimoria.—When you refer to the financial question being discussed, it was with regard to the method of raising a loan; but that does not necessarily deal with the soundness or otherwise of the scheme?

A.—No. By the financial aspect of the scheme I meant it was chiefly concerned with the method of raising money during the first five years.

Q.—The Government of Bombay proposed premium bonds, and the Secretary of State would not entertain that proposal, and so on?

A.—That is right.

Q.—The Secretary of State did not consider whether the scheme was financially sound or otherwise. That consideration was not given to the scheme?

A.—No. I want to lay stress on the point that the scheme was not regarded as a commercial undertaking estimated to cost so much or estimated to yield so much. It was regarded as a scheme to deal with this scandal in Bombay. It was regarded, certainly, in that light by the Secretary of State and no doubt also by the Government of India and by the Government of Bombay.

Q.—When the scheme was submitted, certain figures were also submitted to the Secretary of State. It was stated that it was possible to have this scheme completed at an estimate of 367 lakhs. That was the basis on which the Government of India were induced to carry on with it, and that was also the reason which actuated the Secretary of State in approving of and sanctioning the scheme?

A.—By the scheme, are you referring to the Back Bay scheme?

Q.—Yes.

A.—I have already laid stress on the fact that we did not treat the Back Bay scheme as a separate scheme but as a part of a much larger scheme. That larger scheme was treated as a whole. It included, as you know, not merely industrial housing and not merely Back Bay. There was another reclamation scheme, suburban development, and so forth.

Q.—As far as the Back Bay scheme is concerned, there was direct correspondence between the Secretary of State and the local government?

A.—Yes, regarding the choice of an expert.

Q.—Not only regarding that, but with regard to the scheme itself?

A.—Not between the Secretary of State and the Government of Bombay. I do not think so; I may be wrong.

Q.—The report of the expert was submitted. The Secretary of State was requested to look out for some expert who could go out to India and give an opinion on the feasibility or otherwise of the scheme?

A.—That is so.

Q.—Therefore, although it was considered as a part, it was considered separately?

A.—In that sense; but the fact that the Government of India or the local government asks the Secretary of State to recruit an expert has no connection with the sanctioning of the scheme afterwards.

Q.—If the Bombay Government had not mentioned that the scheme was going to cost 367 lakhs but was going to cost much more, would the Secretary of State have sanctioned the scheme.

A.—That is a hypothetical question on which I cannot give an opinion. I do not think I ought to give a personal opinion.

Q.—Was not the money part one of the considerations, apart from the congestion and the tension which was felt? You could not have undertaken a large scheme of this magnitude without due regard to finance. The financial position was also one of the factors to be considered, was it not.

A.—One of the factors.

Chairman.—I think what Mr. Billimoria wants to know is this. As far as you know, was the Secretary of State influenced by the fact that apparently this large reclamation could be done for a relatively small sum of 367 lakhs? That is one question. The other question is: was finance a governing consideration, or were other considerations the governing ones?

A.—Well, as to the first part of the question: when the scheme as a whole was examined the Back Bay part of the scheme was regarded, on the materials presented, as a very attractive proposition. It was estimated to cost so much and estimated to yield so much. I do not for a moment say—I can only here give my personal opinion—that that was a determining factor, or even a contributing factor, in influencing the decision. I have said before, and I repeat it, that the dominant consideration was the urgent need of improving the industrial housing conditions in Bombay. Whether or not if the scheme had been estimated to cost, let us say, twice the amount that was stated, the Bombay Government would have sent it up, or the Government of India would have sent it up, or the Secretary of State would have sanctioned it, is a matter of opinion.

Q.—No one can tell?

A.—No one can tell.

Sir Frederick Hopkinson.—Did you know that it was stated in the House at Bombay that this was going to produce a profit of 32 crores?

A.—I do not remember the figure.

Q.—It would be enormously profitable?

A.—Certainly; taken on the basis of land values at the time, it was a very attractive proposition; but I want to make it clear that the fact that the Back Bay scheme as presented was an attractive proposition was not the determining feature in the case.

Mr. Billimoria.—It was one of the considerations?

A.—It was no doubt a consideration.

Q.—Not predominant, but one of the factors?

A.—I want to make it clear that it was not a dominant consideration. I want to make that perfectly clear.

Sir Frederick Hopkinson: There is not so much connection between the Back Bay scheme and housing as you might think, because the Back Bay reclamation was not going to provide housing for the working classes?

A.—That is clear. Possibly you may take evidence from somebody with greater knowledge of Bombay than I have on that.

Q.—I was just bringing to your notice that the Back Bay reclamation was not intended to supply houses for the working classes?

A.—Not directly, but surely—at least, we understood so—the reclamation of this large area would ease the congestion in Bombay.

Q.—But not the housing of the working classes?

A.—As I say, evidence from somebody familiar with Bombay conditions would be more valuable than my evidence on that point.

Sir Frederick Hopkinson.—We have had witnesses who have tried to connect the two.

Chairman.—It is a long chain.

Sir Frederick Hopkinson.—It is a long chain.

Chairman.—In fact, it is a very long chain.

Sir Frederick Hopkinson.—The one is very remote from the other.

Chairman.—But regarding it as an attractive proposition, as was said in the Legislative Council, whatever profit was realised could be applied to the amelioration of the working classes?

A.—Yes.

Q.—It can be applied for the building of houses for the industrial population?

A.—Yes.

Mr. Billimoria.—The congestion of housing was a dominant consideration, you have stated, at the time; but how was the reclamation linked up with it except on this point that it was going to yield a very handsome profit which would go to relieve this congestion?

A.—No; it was not regarded from that point of view. We have just been discussing that.

Q.—How does the Back Bay scheme come into that?

A.—I say I cannot speak with any local knowledge of Bombay worth anything. If you take evidence from people acquainted with Bombay then they may be able to trace the connection. We knew, of course, that tenements were not going to be erected on the reclaimed land at Back Bay. That was clear; but we understood that the throwing open of this large area would ease the conditions in Bombay and so enable tenements to be built.

Q.—Did you expect that by the reclaimed area congestion, with reference to industrial housing would be eased?

A.—Well, of course, any question of congestion is a fluid proposition. It is not that site, or this site, or the other site. Here I am rather going out of my province, but I should have thought that when you have acute land congestion in a town, if you rendered available a large area, it would ease the condition of things all round. I should imagine so.

Q.—I will not press that, because we have had evidence of other people on that.

A.—You will probably take evidence about it.

Q.—With regard to the note of Mr. Montagu which you produced, I find it is undated. Can you explain why it is undated? If you look at the file you will observe it is not dated at all.

A.—I can fix the date, because the note is on a file which was put forward on a certain day and disposed of on a certain day, so obviously between those two dates the note was written. Do you attach any importance to the date?

Q.—No; but because I happened to read in the files this document and it is undated, I thought possibly you might be in a position to clear up the circumstances under which this note was not dated. It is a very important note, and it has a very great bearing on this question.

A.—If you have any doubts in your mind, I can resolve them.

Q.—It is not a question of doubts in my mind. It is a question of the date. It is an important document for it not to be dated.

A.—Here is the original of the note. I have got it in front of me. What I was reading from was a typed copy, because the original note is rather illegible. The case was put forward by me on the 31st March in the ordinary way and dealt with by the Under-Secretary of State on the same day, and the final telegram was sent on the 8th June, so the note was written between those two dates. From the fact that I see "E.M.S. 6.4" I am presuming it was the 6th of April.

Chairman.—Then it is dated?

A.—Well, no; because the "E.S.M." is not written in Mr. Montagu's writing. Probably it is his private secretary's writing. There is no doubt whatever it was written within those two dates.

Q.—It indicates the 6th of April as the date?

A.—That is the date I gave you before.

Mr. Billimoria.—Was that before his Excellency was appointed Governor of Bombay?

A.—Was what before?

Q.—This note of the 6th April that you are referring to.

A.—It is the 6th April, 1920—it was long after.

Mr. Billimoria.—How then does the note read that: "I charge the Government."——

A.—It is "charged."

Q.—In our copy it is "charge." It is not the past. It is: "I charge."

A.—I am sorry. That is wrong.

Q.—Then this must have been discussed before his Excellency took over charge of his office as Governor, and Mr. Montagu put the note later on.

A.—That appears to be the case.

Q.—Do you know the circumstances under which Sir George Buchanan happened to be appointed engineer in connection with this reclamation—as to how he was selected?

A.—I think the selection was made by the Government of Bombay, was it not?

Q.—Yes. The Secretary of State was asked to recommend some engineer, and in the meantime Sir George Buchanan was appointed.

A.—I think what happened was the Secretary of State was asked to obtain an expert, and the particular expert we thought would be suitable was unable to go to Bombay before the monsoon.

Sir Frederick Hopkinson.—It was stated he could not be there till October.

A.—Yes; as the matter was regarded as urgent the Government of Bombay, with the knowledge and approval of the Government of India, then appointed Sir George Buchanan. I think that is what happened.

Sir Frederick Hopkinson.—There is a little difficulty about the date of that appointment because I think the Secretary of State did not approve the appointment of Sir George Buchanan until May 30th. I think the Government of Bombay cabled on the same day that they had appointed Sir George Buchanan, and he was proceeding with the preparation of the scheme. Is not that so?

A.—I am afraid I will have to look up the documents.

Chairman.—I can give it to you a little more closely. On the 7th May the Government of Bombay tells Sir George Buchanan that they will want, or may want,

his services. On the 19th May he arrives at Bombay, and on the 26th May the Government of Bombay wires because of the difficulty of getting Sir Sydney Palmer they have appointed Sir George Buchanan. On the 26th May they say: "Because of the difficulty of getting Palmer decided to employ Sir George Buchanan who is at present engaged on the work, and will probably go home to make enquiries with regard to the dredging plant and material." Those are the dates.

A.—I have got those dates.

Sir Frederick Hopkinson.—There is a note somewhere which says that he is going home the next day.

Chairman.—That is a letter.

Sir Frederick Hopkinson.—I cannot find it at the moment, but there is such a note. So, apparently, Sir George Buchanan on 19th May arrived, and the Government of Bombay decided to employ him on the 26th May.

Chairman.—No; they announce it as a fact: "The Government decide to employ Sir George Buchanan who is at present engaged on the work," which points clearly to the fact that he began about the 19th or 20th of May. It was submitted as an accomplished fact.

Mr. Billimoria.—I want to find out whether the decision rested with the Government of Bombay or with the Secretary of State with regard to a scheme of such magnitude.

A.—The decision regarding what?

Q.—The appointment of an engineer. Before Sir George Buchanan was appointed was the Secretary of State consulted?

A.—No. As the Government of India said and were careful to say, the appointment of an expert to examine the scheme did not commit anyone to accept the scheme. It was quite in the ordinary course of business that either the Government of India or the local Government would ask the Secretary of State to obtain the services of an expert, just as they might ask the Secretary of State to recruit an officer. When the Secretary of State was asked, as has been explained, Mr. Palmer was thought to be suitable; but we told the Government of Bombay that he could not get out before October. Then we received this telegram which the President has just read, and the matter dropped.

Q.—You would agree with me that the success of any scheme would depend very largely upon the expert advice?

A.—But there was no reason to suppose that the expert advice which the Bombay Government had decided to obtain was unsatisfactory.

Q.—But before the formal sanction or approval of the Secretary of State was given to the scheme the question of investigation was also a material point for the consideration of the Secretary of State, was it not?

A.—Investigation had taken place by Sir George Buchanan; that is, by the expert who had been selected by the Government of Bombay and the Government of India. That examination had taken place, and on that that particular part of the scheme was based.

Q.—If you will pardon me, provisional sanction was given on the 4th of May.

A.—Yes.

Q.—Sir George Buchanan's appointment was not till the 19th of May.

A.—Is that so?

Chairman.—You are mixing up two years. It is the 7th May, 1919, that the Government of Bombay indicate they want his services, and it is 4th May, 1920, that provisional sanction is given.

Mr. Billimoria.—I beg your pardon. Then, being corrected as to these dates, did the Secretary of State see that the expert advice was proper advice before launching on the scheme?

A.—No; the scheme was dealt with and considered as an ordinary scheme which had been prepared by a competent expert and examined by the Government of India. There was no reason, as I have explained before, to depart from the usual practice of not obtaining additional expert advice.

Q.—Did the Secretary of State know that some members of the Government of India did not favour the appointment of Sir George Buchanan?

A.—I know nothing of that.

Q.—And that they did not think at all highly of him as to his qualifications and experience?

A.—As to that I can say nothing. I have no knowledge of that.

Q.—Had that fact been disclosed, would the Secretary of State have departed from the rule of not appointing another expert?

A.—That, again, is a hypothetical question that I cannot answer.

Q.—Could you tell me the circumstances under which the order was placed with Simons?

A.—No; I have already told the Chairman that I have no knowledge of the details of placing the order. Colonel Padden will give you all the information on that, if he has not already done so.

Q.—Is it not usual for the Secretary of State to interfere in that?

A.—That is a matter of Stores' administration which I am not very familiar with. It is now dealt with by the High Commissioner, as you know.

Chairman.—Thank you very much.

(The Witness withdrew.)

53rd Witness, Mr. Llewellyn W. Lewis, called and examined.

Chairman.—What are your Christian names?

A.—Llewellyn William.

Q.—I think you have come over here at considerable physical inconvenience?

A.—Yes.

Q.—You have sustained an injury to your knee?

A.—Yes.

Q.—Were you Chief Engineer to the Back Bay Reclamation Scheme from the 11th December, 1920, to the 12th July, 1924? You may take that date from me, I think?

A.—About that. I was connected with it before that.

Q.—You were Chief Engineer from the 11th December, 1920?

A.—I was.

Q.—There was a period from May to October of 1922 during which you went on leave?

A.—Yes, I was on sick leave.

Q.—When did you first hear from anyone that it was proposed that there should be a reclamation in the Back Bay area?

A.—I first heard of it in either January or February, 1920. I was in Rangoon and Sir George Buchanan was passing through Rangoon at the time, and he came to see me and he mentioned the fact that he was engaged on a scheme.

Q.—You were a member of the Public Works Department?

A.—I was.

Q.—You were at one time working at the Rangoon River work?

A.—I was on the Rangoon River training works.

Q.—Had you any previous experience of reclamation on an open sea front?

A.—Well, I had had experience on an estuary, the Fao, on the Shatt-el-Arab, and I have had a good deal of experience of reclamation in Basra itself.

Q.—For the moment my question was confined to an open sea front—by that I mean an area subject to tides?

A.—All those areas were subject to tides.

Q.—Was the Basra area subject to tides?

A.—Yes.

Sir Frederick Hopkinson.—They were not open sea fronts?

A.—They were not open sea fronts.

Chairman.—River training at Rangoon means moving the river in some desired direction?

A.—Yes.

Q.—In Mesopotamia you were principally concerned in building wharves at Basra?

A.—Yes, up to January, 1918.

Q.—Is Basra some 30 miles up the river?

A.—I think 30 miles, but I am not quite sure. I think it is something in the neighbourhood of 30, but I could not say off-hand.

Q.—So that, in fact, as regards reclamation on an open sea front, you had had no previous experience of that?

A.—Not on an absolutely bare coast, no.

Q.—Were you nominated for this post by Sir George Buchanan?

A.—Yes.

Q.—You had been in association with him in Rangoon?

A.—Yes.

Q.—And also in Mesopotamia?

A.—Yes.

Q.—I suppose we are entitled to assume that he would not have nominated you unless he had every confidence in your ability to carry out the matter?

A.—I presume not. As a matter of fact I was looking at the letter which he wrote to me in which he asked me to take on the job.

Q.—Have you got this letter?

A.—I have not it with me here.

Chairman.—We have not got that, Mr. Ewbank?

Mr. Ewbank.—No, Sir.

Witness.—It was a private letter.

Chairman.—Will you continue?

A.—He said he knew no one whom he would sooner have than myself to carry out the work.

Q.—He was to be the Engineer. This was an enormous undertaking?

A.—Yes.

Q.—Therefore in his own interests he would choose somebody in whom he had very great confidence. Have you seen any evidence which has been given. Apart from anything in the Press have you seen any of the shorthand note transcript?

A.—No.

Q.—Before you became Chief Engineer were you engaged in London on the preparation of the plant?

A.—Yes.

Q.—Would that be about August, 1920?

A.—About that.

Q.—Were you working in Sir George Buchanan's office?

A.—Yes.

Q.—By that time had the partnership of Meik & Buchanan been entered into?

A.—I think so. I am not certain but I have always understood that the partnership then existed.

Q.—The point is this. Sir George Buchanan and Mr. Meik went into partnership at some date after the arrangement with the Government of Bombay had been come to?

A.—I did not know that.

Q.—Was Mr. Meik in the office then?

A.—Yes.

Q.—Then you may take it that the partnership of Meik & Buchanan was established when you were there in August, 1920. In a work of this character which was estimated to cost between £2,000,000 and £3,000,000—that was the original estimate of 367 lakhs—is not it essential that there should be a most careful and accurate provision of plant?

A.—Yes.

Q.—A contractor before giving a price for a work of this character would estimate, would he not, the quantities of cement, the quantity of rolling stock, the quantity of steam shovels and those sort of things that he would require?

A.—Yes.

Q.—Who drew up the original statement of plant that was required—do you remember?

A.—I think I did it myself mostly in consultation with Mr. Meik at that time. Sir George Buchanan left for South Africa, I think, on the 25th August, so I had not the advantage of Sir George Buchanan's advice. When I consulted anybody it was usually Mr. Meik.

Q.—Did Sir George Buchanan leave for South Africa a few days after you came into the office?

A.—Well, I cannot remember the dates. I got to London sometime in July, but I am not quite sure.

Sir Frederick Hopkinson.—You thought before that you began the preparations for the plant list about August, 1920?

A.—That would be so. I do not think I began the plant list immediately. There was a question of seeing how the scheme was going to be worked out and what plant would be required.

Chairman.—Substantially was the amount of plant that was decided on settled by Mr. Meik and yourself. Is that substantially right?

A.—I think so.

Q.—Will you tell us what information you had that would enable you to decide on the quantity of plant and on the quantity of material. Had you anything more than Sir George Buchanan's report?

A.—No.

Q.—With nothing more before you than Sir George Buchanan's report could anyone make more than a rough estimate of the plant and material required?

A.—Well, we had certain things laid down. I think it was possible to gather from Sir George Buchanan's report, for instance, what tonnage of rock was to be sent down per day.

Q.—The arrangement was 1,000 tons per day?

A.—Yes.

Q.—You ordered sufficient wagons for that purpose?

A.—Yes.

Q.—Then in less than 18 months the tonnage became 2,000 tons a day and you ordered another 106 or 126 wagons?

A.—Yes.

Q.—That is one of the questions which I will put to you in detail a little later on, to suggest, not through any fault of yours in the least, that when you went into Sir George Buchanan's office in August, 1920, you were working practically upon Sir George Buchanan's report in framing the amount of the plant, the character of the plant, and the quantities that were required?

A.—Yes.

Q.—And that document by itself was not of a character which would enable you to make anything like an accurate estimate of plant and material?

A.—Well, I think that in working we did not absolutely take it. We elaborated it. His report was not a fully detailed report as regards items and that sort of thing. It was a report to the Bombay Government more of a general character.

Q.—That is quite right.

A.—And my work consisted very largely in those days of scheming out how the work should be done and scheming the plant that would be required to carry out that work in that way.

Q.—For instance, did you have any document showing you in detail how the 367·61 lakhs was arrived at by Sir George Buchanan?

A.—I have never seen anything more than his report as regards that point.

Q.—As regards the dredging plant, that had been already ordered?

A.—It had already been ordered before I got to London.

Q.—You were therefore concerned with a plant that would be required for the Kandivli quarry?

A.—Yes.

Q.—The material that would be required for the building of the sea wall?

A.—Yes.

Q.—The laying out of the railway at Colaba to Marine Lines?

A.—Not at that time—that came afterwards.

Q.—How did it happen that that came afterwards?

A.—Because when we started out the idea was that the first 8,000 feet of sea wall from the Colaba end were to be done by contract. When, I think, in the beginning of February, 1921, Sir George Buchanan reported on the tenders that came in, he reported to the effect that none of these tenders should be accepted, and then I was informed that I had to carry out the work from both ends. That meant doubling the amount primarily of rock that had to be got out and sent down to Bombay. It was a change of policy.

Q.—You are not concerned with the decision, but I am asking you as an engineer: Was not it a change of policy that did not make for economy?

A.—Well, to give an absolute opinion on that would mean a great deal of working out.

Q.—Let us see if we can get an opinion. The original idea was to begin the sea wall at the Colaba end and carry it along on a course for about 4½ miles, was it not, joining up with Marine Lines?

A.—No, it was intended always that the work should be carried out from Marine Lines end departmentally.

Q.—That is right. What misled me was the numbers have been altered. The numbers on that map are not the same as the numbers Sir George refers to in his letters. The original plan was to begin from Marine Lines?

A.—Yes.

Q.—The point I want to make is this. Beginning from Marine Lines the original intention was to build a certain section of the sea wall and then to close that section in with a crossbund, so that you got an entirely enclosed lagoon. That was the original intention, was it not?

A.—Practically.

Q.—Having got that small enclosed lagoon to begin pumping into that?

A.—When I came on the scene, the intention was also to carry on the work from Colaba at the same time.

Q.—Do you mean in August, 1920?

A.—Yes. As far as I remember, the whole of the specifications and conditions of contract for the Colaba wall were worked out by Sir George Buchanan before he left for South Africa. I think I am right in saying that. They may have been slightly elaborated afterwards in the office, but I think in the main they were done before he left for South Africa. When I got home, the idea was that we were to work departmentally from the northern end, and that the 8,000 feet was to be done by contract.

Q.—As regards reclamation, am I not right in putting it that the original intention was to build a certain section of the wall, then to carry from the end of it a crossbund down to the land, and thus enclose a small lagoon—what was referred to I think by Sir George Buchanan as No. 1?

A.—Well, the whole scheme was, when the sea-wall was built, to divide the area by crossbunds, and to pump in from the Harbour through the various conduits which were to be laid across the Peninsula.

Q.—Building the sea-wall in sections as was required and filling in the crossbunds, so that you had one lagoon into which you were pumping at one time, would have been an economical way of doing it, and then continuing your sea-wall whilst you were pumping in. The point I am trying to make is not to put an enormous amount of money in a sea-wall that is carried on far beyond the area that you are able at the time to reclaim?

A.—Yes, but I think that the whole work was to be done in a certain number of years. We knew approximately how much we could do per season. We have a season of only a certain number of days, and we knew approximately what we could do per season. As far as I remember, if the dredging had kept up, the wall would have had to have been in advance of the dredging to a certain extent—certainly a year's work.

Q.—You began the building of the wall in 1921?

A.—Yes.

Q.—July, 1921?

A.—No, it was in the cold weather.

Q.—Of 1921 or 1920?

A.—1921.

Sir Frederick Hopkinson.—About November?

A.—Somewhere about that—later probably, it was December. I have not got the exact date.

Chairman.—Is the present position that you have got an enormous length of sea-wall which is in two lengths, one coming from Colaba and the other from Marine Lines, of a total length of 4½ miles, minus 1850 feet in the middle—yes or no?

A.—Well, I have not been there for two-and-a-half years.

Q.—If you will accept it from me, the sea-wall now, with the exception of a gap of 1850 feet, is complete, Do you approve of the building of the sea-wall to that extent, or would it have been more economical to have built it keeping just ahead of the lagoons that you had made for immediate reclamation? It is obvious, is it not?

A.—Yes. Of course, the whole thing was upset by the dredger not turning out the quantity that was expected. As far as I remember, we were to finish that large block No. 8, I think it is.

Q.—The Military area?

A.—The Military area was to be finished either at the end of 1924-25 or the beginning of 1925-26—I forget now—at what point the wall stood, and what the distances were at that date I do not quite remember.

Sir Frederick Hopkinson.—But the whole thing was to be finished by 1926?

A.—Yes, according to Sir G. Buchanan's original report.

Chairman.—Why was it that the dredger which arrived in March, 1922, was not used for a year and nine months?

A.—Well, we had nothing to put it on to.

Q.—Why had you not?

A.—As far as I remember now, early in 1921 I went into that question very carefully and I wrote to Sir George Buchanan, or to Messrs. Meik and Buchanan, and said that

I did not see any possibility of the dredger starting work until the cold season of 1923-24. That was the opinion that I expressed.

Q.—That is the letter of the 20th May, 1921?

A.—Yes.

Q.—"I do not think the dredger will pump an ounce of material into the reclamation before the cold weather of 1923-24." That was a most accurate forecast. You were quite right about that. Sir George Buchanan on the 11th April, 1921, writing to you, had said: "The earliest the dredger can start work will be at the end of 1922" —so that he is putting it a year earlier than you?

A.—Yes.

Q.—You were beginning at *this* end (*pointing on the plan*)?

A.—Yes, it was begun that end and the other, too.

Q.—Why was it not possible to enclose an area like that block 1, and pump into that within six months of the dredger arriving? Take it the other way, if you like. Take block 8, which is the Military area, or block 1, choose whichever you please. Why was it not possible to build the sea-wall to the extent necessary to shut in block 8 or block 1 and to run your crossbund down to the land? Why could not that have been done with regard to either block 8 or block 1?

A.—Well, it is two and a-half years since I had any connection with the work, and I am afraid I have not got the figures immediately at the back of my mind, to give you an answer. I should have to work it out and put myself back into the position of affairs then.

Q.—Can you give us at this moment any reason why it was not possible to enclose block 8 or block 1, whichever was most suitable, and to pump into it in the cold weather of 1922-23?

A.—May I look at the plan?

Q.—Please do?

A.—(*Pointing on plan Block* 8.) At the end of October, 1922, *that* was as far as the wall went.

Q.—So it went from zero to 2,000?

A.—Yes. There was this little crossbund here. No, that was put in afterwards, to work this length.

Q.—You got from zero to 2,000, in fact?

A.—Yes, that was in October, 1922. That was not worth while putting a dredger down on. It was only a very little area, and it would have been—I have not got all the figures now in my mind—a drop in the ocean.

Q.—We quite see that.

A.—With all this high ground, it would have been a very small amount. Sir George Buchanan always wanted us to get on and start. He wanted us to put the dredger on even for a month. Well, I was very much against that, because we should have to get all our crew out and all our staff for the dredger. They were men who were engaged here to work out there, and they were not men you could take on for a week and send away afterwards. It would have meant keeping them for six months or so. We should have had the expense of bringing the whole plant to site, getting all the pipes coupled up, and for a month or so's work I did not consider it was worth while taking all that trouble and expending all that money.

Sir Frederick Hopkinson.—It was not a business proposition?

A.—No.

Chairman.—I am suggesting to you that if you had chosen either block 8 or block 1, and had concentrated all your efforts on block 8 or block 1, could you not have begun pumping in 1922-23?

A.—No, I do not think so. I do not think we could deposit more material at one working face. We had to go out a long way, and had only one point of access to each working face. It was not as if we were working out from the shore.

Sir Frederick Hopkinson.—Your question is based on the assumption that they knew that the dredger was going to get there in March, 1922, and whether they could not have been ready when it got there?

A.—No, we could not have been.

Q.—That is to say, the dredger was ordered too early?

A.—The dredger was ordered too early. It came out there too early. As I say, I wrote in 1921 that I did not think she would work before the cold weather of 1923-24, and she began on the 8th December, 1923

Chairman.—58½ lakhs would be £440,000. The position at the present moment is that the cost of that sea-wall up to the 30th June, 1926, is £440,000. Keeping that

figure in your mind, would it not have been more economical to have begun the wall at one end and not to have begun it at both ends?

A.—Well, that was done under orders.

Q.—I agree; but I am merely asking you on the question whether it would not have been better engineering and more economical to have begun from one end rather than from both ends. Look at the interest on the £440,000, it is £27,000 a year interest.

A.—But, of course, we were always told: "This dredger is going to do 2,000 cubic yards an hour. It is going to do 5,000,000 cubic yards in a season." We had to get on ahead of that.

Q.—And you did, did you not?

A.—Yes.

Q.—Still, I would like an answer to my question, which is: Would not it have been more economical, and would not it have been the proper way, to build the wall from one end and not from both ends? Never mind who gave the orders.

A.—(*After a long pause.*) Well, it would appear so now.

Q.—Supposing you had had a perfectly free hand, supposing there had been nobody to control you, would you have built the sea-wall from one end only and not from both ends?

A.—I was not in that position.

Q.—I am asking you now?

A.—I should probably have done a great many things in a different way.

Q.—Will you confine yourself for the moment to the question of the sea-wall? Had you been in sole charge of this work, having complete control of it, would you not have built the sea-wall from one end and not from both ends?

A.—I never considered that.

Q.—Will you consider it now, please? The answer is, surely, yes, is it not?

A.—Well?

Q.—Is it not so?

A.—Probably, if I were to take up the work absolutely from the beginning, if it had been absolutely free, it is quite possible that I should have done things a great deal differently.

Q.—Never mind about doing things differently. I want you to keep to the sea-wall. Is it not quite certain that you would have endeavoured to have put as little unproductive money into the sea-wall as you could; that is, you would not have built a sea-wall to lie out there with a large extent of the sea-wall having no enclosed areas?

A.—Probably I should not.

Q.—That is to say, you would have built the sea-wall from one end and enclosed the lagoons successively as one after the other was about to be reclaimed, would you not?

A.—Yes, I should have kept on ahead.

Q.—I quite agree that you would have kept on ahead, but not so far ahead as to have a useless length of the sea-wall?

A.—May I go and look at the plan again?

Q.—Please do. Let us take block 8. You built along the end *here*?

A.—That is, 5,500.

Q.—You build up there, and then you run the crossbund and in that way you get your enclosed area?

A.—Yes.

Q.—Then, when you are pumping into that enclosed area, is not the business thing to do to go on extending your sea-wall up to block 7?

A.—Yes.

Q.—Extending it up to *there* (*pointing on the plan*)?

A.—Yes.

Q.—And when you have got it up to there, enclosing your lagoon by either a storm-water drain or a crossbund?

A.—Yes, that was the idea.

Q.—But, surely, the moment you start with a wall at both ends you are going to let yourself in for a very heavy cost, are you not?

A.—You must remember we had the "Kalu" there.

Q.—It is true you had the "Kalu" there. What was the "Kalu" supposed to do?

A.—The "Kalu" was supposed to dredge.

Q.—Where?

A.—When we first got her it was not settled.

Q.—Was it not? Did not Sir George Buchanan put forward the theory that the "Kalu" should work in connection with the "Colaba" and the "Sir George Lloyd"?

A.—That was put forward at one time; but that was only for the occasions where very long lengths of pipe had to be used.

Q.—Originally the "Kalu" was bought for the East Colaba reclamation?

A.—I do not know what the "Kalu" was bought for. I do not remember the date when it was bought.

Sir Frederick Hopkinson.—It was before your connection with the matter?

A.—It was before my connection with it.

Chairman.—The "Kalu" was bought in 1919?

A.—I had never heard of the work then.

Q.—On the 24th September, 1919, Sir George Buchanan recommended the purchase of the "Kalu"?

A.—Did he recommend the purchase of the "Kalu"?

Q.—He did in fact recommend the purchase of the "Kalu" on the 24th September, 1919, and in November the Government decided to buy the "Kalu" for £75,000. She was bought for £75,000, and then some £25,000 worth of repairs were found to be necessary?

A.—Yes.

Q.—And she started work some five years later. That is the history of the "Kalu" up to that point. Anyhow, the "Kalu" was bought. The original plan was to work the "Sir George Lloyd" alone pumping from the harbour, with the "Colaba" as the intermediate pumping station. That is right, is it not?

A.—Yes.

Q.—Then it was suggested by Sir George Buchanan that the "Kalu" might work with the "Colaba" and the "Sir George Lloyd" when extra long lengths of pipe were required, but she never in fact did that.

A.—No.

Q.—Do you know her history? Do you know what she did up to the time you left?

A.—She had not started work when I left.

Q.—She had not started work at all?

A.—No, I do not think so. I am right in that, am I not?

Mr. Elgee.—Yes.

Chairman.—You left in July, 1924?

A.—Yes.

Q.—The "Kalu" had not started work then at all. Was the great essential of this work the certainty that there was material of a quality and character suitable for reclamation?

A.—Yes, that was the crucial point.

Q.—Did you know very much about the character and quality of the material in the harbour?

A.—I did not know very much.

Q.—In fact, one may say you really knew nothing at all about the character of the material in the harbour down to December, 1923?

A.—We knew a little before.

Q.—I am asking you.

A.—We knew before that.

Q.—What did you know?

A.—My attention, I think, was drawn to the quality of the material—it must have been some time before July, 1921. Mr. Mitchell was a chemist and geologist, and as far as I remember we got talking about the work—I do not know where—and I think it must have been from him that I rather had my doubts about the quality. It was that and inspection of the cross-sections over the area that was to be dredged. I was not happy about it.

Q.—It was nothing to do with you?

A.—It was nothing to do with me.

Q.—It was rather late in the day for the Chief Engineer, when £850,000 worth of dredging plant had been purchased, to be unhappy about the character of the material, was it not?

A.—Well, I had to take things as I found them.

Q.—Exactly.

A.—I then cast round to see whether there was any other source possible, and that was why I started doing the borings in Back Bay.

Q.—I will put two letters to you, and then I will repeat the question. On the 28th July, 1921, you wrote this letter to Messrs. Meik and Buchanan: "I have noted your remarks and do not propose to go further into the subject"—that is the material to be dredged from the harbour—"until we find by experience what is the character of the material we have to deal with." Ought not the character of the material to be dealt with to have been ascertained before any order for a dredger was placed?

A.—I quite agree.

Q.—That shows that in July, 1921, you did not know what the character of the material was that you would have to deal with?

A.—I was not sure about it.

Q.—Let us see what happens. After that letter there is an interval of some 16 months. Then on the 21st November, 1923, you say: "I would point out that we are by no means sure that the filling from the harbour is going to be of use as a means of reclaiming the area." That again pointed to your lack of knowledge of the suitability of the material?

A.—Well, we had then pumped and the material that we got was so good we thought our fears were all allayed.

Q.—On the 10th December, 1923, you see you are writing—this is two days after the dredging had commenced—"I consider that if material suitable for filling is met with in the harbour there is no reason to doubt the capacity of the dredger to do its guaranteed output." Does not that show that right away down to the 10th December, 1923, you, the Chief Engineer of the project, through no fault of your own, were in ignorance of the character of the material with which this dredger would have to deal?

A.—I was in doubt until we had actually dredged.

(Adjourned for a short time.)

Chairman.—The first letter to which I referred you was the letter of the 28th July, 1921, in which you said, "Until we find by experience what is the character of the material we have to deal with." The character of the material could have been found by experience during the season of October, 1921-22, could it not, with a grab dredger?

A.—I did try a grab dredger.

Q.—In the harbour?

A.—In the harbour. The results were not very convincing to me. We had a grab, and it went down into mud, and the mud was so thick that the grab did not work properly.

Sir Frederick Hopkinson.—What you mean is that you did not get down to the clay?

A.—We could not get down to the clay. There is more mud, I think, than clay shown in the section, so far as I remember, and we did not get down to the clay with the grab dredger.

Chairman.—Was the decision to prospect in Back Bay in consequence of the fact that the Port Trust and the Royal Indian Marine took away a certain dredging area?

A.—I cannot quite remember as to dates.

Q.—What took you into Back Bay at all, because Back Bay dredging was no part of the original scheme? All was to be done from the harbour?

A.—Yes. As I say, I had a certain amount of doubt, and I wanted to see if we could get a second string to our bow. I think it was in 1921-22 that I tried to do some wash borings in Back Bay. They were not as successful as I thought they ought to be. They did not get through the stuff very well. Then in 1922-23 I put on a Calex drill and we took borings—I forget now how many, but a good many. The cores or samples of the cores, anyway, were all got ready in 1923—about the end of the fine weather.

Q.—Did you not come to a definite conclusion that there was very little possibility of getting sufficient material from Back Bay?

A.—No.

Q.—For instance, there was not sufficient material to work the "Sir George Lloyd" dredger economically there, was there?

A.—As far as I remember, there was an average depth of about 18 feet.

Q.—Surely not. Look at your letter of the 10th May?

A.—That was after the unsuccessful first season's work. There is another letter which gives the result of the second season's borings. The letter of the 10th May, 1922, gives an average of 9 feet, about. There is a record of another season's work in which we did the borings again.

Q.—Did you ultimately show there were 24 million cubic yards to be obtained there?

A.—I forget the figure.

Q.—Was it a very large amount?

A.—It seemed that there was a possibility of there being enough, very considerably to help matters.

Q.—How was a dredger like the "Kalu" going in to do the work in that shallow Back Bay?

A.—The idea was that she should have her moorings, come in on the tide, and dig a hole in which she could float.

Q.—Dig her own flotation?

A.—Yes.

Q.—Do you know how long she took to do that, in fact?

A.—No.

Q.—She took a whole season to dig her own flotation. She was there for two or three hours every day for alternate weeks, spring tides, and at the end of the whole of the season she had just dredged a sufficient hole to enable her to float.

A.—I think the suggestion of bringing the dredger in to dredge a hole for herself emanated from Meik & Buchanan's offices.

Q.—Obviously, if her draught was such that at low water she would be on the rock, or on the bottom, she has either got to dredge a hole for herself or she has got to have some grab dredger to do it for her. You cannot leave her there as the tide is receding?

A.—No.

Q.—Therefore, if you are taking the "Kalu" into Back Bay at all, she has either to go in and out for a few hours each day for every other week, or she has got to dredge her own flotation, or have it dredged for her?

A.—The proposal which I put up, as far as I remember, was that she should dredge her way in.

Sir Frederick Hopkinson.—From deep water?

A.—Yes.

Q.—Making a long narrow channel?

A.—Yes. That was put forward to Messrs. Meik & Buchanan, and they settled it was to be done on tide work; but what was actually done I do not know.

Q.—Did not they send you the plan showing this long narrow channel?

A.—No. We sent it home to them.

Q.—Are you sure?

A.—As far as I remember.

Q.—I think the plan emanated from London?

A.—No. A scheme was worked out between Brims and myself. I think so.

Q.—It may have been worked out by you and sent to London and returned from London?

A.—It was returned from London, and they said that what should be done was to go in and work on the tides. I think in the letter which came, as far as I remember, there was some reference made as to proposals to dredge the channel and bell mouth made by me.

Q.—Is not this the plan? (*showing plan* 3411 *to witness*).

A.—No.

Q.—That shows what you are describing?

A.—That was not the one

Q.—It has your number 603 on it. This is your plan. This has Meik & Buchanan's stamp on of the 2nd May, 1923, and your stamp on of the 11th June, 1923, so it looks as if this plan was sent from London to you, and you put your stamp and number on it. It shows this long narrow channel from deep water into the place where the dredger was going to work. Here is another one, with your number 913, 4-6-24?

A.—That was just before I left.

Q.—That shows the same: "Flotation cut for dredger. Material to be cast on one side."

A.—Yes, that was it. That was the idea.

Q.—Whose idea was that—your's or London?

A.—I think that originated in Bombay. It was the result of talking things over with Brims.

Q.—It will be yours then, coming from your office of which you were the head?

A.—I think so. The other scheme, as far as I remember, of coming in and doing it on tide, did originate in London. I could not be quite sure, but that is the feeling I have about it.

Chairman.—At the time when you became chief engineer, did you believe that five million cubic yards of dredging was capable of being done in the 170 working days?

A.—At that time really the whole idea of the dredging had been so settled on, and we were very hard pressed on other matters, that it was only later that we began to go into the question. I think I rather took Sir George Buchanan's figures, and I did not dispute them.

Q.—Did you think it could be done?

A.—I think it would have been very difficult. Of course, it would depend on what the dredger's output was. We were told that the dredger would be able to do 2,000 cubic yards an hour. I had had some of Messrs. Simons' dredgers working before under me. and my experience of them was such that I should not have been at all surprised if we had had more than the 2,000 output

Q.—To what dredgers are you referring?

A.—I am referring particularly to a dredger called the " Oswald."

Q.—Was she a rotary cutter suction dredger?

A.—Yes, she was a cutter suction dredger and was built for the Government of Burma by Messrs. Simons. She was engaged on the cutting of the Twante Canal in Burma, which is a canal 23 miles long with a 200 to 300 feet bed width—quite a considerable thing. There were three dredgers got for that work—the " Oswald," the " Campbell " and the " Lees." The " Oswald " was working in Mesopotamia, and the " Campbell " and the " Lees " came up afterwards to Mespot. As a matter of fact, I worked the " Oswald " 24 hours on end, three shifts, for two solid months in the Hamar lake. She was dredging a very heavy and hard clay—grey clay. We were working under very difficult circumstances, and we took very careful records of those two months' work, and only on two days in those two months did the " Oswald " turn out less than her guaranteed output. She has already done five years' work in Burma to my knowledge. I must tell you that Hamar lake was really an overflow of the Euphrates. The Euphrates had burst its bank and had made an immense lake. After the floods the water got very shallow. It was not more than about 15 inches deep. With the hot sun on it the water got very hot indeed. The water was over 100° temperature. On those two days the water was so hot that we practically could not keep steam. I was looking at the records the other day, and I found that day after day the dredger turned out considerably more than its original guaranteed output. So that personally I had it at the back of my mind that probably the " Sir George Lloyd " would be able to turn out a greater quantity than the 2,000—the amount specified.

Q.—Had you seen the publication of Mr. Messent, the chief engineer of the Port Trust, of the performances of the " Kalu " and " Jinga "?

A.—No.

Q.—That was accessible to you. It was published in 1915 in Bombay, and was a narrative of the work done by the " Kalu " and " Jinga," both suction dredgers, and both built by Messrs. Simons. I need not take you through the figures, but if you had seen them they might have caused you to alter your view. They were working on the Sewri reclamation. When did you begin to have misgivings about the output of the dredger?

A.—Only just before I left.

Q.—You left on the 12th July, 1924?

A.—Yes.

Q.—I want it a little closer than that. Did you have misgivings in January—six months before you left?

A.—I do not remember.

Q.—Or February?

A.—I could not say month by month.

Q.—How long before you left in July, 1924, did you begin to have misgivings?

A.—I do not know when. I could not give a date like that.

Q.—Had you any misgivings, or did you go away in the belief that everything was well?

A.—No. We had the final figures.

Q.—By final figures you mean the amount said to be deposited in the reclamation?

A.—Yes.

Q.—You could have had misgivings on the 15th December, 1923, could you not—that is, seven days after the dredger began to work?

A.—You mean on the results?

Q.—I mean on the results of the soundings. The dredger began to work on 8th December, 1923, and she was supposed to dredge 2,000 cubic yards an hour. You had the number of pumping hours; your people took soundings every succeeding day,

and in seven days you ought to have known from the soundings that that dredger was not giving anything like her output of 2,000 cubic yards an hour?

A.—Yes, I probably did.

Q.—If you did know it in December, 1923, did you bring it at once to the attention of the Directorate of Development?

A.—I really cannot say.

Q.—See how important it was. The whole thing hinged, did it not—the whole financial success of the scheme, and everything—on a dredger working with perfection 2,000 cubic yards per hour for 15 pumping hours for 170 days in the year? If she was only turning out 50 per cent. of her guaranteed output, that would mean that the reclamation would take twice as long, would it not?

A.—Yes.

Q.—And might be disastrous from a financial point of view?

A.—Yes.

Q.—Now cannot you remember whether, in fact, you looked at the soundings when they came in?

A.—Well, of course, the ship was a new ship. The dredger was a new dredger. We had a new crew on board. One would not perhaps expect to get the full outturn immediately.

Q.—That is a very fair answer. What I want to know is did you, in fact, know within a week of the time of the " Sir George Lloyd " commencing that the soundings showed that she was not giving 50 per cent. of her guaranteed output?

A.—Well, if the report said so—I mean if that is the result of the report, I must have known it.

Q.—Mr. Spiers was the dredging master, was he not?

A.—Yes.

Q.—He was nominated by Messrs. Simons & Co.?

A.—Yes.

Q.—Or nominated by Meik and Buchanan?

A.—Meik and Buchanan simply went to Messrs. Simons and asked them to give the best dredging master they could.

Q.—That is right, and up to now no complaint has been made as to the personal efficiency of Mr. Spiers?

A.—Certainly there was none in my time.

Q.—Very well. Then you have got on 8th December a suction dredger which was one of the most powerful in the world; you had a very experienced dredging master. How long should it take the crew to settle down to get the proper output of the vessel—a month or six weeks?

A.—I think it certainly ought to be done by then. Yes, I think it ought to be done by then.

Q.—Six weeks brings us nearly to the 1st February. Take the 1st February. From the 1st February to the end of that month, were you always aware that the dredger was not giving more than 50 per cent. of her guaranteed output?

A.—Well, as I say, I cannot remember the figures, but if the reports that came in showed that, I was aware of it.

Q.—If you were aware of it why does one find in this correspondence between yourself and Messrs. Meik and Buchanan no reference to it?

A.—They had the same information.

Q.—Doing only 50 per cent. of her guaranteed output was a matter of vital importance, was it not?

A.—Yes.

Q.—And it was obviously a thing that you should have communicated at once to Sir Lawless Hepper. It was a breakdown of the central machine, was it not?

A.—Yes.

Q.—Ought you not to have communicated that at once to Sir Lawless Hepper and have said, " Look here, here is the whole scheme going to come to grief because the dredger will only give 50 per cent. of her output." Did you ever do that?

A.—I do not know that I did it in writing, but I think I certainly talked it over with Sir Lawless Hepper.

Q.—Did you ever have any interview with Sir George Buchanan about the low output of the dredger?

A.—Yes, I think we did, as far as I remember.

Q.—Can you fix a date at all—what month?

A.—It was when Mr. McMurray was in Bombay that year. I remember we had several talks about it. Mr. McMurray was there and he went over the work

with us. Sir George Buchanan, Mr. McMurray, Mr. Brims and myself all went over the dredger and right along the pipe line. I remember that.

Q.—What were you discussing at that time?

A.—We were discussing as to how we could improve the output.

Q.—Had you told Sir George Buchanan that the output was in the neighbourhood of 50 per cent?

A.—I think I must have done so. I cannot remember specifically having told him such-and-such is the case.

Q.—Did he offer any explanation?

A.—No. There was no explanation that I could feel was satisfactory.

Q.—Did Mr. McMurray offer any explanation?

A.—I think Mr. McMurray's attitude was that we were not working the dredger properly.

Q.—In what way were you not working it properly? Did he tell you?

A.—He must have told us at the time, but I really cannot remember the details. It was mainly, I think, the way the pipes were laid out, and things like that.

Q.—Can you remember at all what Mr. McMurray advised?

A.—I do not think we got any satisfactory advice. We were sort of told, " Go and do better "—something to that effect. I do not remember, and I would not like to say actually to a certainty. I do not remember that we got anything really helpful.

Q.—Can you remember whether Mr. McMurray said to you, or to anybody in your hearing, " Oh, we designed a dredger to cut soft clay, and you are putting it to work in hard clay? " Did he ever say that, drawing the distinction between soft and hard clay?

A.—I do not remember it.

Q.—It would be a very striking thing to say, would it not?

A.—I do not remember hearing anything of that kind until a letter which I got long after I left Bombay. I think that was the first time I heard that that was the attitude which Messrs. Simons took up.

Q.—I still feel puzzled about this. You must forgive my going back to it. You were the chief engineer. The soundings, that is, a daily record of the amount excavated by the " Sir George Lloyd," came into your office, and you were able to see each day the work that was said to have been done on the preceding day. I feel in a difficulty as to why you did not, within a week of the dredger beginning to dredge, raise a great disturbance about this matter. Seven days' figures would have shown you at once that for some reason she was doing less than half her guaranteed output. Why did you not make a disturbance about it? You have told us she was a new craft with a new crew and that that may have been the reason?

A.—I think it was partly that. That certainly had an influence.

Q.—You were influenced by the fact of a new craft and a new crew. You told me that in six weeks the people ought to shake down, and therefore I ask you why you did not, in February or March or April or May, make a great disturbance about this matter?

A.—Well, I do not know.

Q.—Is it right to say that when you were considering the work which would have to be done, the storm water drains were overlooked? Let us take Sir George Buchanan's original estimate. In Sir George Buchanan's original estimate is it not the fact that the storm water drains are omitted?

A.—It is so long since I have seen this thing.

Q.—Take my copy and turn to page 29. You see there is an omnibus item there. Let me read you what somebody has said. This is on the sea wall: " (Q.) no provision had been made for the storm water drains, so that although you got the dredger there, and although you got the wall built, you could not begin dredging because the storm water drains had not been built? Why not have built the storm water drains first of all? (A.) It had been overlooked.—(Q.) It is an expensive overlooking. That accounts for the tying up of the dredger for 18 months, does it not? (A.) I think it is one reason why the dredger could not have started in October, 1922, or December, 1922.—(Q.) Did Sir George Buchanan overlook it? (A.) I think he did.—(Q.) How long is the storm water drain "—and then he gives the length. " (Q.) Do you mean that all the storm water drains had been overlooked? (A.) I think the necessity for storm water drains, or rather of constructing them before the filling in was done, was overlooked. There is a letter in the correspondence with Meik and Buchanan referring to this." With that document in front of you at Page 29, are you able to say whether in fact in London in August, 1920, when you were making out the plant and material required, that the storm water drains were in fact overlooked?

A.—I do not know that they were gone into. In fact, I am sure they were not gone into in London at that time. It was when I got back to Bombay that I went into the matter.

Q.—That is exactly it. You in London, dealing with the necessary plant and the amount of material that would be required for the execution of these works, made no provision for storm water drains?

A.—Well, you see there were then no plans for the storm water drains from which the plant required could be determined.

Q.—I am not criticising you. I want the fact?

A.—Storm water drains really—well, they had not then been considered in detail.

Q.—They had not crossed your mind?

A.—They had crossed my mind. I knew drains would be necessary, but I was being urged to get things started. I certainly admit it was one of the items, but we had to get on with the quarry; we had to be able to get our material, and the storm water drains were taken up at a later date.

Q.—At a later date, undoubtedly, but you are not going to suggest that storm water drains are in that item on Page 29, are you?

A.—Well, that is not mine. That is Sir George Buchanan's. In the sanctioned estimate the question had been gone into. That was in 1922.

Q.—The sanctioned estimate of 702 lakhs did include provision for storm water drains, and I am right in saying that the cost of those nine storm water drains was £482,000.

A.—I do not remember the figures.

Mr. Billimoria.—In the revised estimate 60 lakhs have been added over the 75 lakhs.

Chairman.—That is how you get it. There were 62 lakhs in fact.

Witness.—The figures in the 1922 estimate were done quite irrespective of *this (pointing to page 29, Buchanan's report)*. This was a half-sheet of paper, and the other thing was a compilation of a very great number of estimates for particular works, etc.

Q.—Did you also study Mr. Kidd's report? You must have done so because Sir Sir George Buchanan proceeded to some extent on Mr. Kidd's report?

A.—Yes, he did.

Q.—The 1912 one?

A.—I do not know that I had a copy of that in our office.

Q.—I was not so much asking about that, but that answer very much surprises me. The point of my question really is that when in August, 1920, you went into Sir George Buchanan's office, would you not naturally have had your attention called to Mr. Kidd's report, because, you see, Sir George Buchanan makes so many references to Mr. Kidd's report in his that it was an essential document for you to see?

A.—Yes, I did read it. I remember now.

Q.—He estimated that he could do the reclamation in 1912 for 325 lakhs. Did that occur to you as a reasonable figure?

A.—It was impossible. Things had changed so much between 1912 and 1920 in every sort of way.

Q.—Still, you were living in 1912 and you were an engineer in 1912. Did it occur to you that Mr. Kidd's figure of 325 lakhs for a 1912 project was about right?

A.—I do not think I ever went into it.

Q.—When did you begin to have misgivings about Sir George Buchanan's figure of 367 lakhs? Was it when you were actually in his office in August, 1920?

A.—No, I had too little to go on there. It was when I got back to Bombay and we got working out the estimates and things, and it must have been in 1921 that I saw it was not sufficient. I think Sir George Buchanan saw that too. He made up another estimate in February, 1922.

Q.—And you proceeded to make a detailed estimate which eventually worked out at 702 lakhs?

A.—Yes.

Sir Frederick Hopkinson.—That 702 lakhs is not the real figure, because in the estimate of 1919 Sir George Buchanan gives credit for 10 lakhs for plant, whereas in this estimate they give credit, I think, for 67 lakhs. Therefore, the comparable estimate would be about 760.

Chairman.—Let us get that right. In Sir George Buchanan's estimate he gives credit for 10 lakhs as the ultimate sale price of the plant, does he not?

A.—Yes.

Chairman.—Therefore, the net cost was going to be 357 lakhs. Your estimate of 702 gave 67 as the amount that would be recoverable on the sale of the plant.

Sir Frederick Hopkinson.—Yes, 67 and nearly six lakhs more for the value of the plant that they were going to debit to East Colaba. So it really is 73, making 774.

Chairman.—It is 377 as compared with 774. We are going to take formal evidence as to the rise in price of material between 1912 and 1919 and onwards, but will you tell me this. Was there such a rise in the price of material between September, 1919, and your revised estimate in 1921 as would account for the difference in your price and Sir George Buchanan's?

A.—No, I do not think so.

Q.—That is, you found in preparing the 702 lakhs estimate that you had to provide higher prices than Sir George Buchanan had put for corresponding work?

A.—Yes, I had to amplify.

Q.—Amplify Page 29?

A.—I did it on different lines.

Sir Frederick Hopkinson.—Sir George Buchanan's estimate, I think, is 13 items. Yours is probably 700. Is that right?

A.—Yes, and of course each of the items here is the bare result of a long estimate, often. In fact, the detailed estimates were only available in 1922.

Q.—But you never saw such details connected with the 1919 estimate, did you, in London?

A.—No.

Chairman.—You told us you saw no details whereby the sum of 367.61 was arrived at?

A.—No, I do not remember ever having seen it.

Q.—How about the sea wall? One object of the sea wall and one object of the cross wall—what we have called the Bund—was to retain the material pumped into it?

A.—Yes.

Q.—As regards the sea wall, was there in your time any leakage of reclaimed material?

A.—Oh, yes—very fine stuff. Fine stuff was going through.

Q.—That, of course, in itself brought down the figures of the amount ultimately deposited?

A.—Yes.

Q.—Did you regard that leakage as serious?

A.—Yes.

Q.—In the year that you were there, 1923-24, 859,858 cubic yards were said to be dredged as ascertained by soundings, and the amount of filling as measured in Back Bay was only 528,000?

A.—That loss may have occurred to a certain extent in the harbour. The tide may have taken a certain amount off when the cutter was working. The tide may have taken a certain amount of it away. I do not think the figure of 800,000, or a relative figure, ever went through the pipe.

Q.—But the sea wall ought to have retained the material, ought it not?

A.—Yes.

Q.—It ought to have been so constructed as not to be porous?

A.—Yes, naturally.

Q.—Was the sea wall constructed in accordance with a design approved by Sir George Buchanan?

A.—Yes. There was very little altered in the main design of the wall; that is, there was the rubble mound and on top of that the mass concrete wall. In principle that was adhered to all the way through, except for the 2,000 feet at Colaba.

Q.—Did he ever make any complaints to you that there was mishandling of the dredger?

A.—I do not remember any.

Q.—Did he ever make any complaint to you that the work as a whole was being carried on inefficiently?

A.—No, not as a whole. Now and again he would bring up items. He would say that he did not like this, or thought that we might do better there; but on the whole I think we did the work satisfactorily.

Q.—I was referring to a statement which has been made by Sir George Buchanan that for years he had been complaining against inefficiency and extravagance?

A.—You can see his reports. On one occasion I remember he found a heap of ballast was not quite clean. It happened to have come in a little dirty. Then there was some question of sand which did not quite please him, but I do not think as a rule there was any complaint.

Q.—Can you remember any instance in which he took you aside as chief engineer and told you in terms that the work was being carried on—the whole work—with inefficiency?

A.—In so many words?

Q.—Not in so many words. Did he ever take you, as chief engineer, to task and say "Look here, this work is going wrong because you are all inefficient"?

A.—No.

Q.—Did he make any complaint of inefficiency to you as chief engineer against any particular man that you remember?

A.—No, I do not remember any.

Q.—We know there was an order given for a variety of fresh plant?

A.—In 1922, or it may have been 1921. We ordered a lot of wagons.

Q.—On the 17th March, 1922, you enclose a list of additional plant required for the Back Bay reclamation scheme?

A.—Yes.

Q.—The firm of Messrs. Meik & Buchanan took some exception to some of the plant that was asked for, did they not?

A.—Yes. I remember one item of railway wagons.

Q.—Did they say this: "We shall be glad if you will discuss this letter with the Director and send us a cablegram at the earliest possible date. We fully understand that as the work is being done without a contractor great weight must be attached to the wishes of the engineer on the spot in the matter of plant and plans for execution. We have no desire in any way to hamper you. On the other hand, it must be remembered that in addition to the actual capital cost of the plant, interest for many years has to be paid, and it is desirable to economise wherever it is possible to do so without interfering with efficiency or with speedy execution"?

A.—Was that with reference to the wagons?

Q.—That was in reference to 132 20-ton side tipping wagons, two locomotives a 6-ton crane and three Ruston navvies?

A.—That demand was consequent on the order to do the work at Colaba.

Q.—To get 2,000 tons a day?

A.—Yes, instead of the 1,000 as originally intended.

Q.—Then in point of fact it appears that you did consult Sir Lawless Hepper, and on the 3rd May, 1922, a telegram is sent confirming the fact that the material was required?

A.—Yes. I think there were some alterations made, were there not? For instance, that item of the crane was left over.

Q.—Yes. A telegram was sent saying that with some exceptions the other material was required. The letter I have read you from Messrs. Meik & Buchanan was a case in which they were counselling you not to specify for more things than were absolutely necessary?

A.—Yes, but the task we were set had been doubled.

Q.—I follow that. Except for that letter, and possibly one other, have you any recollection of there being any suggestion of extravagance?

A.—On one occasion Sir George Buchanan accused us of having put in 50 per cent. more stone into the Marine Lines section than was necessary. That would be in 1922-23 I think, but I pointed out to Sir George Buchanan that the cross-sections which he had got from an assistant-engineer on the work contained two items of the estimate—that is, it contained the rubble mound and the protection stone, which were two items in the estimate. He lumped the whole thing together, took the figure on the rubble stone, and said "You have exceeded it by 50 per cent." I pointed this out in several letters to him but I got no redress. That was one item I remember.

Q.—In fact was there any excessive amount of stone in the building of that wall?

A.—There was a slight excess, and that was due to the fact that when we opened out the quarry there was more small stuff than we got later on.

Q.—Relatively, to a work that was costing hundreds of thousands of pounds, is not that a very small matter?

A.—Yes; it was a matter which I do not think one need bother about.

Q.—Can you recollect any other instances at all in which there was any suggestion that there was extravagance?

A.—In 1921, I think, you will see in one of Sir George Buchanan's reports he said he thought we had done the work at Kandivli rather too well. Really, as a matter of fact, we had to handle a great deal of traffic and do a great deal of work up there, and if we had not had good arrangements it would have been impossible to do the work.

Q.—In your opinion, was there any extravagance at Kandivli?
A.—No; every penny was most carefully looked after.

Q.—I want to go back to the dredger and then I have finished. Throughout the whole of the time you were there, how many hours a day did the dredger work from the 8th December to the monsoon?
A.—I cannot remember now. It will be in the reports.

Q.—Whilst you were there, there never was a double shift, I believe?
A.—No; I do not think there was.

Chairman.—That is right, is it not, Mr. Elgee?

Mr. Elgee.—Yes; a single shift.

Sir Frederick Hopkinson.—We have had that over and over again.

Chairman.—There is no question about it being a single shift. Did not that fact alone make it absolutely impossible to get 5,000,000 cubic yards in 170 days' working?
A.—Yes; it would.

Q.—It was absolutely impossible?
A.—That was working on the basis of 15 hours of pumping.

Q.—15 actual pumping hours?
A.—Yes.

Q.—Did you at any time make any report in writing to the Director of Development with regard to the certainty that the pumping season of 1923-24 must be a failure because you were only working one shift, and because the soundings showed that she was only pumping 50 per cent. of her guaranteed output?
A.—I cannot remember for the moment any report; but I was in constant communication with Sir Lawless Hepper.

Q.—We have had Sir Lawless Hepper in the box. Did you ever before you left India put those two points before him, that the dredging season of 1923-24 was bound to be a failure because the vessel was only working single shift; and secondly, because the soundings, which were sent into your office each day, showed that she was doing only 50 per cent. of her guaranteed output? Did you ever put those two facts plainly and directly to Sir Lawless Hepper?
A.—I wrote a note to him shortly before I left, in which all the figures that I had were included.

Q.—Did you in that note, or in any note, put it to him in the way that I have put it to you, that because of the single shift and because the soundings showed that the vessel was giving only 50 per cent. of her guaranteed output the result for the season 1923-24 must be a failure?
A.—I gave him the actual facts.

Q.—Did you fasten on those two cardinal points—single shift and 50 per cent. of output?
A.—I cannot remember the actual wording of the note.

Q.—Where would the note be?
A.—It will not be in there with those documents. That is only the correspondence of Messrs. Meik and Buchanan.

Q.—Was that an official note written to him just before you left India?
A.—Yes; shortly before I left India.

Q.—July, 1924?
A.—I think it was in June.

Q.— June, 1924?
A.—Yes.

Q.—Written by you as Chief Engineer to him as Director of Development?
A.—Yes. It was an unofficial note, as we call them. Most of the correspondence was done in that way. We were in the same building.

Q.—As a result of that note, did you have any meeting with him to discuss it?
A.—Well, I was always going down to his room and discussing things with him, and we certainly did discuss that.

Q.—What I want to get at is: Did you ever tell Sir Lawless Hepper plain and straight, " This dredging season must be a failure because of the two reasons, single shift and output 50 per cent. less than the guaranteed output "?
A.—As far as I remember, in that note I pointed out to him what had happened and what the results were. I am pretty nearly certain that I drew his attention to the result that that working would have on the work. I drew his attention to the effect that those results would have on the work—I am speaking to the best of my recollection.

Q.—In other words, that the season 1923-24 must be a failure?
A.—That it certainly had not come up to anticipation.

Q.—And had not come up to anticipation, because instead of having 5,000,000 cubic yards you only had 528,000—about one-tenth?

A.—Yes.

Q.—If you sent a note of that description to Sir Lawless Hepper, must he not have called you in and discussed the matter with you?

A.—I think we did discuss it—yes; we did discuss it.

Q.—Do you retain any real recollection about it? Have you not any real recollection about it?

A.—I recollect being down in his room with him and talking the matter over with him.

Q.—You see you were the Chief Engineer. Sir Lawless Hepper had definitely disassociated himself from any technical knowledge. He said: "I had no technical knowledge. Mr. Lewis was Chief Engineer." As Chief Engineer, I am suggesting to you that on 22nd December, 1923, and so on, day by day, week by week, throughout the dredging season you were in a position to know that this dredging was going badly. I ask you why you did not make the most definite, if you like, alarming statements to Sir Lawless Hepper about the certainty of failure unless matters were remedied. Why did not you do it? Can you tell me? What is your answer?

A.—(*After a pause.*) Well, I think that we realised that we had not then done what was anticipated and we rather hoped that things would improve. I think that was the main thing. What I had always been troubled with was the quality of the material. That was my first fear. When we started pumping we got excellent material but we got a smaller quantity of it.

Q.—No matter what the excellence of the quality was, the smallness of the quantity was going to throw your time schedule out completely?

A.—Yes.

Q.—I cannot carry that any further, but still I am puzzled, and if you can help us I should be glad as to why it was that you did not, as I say, week after week, write to Sir Lawless Hepper memoranda about this thing saying: "It is going wrong and it must go wrong and will continue to go wrong, and something must be done." Why did not you send imperative memoranda to him so that he would know exactly your view as Chief Engineer? You cannot give me any other answer?

A.—Well, I think a great deal of our communication was done really by word of mouth. I used to go and see him and talk over things. In that way a great deal did not get on paper, but I think Sir Lawless Hepper certainly was kept informed of the progress of the work.

Sir M. Visvesvaraya.—Is it because you lost confidence in the dredgers that you did not take any decisive action or was it because you were leaving the works?

A.—No, I do not think the fact that I was leaving the work made any difference.

Q.—You said in a note on the 21st November, 1923: "I would point out that we are by no means sure that filling from the harbour is going to be of use as a means of reclaiming the area"?

A.—That was before we began. The result of the filling was a great surprise to me, and a very pleasant surprise to me, as regards the quality of the stuff.

Q.—It was better than you expected?

A.—Much better than I ever expected. I think everybody was surprised at that. Of course, that rather prevented me from airing my views any further about the matter.

Chairman.—Did it? Because, however good the quality, the rate was so poor?

A.—Yes.

Q.—Everything depended on the rate?

A.—Yes.

Sir M. Visvesvaraya.—What makes you say that that made things better. The Chairman all the time has been pointing out to you that it did not give the required output. Did you make a definite stand and say that things were to be remedied or did you regard things as being better?

A.—The quality of the material was better than what I expected.

Q.—In what way does that help?

A.—It was going to make a much better filling.

Q.—But it will not improve the quantity?

A.—It did not improve the quantity, but there was a better quality of material coming than I certainly had expected.

Sir Frederick Hopkinson.—Did you not get mud first as the mud was overlying the clay?

A.—No, we started the dredging and the resulting filling was good clay that dried rapidly.

Q.—You started on Block K?
A.—Yes.

Q.—There is no clay at all there according to your own figures?
A.—Well, beautiful fine clay came out.

Q.—There are your figures. These figures are: Block K, mud 2,281,000 cubic yards, clay none?
A.—We were somewhere out here, I think. (*Pointing on the plan.*)

Q.—That is in the same block. Going to the next block, G: Mud 1,578,000 cubic yards, clay none?
A.—Well, the fact of the matter was that when it came out here, with this pipe-line running here, instead of it floating away, instead of it coming out like water, it was solid. We were walking on it an hour or so after it had come out.

Q.—Therefore it could not leak through the sea wall?
A.—No, at least that stuff could not. It would have staunched the sea wall, if anything.

Sir M. Visvesvaraya.—You had misgivings before the dredger started that all was not well?
A.—You mean as regards the quality of the stuff? Yes, I had misgivings before the dredger started, but when I saw this stuff, as I say we were walking about on it very soon after it was deposited, and I was re-assured.

Q.—What did this statement of yours mean: " that the whole show has bust "?
A.—I forget now. That was before we started pumping.

Q.—Will you refresh your memory and answer what that statement means?
A.—That was with reference to the whole of my programme which had been carefully made out. We had bought the material and everything like that and suddenly I was told to reduce the programme by half. I am afraid I was rather put out when I used that phrase.

Q.—It is nothing to do with the dredgers?
A.—No, that does not affect the dredgers. I think the whole letter was a protest against the programme suddenly having been cut down to half.

Q.—Then when you started with the 367 lakhs estimate, did you think it was a reliable estimate and one on which you could work?
A.—I never took it as a working estimate. I took it it was merely an administrative estimate. I realised the first thing we had to do was to make out our project estimates. That was the thing that we set ourselves at once to do.

Q.—You thought a revised estimate was necessary?
A.—It was not a revised estimate. It was a project estimate we required. That was not a project estimate. That was an estimate on which administrative sanction for the work had been given.

Q.—When did you realise a revised estimate was necessary?
A.—That was not a revised estimate, that was a project estimate.

Q.—Your chief says in that very report that the estimate is reasonable and reliable?
A.—This report here?

Q.—He says: " It is a reasonable and reliable estimate." Where was the necessity for revision?
A.—I am not responsible for that. When I went into the matter and began to work things out, the result of my work was the estimate which I put forward in 1922.

Mr. Billimoria.—When did you start preparing that 1922 estimate?
A.—We started as soon as we got in there in 1921.

Q.—It took you over six months to prepare the estimate?
A.—Yes. Each item towards the cost was an estimate in itself in many cases.

Q.—Should not that have been done at the very beginning?
A.—That should have been done in the ordinary course of events instead of Sir George Buchanan's estimate

Sir M. Visvesvaraya.—I will read what he says: " With reference to my estimate of the cost of the work at the present time, I have gone into the matter very carefully and I believe my figures to be reasonable and reliable "?
A.—Well, I did not write that, I had certain work to do. I was told to go there and do the work and I had then to satisfy the accounts people and get sanction. They could not treat that estimate of Sir George Buchanan's as a sanctioned estimate because there was nothing to go on.

Q.—There is nothing said in the despatches of the Bombay Government to the Government of India to suggest that this was a project estimate?

A.—If you call it a project estimate, you may, but there was no detail there. There is nothing of any detail there.

Q.—From what date did you begin to prepare the revised estimate after you joined?

A.—Well, we began preparing it straight away. We had to make all our plans of the various items of work, and as those plans were made the estimates were drawn up, and those were sanctioned as soon as we could get them sanctioned.

Q.—You mean each detailed estimate was sanctioned separately?

A.—Yes. Have you got my estimate there?

Q.—Yes. (*Document handed to the witness*).

A.—I will show you how that comes about. That is the abstract; these were the actual details; and those were the general sort of things we made out. Those were roughed out as you see it there. A special estimate has been done for that; and there is a reference to the sanction of that detailed estimate. You will see that one or more of those items were subject to detailed sanction, and they were all allowed in this estimate here. Many of those items were sanctioned in that one *here*. (The witness explained the estimate to Sir M. Visvesvaraya.)

Q.—Did you prepare a general estimate after all the detailed estimates had been passed?

A.—This is a general estimate. This is the estimate which is sanctioned by the Government.

Q.—First they began to sanction the detailed estimates?

A.—The detailed estimates were sanctioned first. We had to put the cart before the horse.

Q.—Whatever you wanted to get on with you had to get sanction for?

A.—Yes, as soon as possible. In order to be able to carry on what I was told to do, I made arrangements with the Audit Officer and gave him general details for which he sanctioned the expense. The expense was passed as against those details, and when those things were finally sanctioned, the whole of that was written back, so as to correspond to this estimate, so that the accounts would correspond to this estimate.

Q.—Throughout the period after you had joined, you went on preparing estimate after estimate?

A.—Yes.

Q.—When the 367 lakhs estimate was prepared, it was regarded as a reasonable estimate. When you went in for 702 lakhs, did you realise that you could have done the work cheaper by moorum filling?

A.—How do you mean? I do not quite understand your question.

Q.—The total quantity of filling is 28,000,000 cubic yards?

A.—Yes.

Q.—You are now getting moorum at about 1 rupee 8 annas and some pies per cubic yard?

A.—Yes.

Q.—Could not you have done the work as an ordinary dry filling proposition?

A.—No, my hands were tied. There was the plant ordered before I came on to the job.

Q.—Why did you not make any reference to it in the Reports?

A.—Because we had every hope that this was going to come right.

Q.—Even if it had come right and had spent 702 lakhs, it would have been much in excess of what you could do it for by ordinary dry filling?

A.—I do not think we could have done it.

Q.—Will you let me figure out a few points with you? 28,000,000 cubic yards is the total quantity.

A.—Well, I worked it out many a time in train-loads and all sorts of ways, but I have not got the figures now.

Q.—It is a very plain proposition. You have got a sea-wall, and you have got the filling. The filling of 28,000,000 cubic yards is costing 1 rupee 8 annas per cubic yard.

A.—25,000,000, I think it is. Probably there was something off for the top foot.

Q.—That is moorum?

A.—Yes.

Q.—It is 28,000,000 yards.

A.—25,000,000 cubic yards.

Q.—The 28,000,000 covers the moorum also.

A.—All right.

Q.—It is 28,000,000 cubic yards at 1 rupee 8 annas per yard.

A.—1 rupee 8 annas a brass?

Q.—No, a cubic yard. 28,000,000 cubic yards at 1 rupee 8 annas per yard will be 420 lakhs?

A.—Yes.

Q.—The sea-wall was costing about 60 lakhs?

A.—I forget the figure now.

Sir Frederick Hopkinson.—I think you have the wrong figure. It is much more than 64 lakhs.

Sir M. Visvesvaraya.—You are thinking of the dredger.

Sir Frederick Hopkinson.—No, I am thinking of the sea-wall. Sir George Buchanan's estimate of 1919 is 118 lakhs?

A.—The estimate here of sea-wall and rubble mound is 78·14 lakhs.

Sir M. Visvesvaraya.—That is the original estimate.

A.—The gantry was 13 lakhs; that comes in that.

Sir Frederick Hopkinson.—Then there is the quarry?

A.—There is the sea-wall and the rubble mound and the massed concrete wall at Colaba. That is over 100 lakhs.

Sir Frederick Hopkinson.—You will find the rubble mound and wall equals Sir George Buchanan's estimate of 1919, which is 118 lakhs for the sea-wall. You will find it comes very closely indeed to that.

Sir M. Visvesvaraya.—I think Mr. Lewis's estimate is 80 lakhs. 80 lakhs for the wall, 80 lakhs for the quarry and the railway line, and 80 lakhs for all other works and contingencies; so that the whole thing is about 240 lakhs.

Sir Frederick Hopkinson.—No. The first three items come to 101 lakhs. Then the Kandivli Quarry is 18 lakhs. Machinery and buildings 27 lakhs; and 24 lakhs for Marine Lines. Taking the preparation of the site, machinery and buildings and Marine Lines and transport of rolling stock, you will get up to nearly 200 lakhs.

Sir M. Visvesvaraya.—That is the sea-wall.

Sir Frederick Hopkinson.—Yes.

Sir M. Visvesvaraya.—I make it out at about 82 lakhs. I am talking of Mr. Elgee's revised estimate, which comes to 82 lakhs. You are including the works in the Marine Lines.

Sir Frederick Hopkinson.—This is the project estimate I am looking at. You will find the first item is gantry, 13½ lakhs; the next item is sea-wall and rubble mound, 78 lakhs; next, massed concrete wall at Colaba, 10 lakhs. Then the Kandivli Quarry and opening out the quarry is 20 lakhs; machinery and buildings 27 lakhs; Marine Lines machinery and buildings and capital cost of preparation of the site, 24 lakhs.

Sir M. Visvesvaraya.—I have analysed the whole thing, but I have analysed it in a different way to yours. If you had done it with moorum filling, would a costly sea-wall have been necessary at all?

A.—Yes.

Q.—Could you not have done it by rubble and moorum, putting in a wall of rubble and moorum, and then filling in with moorum on the site?

A.—Do you mean could it have been done with dry filling?

Q.—Yes.

A.—I think so.

Q.—If it had been done with moorum filling, would it not have been much cheaper?

A.—My experience of the moorum there was that it was very unsatisfactory stuff to use.

Q.—You did not use any yourself?

A.—Well, we used moorum for some roads, the little trolley lines down by Colaba. We found we had to use stone, as the moorum was not any good. It all melted away as soon as the sea water came up to it.

Q.—Several engineers have recently told us that moorum is better than clay or anything you can pump from the Harbour.

A.—My experience of the moorum which we put into the sea-water was that the roads widened out at the bottom and sank.

Q.—That does not seem to have been the experience of the engineers we have seen.

A.—We certainly had that down at Colaba. I remember that very specially with some roads that we put in near the light railway lines. They simply disappeared. After that we always had to use stone, when we were building anything that had to stand the tide.

Q.—The Chairman of the Port Trust, Mr. Neilson, is also of opinion that moorum is a great deal better for filling than the dredging material which is available there.

A.—It may be.

Q.—The Kay Committee have recommended that so far as possible moorum should be used, even for blocks 2 and 8.

A.—There is a lot of moorum wanted.

Q.—For top dressing?

A.—No; if you are going to dry fill the whole thing in, it is a tremendous quantity.

Chairman.—Nobody has yet put his finger on the place where it is to be found.

A.—No. We were on the look-out. I told Mr. O'Rorke to look to see if he could find anything suitable years ago.

Mr. M. Visvesvaraya.—Mr. Kidd said moorum could be got from a distance of some 10 miles from the work.

Sir Frederick Hopkinson.—That is in the district.

Chairman.—That is Trombay. That is only for a limited amount.

Sir Frederick Hopkinson.—Mr. Kidd said they could get any quantity; but that is over a very large district. Nobody put his finger on the spot.

Chairman.—Nobody has said: "Go there and you will get sufficient face to work the steam shovels, and you can get enough moorum to do the business." Nobody has yet said that.

Sir Frederick Hopkinson.—That is why I advised the Bombay Government to experiment about it.

Sir M. Visvesvaraya.—If we analyse the evidence of two or three people, I think we can come to some conclusion on that point. I, for one, am sure that there are places where it can be found. If you had 28,000,000 cubic yards to do, and you get it done at 1 rupee 8 annas. and we understand that you can get it done now at 1 rupee 4 annas——

A.—I do not know anything about the prices.

Q.—The railway people have told us they would get the moorum up the line—if it was 1 rupee 4 annas, you could easily do the reclamation for 400 or 500 lakhs.

A.—Yes.

Q.—That is a very important point. Has that question ever been investigated by you as an alternative estimate?

A.—No, it did not come up.

Q.—You did not investigate the sources of moorum supply nearer than Kandivli?

A.—No; it was not a matter of actuality in those times.

Q.—Did you make any further surveys after you began the preparation of the detailed estimate, or did you depend upon the original surveys?

A.—All the surveys were made separately. We had surveys of everything, almost—surveys of everything that was done.

Q.—You did not take any fresh borings in the harbour?

A.—No; we did not take any borings in the harbour.

Q.—You depended on the original ones?

A.—They were done every 200 feet, as far as I remember.

Q.—You did not take any trial borings?

A.—No.

Q.—Did you adopt the costing system on the works; that is, take daily costs of what the work was costing you?

A.—No, not daily; but we did it every month.

Q.—Did you do that in the case of the dredging material?

A.—We had a costs system for that.

Q.—How did you calculate the output?—not at site, but only from what you estimated?

A.—We could only go on the measurements got from the soundings.

Sir Frederick Hopkinson.—You did have the quantities taken from the soundings at least once a month for the purpose of your costing?

A.—They were done day by day, I think.

Q.—The quantities were actually taken out?

A.—I really cannot remember the actual details, but the cross-sections were taken.

Q.—We have been told, over and over again, that it was not possible for the engineers to let the Government know the results of the dredging output until the end of the season—that is in August.

A.—I think that was only the final result.

Q.—They could not let them know any result?

A.—Well, it was in the weekly report—at least, I think so—that went home to Meik and Buchanan, and that went through the Director's office.

Mr. Billimoria.—Did you retain any copy at the Director's office?

A.—I think so. Do you remember that detail, Mr. Elgee? I think two copies went.

Mr. Elgee.—Yes; every week—one for the Director and one for Sir George Buchanan

Sir M. Visvesvaraya.—Did Sir Lawless Hepper issue any instructions on technical points to you independent of the engineers?

A.—No.

Q.—What was Sir Lawless Hepper's relations to you?

A.—He was the Director of Development.

Q.—The administrative Director?

A.—Yes.

Q.—Did he control the expenditure?

A.—Yes, ultimately

Q.—Did any of the individual estimates go to him?

A.—Certain estimates were sanctioned by him. Certain went to the Government. What the difference was I am not quite sure; but certain estimates I would sanction. I had powers up to a certain point.

Q.—You had authority?

A.—I had authority to sanction works to a certain point, and then others went to the Director. and I think some went up to the Government of Bombay. Was not that so, Mr. Elgee?

Mr. Elgee.—Yes.

Sir M. Visvesvaraya.—Did Messrs. Meik and Buchanan supply you with any detailed plans and estimates after you were once on the works?

A.—No. The only detailed plans that I remember coming out were for the East Colaba reclamation. Practically, all the designs and all the drawings and all the estimating were done in Bombay. They sent out some plans for the East Colaba reclamation.

Q.—What happened about the East Colaba reclamation?

A.—What happened was this: There was some discussion about it. I sent my proposals to them and they said: "No; this is far too expensive, and we will send you out something which is very much cheaper." They sent me out a set of plans and I went through them, and I did not see how we were going to work them. When Sir George Buchanan came out I put my objections to those plans before him and he quite agreed, and it practically went back to my original plan, so that the economies were not effected.

Q.—Did your estimates go up to Sir Lawless Hepper and the Government through the engineers?

A.—No.

Q.—Always direct?

A.—Always direct.

Q.—How does the responsibility come in?

A.—I do not think that the system was a workable system. You cannot work the thing in that way.

Q.—You say the system was not workable?

A.—Either it has all got to be done in London, and the man on the spot has got to get definite orders that he is to do such-and-such a thing; or else it has got to be done entirely out there.

Q.—The consulting engineers should be on the spot?

A.—That is really what was necessary. Either the drawings should have come from London with everything complete, and perhaps the price might have been filled in in Bombay.

Q.—The arrangement was not workable?

A.—It was not a workable one.

Q.—Do you know that a lot of material escaped through the rubble mound?

A.—There was some.

Q.—Did you know that about nine lakhs of cubic yards escaped through the rubble mound in two seasons?

A.—I did not know that.

Q.—Probably between six and nine lakhs escaped.
A.—I do not know about that.

Q.—That is subsequent to your leaving?
A.—Yes.

Q.—Did you notice the matter in your time?
A.—I noticed that outside the wall there was a certain amount of leakage. You could see there were deposits of silt at low water when it dried up. When the tide was low you could see certain deposits of silt on the seaward side of the wall.

Q.—That showed that something was escaping?
A.—Yes.

Q.—Who made the appointment of engineers generally on the work? Who recommended them, and at what stage was it sanctioned by the Government?
A.—There were very few appointments to be made.

Q.—What was the usual practice?
A.—Well, there were so very few. As far as I remember, I think I had power to appoint up to a certain salary, and that beyond that I had to go to the Director or to the Government.

Q.—To what extent did Messrs. Meik and Buchanan take part in the appointment?
A.—Well, in the majority of cases of European engineers they appointed them—they recommended them for appointment.

Q.—How many officers of the P.W.D. were employed in your time under you?
A.—There was one man—Mr. Philpot Brooks. He was the only man I ever had. He left in or about May, 1921.

Q.—What was the procedure in making home purchases in your time?
A.—I used to indent on Messrs. Meik and Buchanan and they called for tenders and recommended a certain offer to the D.G. of Stores, and the firm making the offer recommended got the order from the D.G. of Stores.

Q.—The Bombay Government did not go into the matter?
A.—No.

Q.—Messrs. Meik and Buchanan were permitted to invite tenders and transmit them with their recommendation to the Director General of Stores?
A.—Yes.

Q.—In Bombay, some of the witnesses said, superfluous stores were purchased. Is that true? Have you any recollection of any stores being purchased in excess of your wants? There is some suggestion about a steam shovel which has not been worked.
A.—I am afraid that shovel was not much use to us, but that was all before I ever came on the ground. It unfortunately was a different gauge to our gauge.

Chairman.—That cost £9,000, did it not?
A.—I believe that was the price.

Sir Frederick Hopkinson.—Did you say it was bought before you came on the ground?
A.—It was bought before I came to London.

Q.—By whom?
A.—The Governor of Bombay so far as I remember. I do not know, as the thing did not pass through me, but I am under the impression that it was purchased from Lord Furness.

Q.—Where?
A.—It was used up at Middlesbrough during the war shifting slag heaps.

Q.—But you made out the requisition list for all the plant required?
A.—Not for that shovel.

Q.—Who ordered it?
A.—So far as I know the Government of Bombay.

Sir M. Visvesvaraya.—It was ordered before you went there?
A.—Yes.

Sir Frederick Hopkinson.—By whom? Was it by Meik and Buchanan?
A.—No.

Q.—Who then?
A.—I think it was the Government of Bombay so far as I remember.

Q.—Do you mean the Governor-General or the Secretariat when you speak of the Government of Bombay?
A.—I think the Governor.

Sir M. Visvesvaraya.—I think it is the Governor himself. There is some correspondence.

A.—I have seen some correspondence about it.

Sir Frederick Hopkinson.—I have never seen any.

Sir M. Visvesvaraya.—There is some correspondence.

Chairman.—Where?

Sir M. Visvesvaraya.—I think in the Bombay Government papers. The Governor himself wired to Lord Furness in the Malay States. He had gone to the Malay States and the correspondence went on by cable, and finally it was closed.

Chairman.—Do you know anything about this, Mr. Ewbank?

Mr. Ewbank.—No.

Sir Frederick Hopkinson.—Have you ever seen this correspondence?

Mr. Ewbank.—I do not remember it.

Sir M. Visvesvaraya.—You will find it in the Bombay Secretariat papers.

Chairman.—We must look into this. This is very important. I would like somebody to give me the papers about it. That cost £9,000.

Sir Frederick Hopkinson.—You speak of this gauge being objectionable, but that does not matter at all, does it?

A.—You see we had not very much room.

Q.—It does not matter about the gauge. It does not run on any railway.

A.—Well, we had our lines in the quarries all one gauge, and it meant a separate arrangement.

Q.—You do not run it about on the railways. You put it down in the place where it is going to work and it stays there for months?

A.—But it would have to shift when you do a blast near it, if it was going to be used in the quarry for loading stone or anything of the sort.

Q.—You would not dream of buying a thing like that for loading stone?

A. Well, I would not, but as I say it was there before I got there. If we were going to load with it it meant that we had to shift it about.

Q.—It is perfectly useless in the quarry, is it not?

A.—It seems so to me. I think we might have got something out of it if it had been more convenient, but we had not got the space to do it. That was not my purchase, however.

Sir M. Visvesvaraya.—There is a complaint in Bombay that you built very substantial houses at Kandivli. Was it necessary to do this for six years of working?

A.—There is a pretty heavy rainfall at Kandivli.

Q.—But at the top of the Ghats, where they are building large dams, they have a large staff but they never go in for such expensive buildings as these?

A.—Well, it was all of rough stone that was got on the site, and mud. You cannot do much cheaper than that.

Q.—Anyhow the total cost was very high?

A.—But, mind you, we had our camp there and we had to have some 1,500 coolies. Housing coolies in Bombay is not the easy matter that it is in some places. They have to live with their families and you have to provide a separate room for each one. It was essential that we should have decent places for them for sanitary reasons. One year we had the plague up at the quarry and it upset the whole scheme of things, as people ran away.

Q.—The Kandivli Quarry was intended for stone primarily for the sea wall?

A.—Yes.

Q.—Was it intended to bring moorum from there also?

A.—Not from the actual quarry. There may have been a little there, but we had not investigated it for that. What we wanted to get was a clean quarry for stone.

Q.—The quarry cost about 40 lakhs, the permanent way and plant cost about another 40 lakhs. Do you think an expenditure of 80 lakhs was necessary for collecting stone for the sea wall. Subject to correction, 80 lakhs was the estimated cost of the sea wall, and you have spent 80 lakhs on equipment to get the material. Was it necessary? I am not criticising, but I want to know the truth about these matters?

A.—What we were sent to do was a certain amount of work to be done within a certain number of days. It was all limited to time and we had to work at high pressure while we were at it. We had to bring the material in a very long way. Of course, if we could have got the stone quicker and easier we would have done so.

Mr. Billimoria.—If you had employed contractors to bring the stone, would not it have been cheaper?

A.—I do not see how they could have handled the quantities that we wanted. You see we used to handle getting on for 2,000 tons a day. Well, how are they to bring it?

Q.—The contractor would have undertaken everything.

A.—Yes, but how would he have done it. It is not his undertaking that is the thing, but how is he going to get it there.

Sir M. Visvesvaraya.—The railway company would carry the stone for you in the railway trucks.

A.—That is the difficulty. They told us that railway trucks could not be provided.

Q.—Did you make a proper investigation?

A.—Yes, that was gone into at the very beginning, I think. Anyway, when I got on to it the question had been decided and we had to get our own rolling stock.

Q.—Why did you retire before the work was completed. We want to know the truth; perhaps you do not mind my asking that question?

A.—I did not get on with Sir George Buchanan. I had reached within eight months of the age limit and I had earned my full pension, and I had not had any real leave for a very long time.

Q.—Was the disagreement on technical or administrative grounds or on general grounds?

A.—It was personal.

Q.—Whose idea was it first to dredge in the Back Bay?

A.—Well, I think I started the idea. I though of it merely to have a second string to our bow.

Q.—Do you know that it is costing very much?

A.—No, I do not know what it is costing.

Q.—Last season it cost 1 rupee 3 annas per cubic yard.

A.—I do not know. I have no information about that.

Q.—Sir George Buchanan complained that you deviated from his programme, did he not?

A.—I think Sir George Buchanan was quite in agreement with our certainly making experiments, and as you see these drawings and things went through.

Q.—He acquiesced in it?

A.—Yes.

Q.—Do you think it was necessary to purchase the " Kalu " and the " Jinga "?

A.—The " Kalu " was bought, I was under the impression, without Sir George Buchanan's knowledge. Well, I will not say without his knowledge, but I understood he was asked whether dredgers like the " Kalu " or " Jinga " could be used for the East Colaba Reclamation, and I believe he said, Yes. On that it was bought. That is as far as I have heard.

Q.—They had no definite idea of how to use it when they purchased it?

A.—Where it was to be used?

Q.—Yes.

A.—I suppose it was going to be used somewhere.

Q.—How could it be used somewhere?

A.—On the reclamation.

Q.—The " Sir George Lloyd " and the " Colaba " were working together. Then when they asked that the " Kalu " also should be put along with them it was said it was not economical. You found it was not economical, did you not?

A.—It meant three bites at a cherry, did it not?

Q.—You do not know how it was intended to use these vessels before they were used in Back Bay?

A.—Do you mean the " Kalu "?

Q.—Yes.

A.—We had various pipe lines there, and it was going to be used.

Q.—They wanted them for the pipe lines?

A.—Yes; if necessary.

Q.—But they had calculated their 5,000,000 yards per annum without the " Kalu "?

A.—Yes; without the " Kalu."

Q.—Did Sir George Buchanan ever tell you why he specified soft clay in his specification for the dredger?

A.—The specification for the dredger was all done before ever I got there.

Chairman.—Sir George Buchanan did not specify soft clay. Sir George Buchanan accepted the specification of Simons. We know they introduced the words " soft clay."

Sir M. Visvesvaraya.—Do you not think they were all of one opinion when the specification was sent out?

Chairman.—The people who first used the words "soft clay" were Simons & Company in the letter of 12th September. Somehow or other that phrase "soft clay" crept into the specification and became part of the bargain. Whether there is any point in the difference between soft clay or hard clay we shall have to determine; but Sir M. Visvesvaraya was asking you whether Sir George Buchanan had ever said anything to you about the specification embodying soft clay.

A.—Not that I remember.

Sir M. Visvesvaraya.—Did you notice in the specification that soft clay had been specified?

A.—Well, I may have done. I really cannot remember. I must have done.

Q.—Why did you not work the dredger in three shifts? A dredger like this is a very costly plant, and contractors usually work such plants in three shifts. Why did it not occur to you to work it in three shifts?

A.—Well, the idea was that we were going to use it for two shifts at first. That was the original idea.

Sir M. Visvesvaraya.—When you found that the output was not satisfactory why did you not resort to three shifts?

Chairman.—But this gentleman never worked more than one shift. He did not increase it even to two.

A.—Well, it meant an increase of staff which, as far as I remember, we asked for. Did not a lot of engineers come out just before I went home?

Mr. Elgee.—I think about that time.

Sir Frederick Hopkinson.—You would not have them out in July to begin work in December?

A.—No; but I think we had asked for them.

Q.—You will find they did not arrive until November.

A.—Yes; but I think in the correspondence you will find we asked for them much earlier.

Sir M. Visvesvaraya.—When the dredger did not give the required output did you inquire whether there was a guarantee in the specification?

A.—Well, the guarantee had already been fulfilled by her dredging in the Clyde, it was not any use out there. The guarantee had been certified as having been complied with by Sir John Biles.

Q.—We know in the case of the "Kalu" they carried out tests in Bombay itself?

A.—I was not aware of that.

Q.—You may take that from me. Do not you think they ought to have done the same thing in the case of a more important plant like the "Sir George Lloyd," and that they should have given a guarantee for test working on the spot?

A.—Well, did Simons get full pay from the Port Trust then, because I have heard it stated that the out-turn of the "Jinga" and the "Kalu" was under the guarantee?

Chairman.—Yes; but the position was this. Simons & Company entered into a contract whereby they undertook to dredge for a certain number of hours in Bombay harbour itself and give the required output. The "Kalu" and "Jinga" were each specified to do 2,000 cubic yards per hour, dredging to a depth of 35 feet which was afterwards extended to 40 feet. Simons took the vessels out, and Simons somehow got the vessels to give the output, and Simons complied with the guarantee. The moment the vessels were handed over to the Port Trust the output became ludicrous. We have all the figures.

Sir M. Visvesvaraya.—I suppose your experience of the working of the dredgers has been too short to give an opinion about the "Sir George Lloyd" and the "Colaba"?

A.—Yes; it was a very short time. I have got the idea at the back of my head that it was represented to Messrs. Meik & Buchanan that the dredger had not done what it ought to have done.

Q.—What action did they take?

A.—Did they not write out then and say it was only the first year and they would want to see what was done in the second year?

Mr. Elgee.—That is in Sir George Buchanan's report.

Witness.—I have seen it somewhere.

Sir M. Visvesvaraya.—There was no question put in a direct way: "the dredger is not giving the required output: there is something wrong with it; come and see what is wrong and correct it. If you want to make any additional charge tell us what it would be. No such question seems to have been addressed to the manufacturers or to the builders?

A.—Certainly not in my time, except that we saw Mr. McMurray who was passing through Bombay.

Q.—There are informal short notes on record, but on the leading facts there has been no correspondence. Why was not a specification prepared for the sea wall?

A.—There was a specification.

Q.—I understood you invited tenders without a specification?

A.—No; a specification was printed.

Sir Frederick Hopkinson.—You are confusing two things. One is the wall at the Colaba end, and the other is the general specification for the other part. There was a specification printed for the Colaba block work, but Mr. Elgee told us there was no specification for the other part of the work.

A.—I was turning over some old papers, and I found the specification.

Q.—Have you got it here?

A.—I have it in London.

Q.—Could you let us see it?

A.—I will send it up.

Sir M. Visvesvaraya.—Who prepared it?

A.—It was prepared in London, I think.

Q.—By you?

A.—Well, I think it was Mr. Meik who did it mainly, and then I went over it with him.

Sir Frederick Hopkinson.—Mr. Elgee built the main portion of the sea wall on marine lines, and he says he has never seen the specification.

A.—Well, as a matter of fact, there was one specification I found for the gantry, and on this thing of mine is a note: "Copy sent to Mr. Elgee," or something to that effect. If you like, I will send it to you.

Chairman.—You might bring it to-morrow.

A.—Yes.

Sir M. Visvesvaraya.—You invited tenders for the sea wall. Why did you not accept one of them?

A.—Have you ever seen Sir George Buchanan's report about it? I have a copy of that if you would like to see it.

Q.—What is your impression about it?

A.—That the proposals were not satisfactory. That was really it. It was not a question of building the wall in a certain way. It was a most complicated proposed agreement. There was a certain number of tenders received—I remember one where the Tata Construction Company proposed to make the blocks in various places. There were three places that they proposed. Then they were going to bring them in through the streets of Bombay on lorries. There were 9-ton blocks. I think it was ruled out on that ground.

Q.—I understood they said they had no proper specifications given to them, and they could not comply.

A.—The specifications were quite complete. That printed specification was quite complete.

Q.—We are trying to find out here the truth about everything in connection with this scheme. You said in the course of your examination by the Chairman: "I could have done a good many things if I had had a free hand." Could you mention some of them? If you had had a free hand what would you have done?

A.—What was that about?

Chairman.—It was about building the sea wall from both ends. I was asking you if you had been an entirely free agent whether you would have built the wall from both ends or from one end alone. Then you said: "Well, if I had been free I would have done a great many things." We will give you till to-morrow morning at 11 o'clock to consider your answer.

(Adjourned to to-morrow morning at 11 o'clock.)

The Committee Assembled at 11 a.m. on Thursday, 14th October, 1926, all members being present.

The examination of Mr. Lewis continued.

Sir M. Visvesvaraya.—Do you remember the last question which was put to you just before we rose yesterday? You gave us some valuable information, and in the course of your replies to the Chairman you said, "I could have done a great many things if I had had a free hand." Will you specify some of those things? It is well that we

should see to what extent you were or were not responsible for the subsequent troubles which ensued?

A.—The subsequent trouble is the failure of the dredging, is it not?

Q.—The character of the organisation and management have also all led up to it to some extent?

A.—The whole trouble is that there is not the material there apparently—or the stuff is not suitable I take it. I have not been out in Bombay for two and a-half years, but I gather from what I hear that that is the case.

Chairman.—You are rather getting away from the question. The question really is this. What had you in your mind yesterday when you told me that if you had been in supreme command you would have done many other things, and, you implied, many other things differently? That was the concluding question which Sir M. Visvesvaraya put to you yesterday, and we invited you to think it over during the evening. What had you in your mind when you gave that answer? What were the things which you would have done differently if you had been in supreme command?

A.—What were my actual words?

Q.—We will turn to the shorthand note if you like, but you may take it that substantially what you said was, " I would have done a good many other things," and that implied—and it was understood by all of us to mean—that you would have done a good many things quite differently had you been in supreme command. What were the things you would have done?

A.—I think, in saying that, that I meant I might have done things.

Q.—You might have done things. That will do quite as well. What were the things you might have done differently had you been in supreme command?

A.—Actually I do not think we should have had the trouble with the estimates. If I had had the whole thing to do, I think I should have gone very much more into the question of the filling that was available, if that had not been settled before I got there.

Q.—The moorum?

A.—No, the filling.

Q.—We have always drawn a distinction in the evidence here between what we have called dredged filling and moorum?

A.—Well, dredged filling. Perhaps I ought to have been more careful in saying a thing like that.

Q.—No, you are here to give us your opinion about the matter. Do not bother about the future. You are here to give us your opinion, and you told us there were things which, if you had been in supreme command, you would have done differently. That was the substance of your answer. We want to know what those things were?

A.—Well, I am afraid that was too general a remark.

Q.—May we get from the general to the particular. Can you give us any one thing which you would have done differently had you been in supreme command?

A.—Well, it is rather difficult to answer.

Q.—Is that a question which you really feel unable to answer?

A.—Well, I feel it is more than I would ever expect to be asked.

Sir M. Visvesvaraya.—You want to help us in this inquiry?

A.—Yes, in every way I can, but my feeling is that perhaps I spoke a little too quickly in that case.

Q.—Too frankly?

A.—No. It was not a question of frankness. I think I have been frank all the way through, have I not.

Chairman.—But, Mr. Lewis, you were Chief Engineer from the 11th December, 1920, to the 12th July, 1924, and you told us, as an engineer and as a man very high up in the P.W.D. that there were things which you would have done differently. That is what it came to. I am only asking you what had you in your mind when you told us that, and after you have answered we will pass away from it. At this stage of the enquiry you need not be shy about making any criticisms if you believe those criticisms to be well founded?

A.—It is very difficult when, all of a sudden, you bring forward such a question. I have had no preparation for this.

Sir M. Visvesvaraya.—You had the whole of last night during which to think over it?

A.—I had to sleep, and I was in a good deal of pain most of the time I was not sleeping.

Mr. Billimoria.—You must have observed several defects in the work when you were engineer in charge, and you can give us an idea as to how they could have been remedied, or, if you had been in independent charge, what you would have done?

A.—Defects in the work?

Sir M. Visvesvaraya.—In the design, or in the administration, or in the organisation?

A.—I think the organisation was all right.

Q.—That is not what you told us yesterday?

A.—The local organisation, I think, was all right—as regards the carrying out of the work. The trouble was caused by having a sort of divided authority; that is, Messrs. Meik and Buchanan in London and having the work in Bombay. There was great difficulty and we did not always get—well, we were rather left to our own resources to a large extent.

Sir Frederick Hopkinson.—Would not that have been all the better for you, if you could have improved on what was being done, if you were left to your own resources?

Sir M. Visvesvaraya.—Do you want to give a reply to that?

A.—It is very difficult suddenly to be asked " what would you do."

Q.—Was the Kandivli quarry started in order to get stone, or both stone and moorum?

A.—Stone.

Q.—The value of the stone required for the sea wall and other purposes was about 25 lakhs of rupees, according to your estimate. The quarry itself has cost about 50 lakhs, and the transport arrangements about another 30 lakhs—in all about 80 lakhs. Therefore, in order to get stone of the value of 25 lakhs why was this large expenditure incurred? I am not criticising you at all; I just want to get at the truth of this business. I will hand you this document. (*Handing same to witness.*)

A.—Well, you see, there was the question of the stone for the cross walls.

Q.—How much would that be?

A.—The figure here is 660,000 tons. Then you must remember that there was stone for the concrete used on the whole work.

Q.—I think you will find that in your estimate for the sea wall?

A.—No, not all. For instance, there are the storm water drains.

Q.—How much is that?

A.—Here it is only put down at a running foot rate; but anyway there was a very large quantity indeed.

Chairman.—Just a moment. The storm water drains will not help you, because the storm water drains were omitted in the first estimate. It was only after you got out there that you came to the conclusion that storm water drains were necessary; and the Kandivli Quarry venture had been decided upon before any question arose of storm water drains.

A.—You must remember there was a great deal of road building to be done later on, and there would be stone required for very many purposes. It meant large quantities of stone.

Sir M. Visvesvaraya.—They could get stone at nearer hand. You did not have to go so far afield?

A.—We had to get a very large quantity. It was a question of large quantities daily. We had to have control of the quarries in order to be able to send down the stone as it was wanted.

Chairman.—You mean that if you had your own quarry, even if it was going to cost a little more than you might have got it done by independent contractors, from a business point of view it was worth it?

Sir M. Visvesvaraya.—Could not you have arranged for contractors to have supplied stone, and for the railway to have carried it for you?

A.—Well, you see, the main cost of the working of the quarry was done by contract—all the drilling and the sledging and loading. All that work was done by contract, and it was put on to our wagons. The contract price, as far as as I remember, included all labour in the quarry.

Q.—That may be a detailed contract. We are not interested in that. What I want to know it this. You wanted stone worth about 30 lakhs outside. Why did you spend 80 lakhs for the transport? Surely there must be a sense of proportion?

A.—I think your 25 lakhs is an under-estimate of the amount of stone that was ultimately required for the work.

Q.—How much would you put it at, at the outside?

A.—I cannot remember the figures, but even then the arrangement would have been very costly.

Q.—But there must be a sense of proportion?

A.—Yes.

Chairman.—You have to have some security for delivery?

A.—Yes. We had to be able to control the quarry ourselves in order to be quite sure that we were going to get the material. On a big job like that, suppose a dispute had arisen with the contractor and suddenly, in the middle of the working season, he had said to us, " This is all very well, but I cannot carry on," where would we have been?

Sir M. Visvesvaraya.—Somebody else would have taken it if your contract had been a specific thing?

A.—But you do not pick up these men every day. To get a man who can run a big quarry, turning out 2,000 tons a day (which was the idea) takes a lot of doing.

Q.—Why not parcel it out among a number of contractors?

A.—You must remember that we only had a very small length of face. We only had 1,100 feet of face, and to get 2,000 tons a day out of that means very intensive working and you cannot have a whole lot of different contractors working on it. You must have it unified.

Q.—The question of the quarry had been settled before you took it up?

A.—The state of affairs when I got to Bombay towards the end of June was this. I was asked to look into the question of quarries——

Sir Frederick Hopkinson.—That would be in 1921?

A.—No, June, 1920. I was given some papers to read, which were some reports by an officer of the Bombay Public Works Department, who had been told to go into the question of quarries which would be useful. He had evidently gone into it, and he mentioned three. There was one at Anderi, another at Gilbert Hill, or something like that—anyway there were three. He explained that the requirements of the work were stone and moorum, and that the idea was that there should be so much of stone and so much of moorum. He said in connection with two of these places, that although they provided those requirements the trouble was that the moorum was on top and that the stone was wanted first. It seemed to me wrong, so I went out with Major Johnson and Mr. Philpot Brooks, and I said : " This is all very well, but I do not want moorum now, and we cannot dig down for the rock. What I want is a rock face. Let us go and see this No. 3 quarry," which the man who was reporting on it said had not got any moorum and therefore was not of any use. I think that is it, as far as I remember. I went out to No. 3 quarry and found this magnificent mass of rock with a sheer face to the east, which was eminently adapted for a quarry. The only thing against it perhaps was the short length of face, which, of course, could be overcome by intensive working.

Sir M. Visvesvaraya.—My only point is the disproportionate expenditure on the quarry and the arrangements made as compared with the amount of stone required?

A.—That was the best quarry we could find at the time.

Mr. Billimoria.—Do you suggest that no contractor would have undertaken this job at a much cheaper rate than what the Department has spent on it?

A.—I do not know. I was told we were to do it departmentally.

Q.—Contractors have given evidence before us, and they have said that if they had been asked they would have done it very much cheaper. Were they approached?

A.—I do not think so. We were told we were to do it departmentally.

Sir M. Visvesvaraya.—Anyhow, you made no investigation about moorum?

A.—No. I knew that actually on the sites which we had for the stone quarry there was a certain amount of moorum, but nothing large enough, and, of course, moorum at that date was a matter of many years ahead.

Sir Frederick Hopkinson.—No, you wanted moorum at that time, because you had no room down at Back Bay for making blocks, or doing anything.

A.—For making blocks?

Q.—Yes—getting your accommodation, your railways, and everything else. You wanted moorum. You made several complaints that you had no room to do anything down there.

A.—Well, we did not use much moorum down at Colaba. It was mostly quarry spoil instead of moorum, because we found that where we had used moorum down at Colaba it gave us great trouble in keeping up banks, and things like that. It sank so much.

Sir M. Visvesvaraya.—Have you thought over my question of yesterday about the alternative cost of dry filling?

A.—No; I have not been able to do that. It is a very big question. You have told me a few particulars, but it is quite possible that, on consideration, I might have to ask you another half a dozen questions as to what you mean or as to what you intend. It is a very large thing to ask me.

Sir M. Visvesvaraya.—It is a very important point, but if you do not want to answer——

Chairman.—It is not that he objects to answering, but I think his first objection would be, " I have no local knowledge which would justify me in saying where moorum can be found in any particular place."

A.—Yes.

Sir M. Visvesvaraya.—He has been several years on the work.

A.—I was not looking out for moorum all the time. I had many other things to do, besides which the question of dry filling did not exist for us. It is only quite lately that any question of dry filling on a large scale has been contemplated. I have not got them now, but I remember making out some ideas as to what the filling would amount to in train loads, and it was a gigantic figure. You must also remember that we were tied down very much by the Bombay Baroda at that time.

Q.—Could not you get trains at night?

A.—They were very averse to giving us even two trains a day.

Q.—It only meant organisation and correspondence and Government influence?

A.—No. More trains would have meant a great deal more rolling stock. When we went out there the idea was one train a day. I remember going to see the Bombay Baroda people about it, and their idea was that they would endeavour to give us that, but we had to find our own wagons for it. That was in 1920.

Q.—Anyhow, you never thought of the question on the larger scale?

A.—No, it was never considered.

Q.—A question has been raised in Bombay about in whose name the invoices and packages connected with the dredger arrived in Bombay?

A.—I think, as a matter of fact, there was a good deal consigned to the Chief Secretary. I think I remember a certain number of packages coming consigned to the Chief Secretary, but I could not tell you at this date.

Q.—The question has been made much of in Bombay?

A.—What is the point? I mean, why is this question asked?

Q.—It is said they came in the name of one authority—one particular party.

A.—Oh, you mean the things being labelled " Sir George Lloyd." That was because they were for the dredger " Sir George Lloyd."

Chairman.—I do not know that we are entitled to talk about what has appeared in the newspapers. but the statement was made in evidence in Bombay that packages addressed to Sir George Lloyd were so addressed because " Sir George Lloyd " was the name of the dredger?

A.—Yes, the same as things for the " Colaba " would probably have been labelled " Colaba."

Chairman.—It is perfectly credible, and I should have thought an entirely satisfactory explanation, and the usual and proper course.

Sir M. Visvesvaraya.—Who negotiated the contract for the purchase of the cement?

A. Sir Lawless Hepper. That was done by the Directorate.

Q.—You had no part in it?

A.—No. I was asked what amount of cement I should require year by year, and I was then told that there was a suggestion that it should be got by means of a contract, which depended, as far as I remember, on the cost of manufacturing the cement, plus a percentage.

Q.—When the operation of the dredger was begun in December, 1923, did Mr. McMurray help in the operation?

A.—I do not think he was there.

Q.—He was in Bombay at the time of the opening ceremony, I understand?

A.—I could not say. My idea is that he was there later. Sir George Buchanan was not out until rather late that year, I think. I remember Sir George Buchanan and Mr. McMurray being there together. It might have been that Mr. McMurray landed in Bombay, and then went somewhere else and came back again, but I do not remember that he was there.

Q.—Did they co-operate and try to make the dredger work properly? Did they co-operate and help each other?

A.—Who?

Q.—Mr. McMurray and Sir George Buchanan—from your own observation?

A.—I think they did make some suggestions.

Q.—Have you refreshed your memory regarding the specifications for the sea-wall?

A.—Yes, I have found them. *This* is the one of which you know already. *That* is the Colaba end. *Here* is a copy of the specification of the northern section; that is,

the Marine Lines end. It was made up in 1920 in London by Messrs. Meik and Buchanan. It was mostly Mr. Meik. That referred to the work as originally proposed. That is the large 20-ton concrete blocks, and various things like that. That got out of date. When we really came to do the work there were so many alterations that that really was out of date, and I am afraid it was not brought up to date.

Chairman.—Will you hand me those. I will mark them and they will be returned to you. You had better put them in and we will have a look at them and they will come back to you.

Sir M. Visvesvaraya.—What do you understand to be the difference between "the engineers" and "the consulting engineers"? Messrs. Meik and Buchanan were consulting engineers first. Afterwards they became "the engineers."

A.—I think Sir George Buchanan always maintained that they were the engineers for the work all the way through, from start to finish.

Sir M. Visvesvaraya.—What do you think is the difference between the two designations—"the engineers" and "the consulting engineers"? Under which of those categories do Messrs. Meik and Buchanan come, in your opinion?

Chairman.—One moment. That is a matter of the construction of the contract, which is for us. We must not, on a point of construction, seek help from any of the witnesses. We shall get into deep water if we do.

Sir M. Visvesvaraya.—Did you call them "the consulting engineers" or "the engineers"?

A.—I am afraid I used both terms.

Chairman.—On one occasion you got a little rap over the knuckles politely by Sir George Buchanan, who said: "The chief engineer seems to have misunderstood our position. We are not consulting engineers: we are the engineers actually responsible for the work." That is the letter of the 22nd July, 1923.

Sir M. Visvesvaraya.—You regarded them as consulting engineers practically. If you did all the estimating and everything yourself, and if you did not send any papers to them, they could not have been the engineers, could they?

A.—I did send papers to them.

Q.—You sent some papers, but your final estimate did not go to them?

A.—I handed that in to Sir Lawless Hepper. That was in May, 1922, I think.

Q.—In your estimate you referred to "consultants' fees." You meant them, did you not?

A.—Yes. I am afraid that it was mixed up a bit. It was not quite clear. I do not know how I should have put that in. There were other consultants besides Messrs. Meik and Buchanan.

Q.—Who were they?

A.—Sir John Biles. He was a consultant, and there was the town planner.

Q.—But the bulk of the expenditure was on this firm?

A.—I suppose if I had had a solicitor at hand I might have written things differently.

Sir M. Visvesvaraya.—We want the truth. We do not want solicitors.

Sir Frederick Hopkinson.—I think you told us yesterday, Mr. Lewis, that you belonged to the Burma P.W.D. What is the difference between that and the Indian P.W.D.?

A.—There is no difference except that I was stationed in Burma. I was allotted to the Burma Provincial Cadre.

Q.—You might have been anywhere in India?

A.—Yes. When I got my appointment from Coopers Hill, there were a certain number of provinces to choose from, and from those I chose Burma.

Q.—So it is really all the same?

A.—Yes. It is now called the Indian Service of Engineers, I think.

Q.—What is the retiring age?

A.—Fifty-five.

Q.—You told us that you were on the eve of retirement in the middle of 1924?

A.—Yes.

Q.—That would make you about 57 now?

A.—I shall be 57 next March.

Q.—Your first connection with this work was in the middle of 1920, was it?

A.—Yes.

Q.—What were you doing before that?

A.—I was Chief Engineer in Burma in the Public Works.

Q.—From what date?
A.—From November, 1919.

Q.—For quite a short time, then?
A.—Yes, but that was my permanent position in the Department. I was Chief Engineer and Joint Secretary to Government.

Q.—But not before 1919?
A.—No. Before that I was Superintending Engineer in what was known as the Delta circle.

Q.—That also was in Burma?
A.—Yes.

Q.—When did that commence?
A.—That commenced in 1919, too. I originally belonged to Burma, and in 1914 I was asked by the Government of India whether I would accept the post of Superintending Engineer at the Imperial capital at Delhi. I arrived there in December.

Sir Frederick Hopkinson.—I think we shall get on better if you just answer my questions.

Chairman.—Just let him finish first. For how long did you stay at Delhi?
A.—I was there until August, 1916.

Q.—Then you went off to Mesopotamia?
A.—Yes.

Chairman.—Then you come back from Mesopotamia, go to Burma, then are called across to Bombay, no doubt on account of this matter, and you arrive in Bombay some time in June, 1920. That brings the history up to date.

Sir Frederick Hopkinson.—Then you were in Delhi from 1914?
A.—Yes.

Q.—During the war, in 1916, you went to Mesopotamia constructing works for the landing of troops, and so on?
A.—Yes. I was constructing the port at Basra at first, and then I was Director of Irrigation.

Q.—That, of course, would be nothing like the Back Bay reclamation? During war time it would be a case of doing something actually required at the moment, with military labour to a large extent?
A.—No, there was very little military labour.

Q.—Under military direction?
A.—No. We all had various titles.

Q.—It was of a military character? You were put into uniform?
A.—Yes.

Q.—Previous to 1914, what was your experience?
A.—I was Superintending Engineer from, I think it was early 1913.

Q.—From April, 1913, to 1914?
A.—For most of that time I was in charge of the irrigation circle in Upper Burma.

Q.—And previous to 1913?
A.—From 1911 to 1913 I was Executive Engineer in Upper Burma. I had the Mandelay Division.

Q.—And previous to 1911?
A.—For a short time I was Under-Secretary, P.W.D., in Rangoon. Previous to that——

Q.—I have not got the time. From 1911 to 1913 you were Executive Engineer in Upper Burma. Before 1911, how long were you Under-Secretary, P.W.D.?
A.—Only a short time. I rejoined the Public Works on the 1st January, and I think I went up to Maymyo in April.

Q.—What shall I put down? How long were you Under-Secretary in the P.W.D.?
A.—Only for about four months.

Q.—And previous to that? You said just now that you rejoined the Public Works Department. Had you left them?
A.—No. I was on deputation with the Port Trust in Rangoon.

Q.—For how long?
A.—From the end of 1907.

Q.—From 1907 to 1911 you were on deputation with the Rangoon Port Trust—what doing?
A.—The Rangoon Training Works—the training wall.

Q.—I thought that was before 1907?
A.—No.

Q.—At any rate, it was some time in 1907. If I remember rightly, that was a stone wall built to train the river to run in a certain direction. Were you in charge of the quarry there?

A.—I was in charge of the quarry first of all, and then for a time I was in charge at the Rangoon end.

Q.—It was a simple operation, was it not? You set out the training wall, you quarried the stone, and you put it into barges and dumped it on a certain line?

A.—It was a little more than that. It was founded really on mattresses.

Q.—You put the mattresses down first, and then the other things follow in their course?

A.—Mattresses, then stone, then the stone was dumped from the hoppers.

Q.—There was nothing in the shape of constructive work, except the small piece of wall above high water level, was there? It was a rough wall, was it not?

A.—It was a concrete wall. As a matter of fact, that was done after I left.

Q.—Then we need not trouble about it. Now, previous to 1907 what were you doing?

A.—I was in the P.W.D. I had charge for 4½ years of a Division.

Q.—Would you mind giving me the years of that?

A.—From the beginning of 1903 until 1907. I forget the date in 1907.

Q.—What kind of works were you doing in those years from 1903 to 1907?

A.—All sorts—embankments, flood embankments.

Q.—Earth embankments?

A.—Yes, navigation canals, locks, and all sorts of things of the kind pertaining to navigation works. Then the roads and buildings in the district.

Q.—Something like the Royal Engineers? They do everything, do they not?

A.—We had to turn a hand to anything that turned up.

Q.—This was all under the P.W.D., and all done departmentally, or was it done by contract?

A.—It was generally done by petty contract.

Q.—Apparently quite small things?

A.—Yes. There was not anything large. One year we might have three or four miles of embankment to do, and that sort of thing.

Q.—I should call that a small work requiring no special knowledge.

A.—It required a great deal of careful work.

Q.—You mean setting out?

A.—Not only setting out, but seeing that the work was done properly.

Q.—Digging a ditch and forming it into a bank. Was that it?

A.—Yes.

Q.—Will you now tell me what you did previous to 1903?

A.—I was on leave for a few months. Before that I was constructing the Mandelay Canal—the irrigation canal.

Q.—In what years?

A.—I went on that at the end of 1896, I think.

Q.—From 1896 to 1903. I do not think we need go any further than that. What I am really trying to get at is this. You told us yesterday that Sir George Buchanan made very flattering remarks to you about the reason why he wished you to take charge of this Back Bay reclamation. I wanted to see really what experience you had had of large works of anything like the Back Bay reclamation which would warrant him suggesting that you should be put in charge of the carrying out of such a large and important work as the Back Bay reclamation; and I think we have got that now. You were in England in August, 1920, preparing the schemes for carrying out this work. Is that so?

A.—Yes.

Q.—With Mr. O'Rorke, assisting you?

A.—He came in afterwards.

Q.—In order to do that, were you given a copy of Sir George Buchanan's report of September, 1919?

A.—We had it in the office.

Q.—Did you have the assistance of Sir George Buchanan in doing it?

A.—For a short time.

Q.—How long?

A.—He left, I think, on the 25th August.

Q.—Would it be a correct description if I said that you were given Sir George Buchanan's report and told to frame methods of carrying the work out?

A.—With Mr. Meik's assistance. Mr. Meik was, of course, the senior partner of the firm.

Q.—Did Sir George Buchanan have anything to do with designing the way the works were to be carried out—Sir George personally, I mean?
A.—I think he left most of that to Mr. Meik.

Q.—I am asking you if he had anything to do with it personally?
A.—No, I do not think so.

Q.—Did he give you any general instructions before he went away as to how he wished the work to be done?
A.—No, I was working that out with Mr. Meik.

Q.—I am asking you, did Sir George Buchanan give you any general instructions as to how the works were to be carried out before he left on August 25th? The answer is yes or no.
A.—I do not remember anything in writing.

Q.—Did he give you any verbal instructions?
A.—It is a long time ago. We naturally talked it over.

Chairman.—Have you any recollection of his having given you verbal instructions, and, if so, on what particular subject?
A.—Only in a general sort of way, I think.

Sir Frederick Hopkinson.—You mean a conversation?
A.—Yes.

Q.—Did he have a conversation with you?
A.—We had many conversations as regarded how the work was done.

Sir Frederick Hopkinson.—That is what I am wanting to get at.

Chairman.—In August, 1920?
A.—Yes, before he went.

Q.—One of the witnesses has said that you arrived at Sir George Buchanan's office about August 20th?
A.—No. It was much earlier than that. It was in July that I arrived. I want to think it out. I left Maymyo on the 20th June, and I think I got to Bombay on the 27th. I think I left by a steamer on the 3rd July.

Q.—Then you would be in town on the 20th July easily?
A.—Yes, easily. It was in July.

Sir Frederick Hopkinson.—Had Sir George Buchanan a clearly defined scheme for doing every detail of this work? Did he tell you that he wanted a gantry here and he wanted to use so many trucks there, and locomotives here, and so on? Did he give you any detailed particulars?
A.—No. I think I worked those out with Mr. Meik.

Q.—But the report of September, 1919, was Sir George Buchanan's only, and not Mr. Meik's. Mr. Meik had nothing to do with it?
A.—I do not know.

Q.—He was not a partner at that time?
A.—Yes, I think so.

Q.—In 1919?
A.—Yes.

Sir Frederick Hopkinson.—Did Sir George Buchanan ever show you details of his original estimate of September, 1919?
A.—I do not remember ever having seen that.

Q.—Did he tell you he had made such an estimate in detail? It would be a fairly large number of papers required to give it in any detail.
A.—Yes; I do not remember ever having seen it.

Chairman.—That is not the question. Did he tell you that he had in fact made out a detailed estimate showing how 367·61 lakhs was arrived at?
A.—I cannot remember that he did.

Q.—Consider for a moment. If he told you must you not have said: "Give me the document"? Must you not have asked for the document?
A.—I did not get any document.

Q.—Does not that satisfy you that he could not have told you that there was such a document? You would have asked for it at once, would you not?
A.—Well, he probably would have shown it to me.

Q.—If he had not shown it to you would you not have asked for it? Must not the answer be "Yes"?
A.—Yes.

Sir Frederick Hopkinson.—Did he give you all the papers and drawings in connection with the scheme?

A.—I had access to them, whatever there was.

Q.—You had access to the whole of the papers in connection with the scheme?

A.—Yes.

Q.—You never saw any detailed estimate?

A.—No; I did not see any detailed estimate.

Q.—Do you know if there were any cross-sections included in that original set of drawings across the reclamation other than those shown in the pocket of his 1919 report?

A.—I think that what they had was the sections taken by Mr. Kidd only.

Q.—Had they any others?

A.—Not that I remember.

Q.—Was there any longitudinal section along the sea wall?

A.—I think there was a longitudinal section, but I do not think it was levelled at that time.

Q.—You do not think it had been levelled?

A.—Not by Sir George Buchanan.

Q.—Did he get one from Mr. Kidd's plans?

A.—I think so.

Q.—In his report he complains of the want of detail in Mr. Kidd's report. I want to get at the fact as to what other detail he gave?

A.—I do not remember any.

Q.—Whose idea was it to build the sea wall from a gantry?

A.—I think that was Mr. Meik's.

Q.—Not yours?

A.—No. I think that was already settled in Sir George Buchanan's report.

Q.—That he was going to build it from a gantry?

A.—I think so. I am not quite sure, but I think so.

Q.—I do not remember it.

A.—Did not he say it was going to be built by a gantry?

Q.—Why need you build a gantry for the Colaba part of the sea wall except for the first 2,000 feet which was above low water level and on rock?

A.—The reason was that there was a very great deal of rock there, and it would have been very difficult to drive the piles into the rock.

Q.—I see it was originally Sir George Buchanan's intention to put what he calls a timber staging?

A.—Yes.

Q.—The Colaba end was done without a timber staging or gantry?

A.—Yes.

Q.—Quite successfully?

A.—Yes.

Q.—Economically?

A.—I think so.

Q.—Where was the necessity for a timber staging or gantry?

A.—Well, at Colaba we started practically from ground level. At the Marine Lines end we were very many feet above the level. We were at the southern end, I think, within a foot or so of the ultimate reclaimed level.

Q.—Was not the stage primarily required for carrying a 20-ton crane?

A.—I cannot remember now what the original idea was, but when it came to a question of investigating I came to the conclusion that we could not put the 20-ton crane on the gantry. It would have meant such an enormously more expensive one.

Q.—This is Sir George Buchanan's report of 1919: "A timber staging to be built in sections across the whole line of the wall, the staging to be wide enough to carry a line of railway and a 20-ton crane." I believe ultimately that 20-ton crane was not required at all.

A.—Well, it was used.

Q.—But not required, because you did not use any 20-ton blocks?

A.—We did not use any 20-ton blocks, but it was a crane, I think, of 50 feet radius. It was used, and it came in very useful.

Q.—Having it there you used it?

A.—Yes.

Q.—It was ultimately found that 3 to 5 or 7-ton blocks were ample for the requirements?

A.—Yes.

Q.—Therefore I say the 20-ton crane was not essential?
A.—No; it did not prove essential.

Q.—I suggest to you that that gantry was entirely unnecessary. There was no reason why you should not have built the wall at the Marine Lines in the same manner that you built it at the Colaba end; that is, without a gantry. Could not you have made a short incline down from the finished level down to the level of the top of the ground?
A.—Yes; and then we should have had to take that away to get the concrete wall on.

Q.—Of course you would, afterwards—you would do exactly as you did at the Colaba end. You did it there, did you not?
A.—Yes.

Q.—There is no difference in the section of the wall?
A.—No; it was only a question of access.

Q.—That is a detail, is it not?
A.—Yes.

Q.—My suggestion to you is that that gantry which cost £90,000 was entirely unnecessary, and was devised apparently by somebody in London who had not seen the site and did not realise that it could have been done without that gantry. After all, it is a very simple matter to tip a rubble mound, is it not?
A.—Yes; it would have meant——

Q.—It would have meant what you did at the Colaba end?
A.—Yes.

Q.—Transferring the stone from side wagons to end wagons and tipping them?
A.—Yes.

Q.—There have been plenty of cases where such work had been done?
A.—Yes.

Q.—It is essentially a simple and easy way of doing the work?
A.—The only question was the difference of level, and that amounted to something like 8 feet.

Q.—That is quite a small thing. An incline of that kind could be made of 1 in 25 or 1 in 30, so that you could have got down in about 250 feet?
A.—It was quite a small thing.

Chairman.—We have not got the answer yet. You heard Sir Frederick Hopkinson's question. In your opinion, sitting here to-day, was the gantry necessary or unnecessary?

Sir Frederick Hopkinson.—Considering it cost £90,000.

A.—(*After a long pause.*) It was, of course, very convenient to us in many ways.

Chairman.—Convenient; but convenient at a price of £90,000! Apart from convenience, was it necessary. Sir Frederick Hopkinson has suggested to you you could have built the wall at Marine Lines in the same method you adopted at Colaba, making an incline of some 200 feet. Is not that so?
A.—That is a question of opinion, is it not?

Q.—I am asking you as an engineer, and as the chief engineer at the time, whether the gantry was a necessity or not. You must answer, please. You must tell us. What is your actual opinion to-day? You have heard how Sir Frederick Hopkinson has put it. Was the gantry a necessity or not? We must get along. We are taking a great deal of time over this.
A.—As a matter of fact, this is the first occasion that I have considered it.

Sir Frederick Hopkinson.—Is it not such a simple thing that it does not need consideration. I am not blaming you in any way. You were told this work was to be done by a gantry and you designed a gantry to do it.

Chairman.—Let us see if we can put it in another way.
A.—I was trying to think whether we did not consider some other ways. I know I did have a conversation about it with a gentleman who was a contractor in London in Mr. Meik's office. As a matter of fact, it was Mr. Railton, of Topham, Jones and Railton. He had done work at Swansea under the same firm of Meik and Buchanan. He made a suggestion rather of that kind.

Q.—It was not exactly the same?
A.—But of that kind. And I remember telling Mr. Meik about it and asking him what he thought about it. He said: "Oh, no, that will not be anything like convenient," or something to that effect. He would not consider it.

Q.—He preferred the gantry?
A.—Yes.

Chairman.—We still come back to the question: Was that gantry, in your opinion, necessary or not? We must have an answer to it.

A.—(*After a pause.*) It was quite possible to have done without it.

Sir Frederick Hopkinson.—You have proved that it was by doing without it at the Colaba end?

A.—Yes; but, as I say, the circumstances were not quite the same.

Q.—But practically the same. You could get over a little difference in circumstances quite readily and at some small expense?

A.—Well, we did, and we could have done it.

Q.—During the whole course of the time that you were there did you look upon Meik and Buchanan as the engineers in sole charge of the work?

A.—Yes. I mean that was the position as laid down, was it not?

Q.—Did you in all cases take instructions from them as to how the work was to be done?

A.—Well, generally, you see, things did not come from London, and I had to prepare them in Bombay.

Q.—That is not quite what I meant. Did you generally take instructions from them as to how the works were to be carried out—not designed. Put that aside for the moment. Did they or you decide how the work was to be done and what means were to be employed?

A.—Well, I think I generally devised the means, and in many cases, where it was necessary the matter was talked over with them.

Q.—In other words it was put up to them for approval?

A.—Yes.

Q.—That is it?

A.—Yes.

Q.—So that really you looked upon them as the actual responsible engineers in charge of the work and you would take instructions from them?

A.—Yes.

Q.—Throughout?

A.—Yes.

Q.—From anybody else?

A.—Well, you see, I was rather in the unfortunate position of serving two masters.

Q.—That is what I want to get at?

A.—I was a servant of the Government of India, or, rather, of the Government of Bombay.

Q.—But under Meik and Buchanan?

A.—Well, no, I was not—well, I was to a certain extent under Meik and Buchanan. It was rather a difficult position which was not really adequately defined at the first.

Q.—Do you think it was a good arrangement?

A.—No, I do not.

Q.—Do you think it was a bad arrangement?

A.—I think it was a very uncomfortable arrangement.

Q.—Do you think it was a bad arrangement?

A.—I do not think it was a good one.

Q.—Was it injurious to the works. Your Chief apparently was 3,000 or 4,000 miles away?

A.—I do not think it was a good arrangement.

Q.—Not a good working arrangement?

A.—No.

Q.—Do you think that the man in sole charge of the works ought to have been resident on the spot?

A.—Yes. I do not see how you can take responsibility unless you are actually on the spot.

Q.—Unless you have the power?

A.—Yes.

Chairman.—He said: unless he was on the spot. You are speaking about locally?

A.—Yes.

Q.—Unless you are on the spot locally?

A.—Yes.

Sir Frederick Hopkinson.—You can have power for carrying out certain sections on the spot and still ultimate power may be in London. So long as you are given a clearly defined thing to do it is your responsibility to do that, being on the spot?

A.—Yes.

Q.—But that need not detract from the responsibility attaching to the individual who gives you those instructions?
A.—No.

Q.—So that the people in London may be ultimately responsible to Government and you responsible to the engineers in London. That is a satisfactory way of working the arrangement, is it not?
A.—Yes.

Q.—But did that apply in Bombay? Did you get orders from anybody but Meik and Buchanan?
A.—Well, I was under the Director of Development, administratively.

Q.—But he has told us that he did not interfere in any technical questions?
A.—In some cases I remember Sir George Buchanan asked me to consult the Director of Development and to let him know what his decision was.

Q.—On engineering matters?
A.—Well, on one occasion it was a question of the supply of plant, and I think on another occasion it was on construction matters.

Q.—Do you take the responsibility for the supply of all the plant to the Bombay Reclamation? You made out a list of plant before you went out there?
A.—Yes.

Q.—Do you take responsibility for that? Were you entirely responsible for it?
A.—Well, Meik and Buchanan were responsible for it.

Q.—For the original estimate—the original list. Who actually made it out?
A.—It was done in their office.

Q.—Who actually made it out?
A.—I think I did.

Q.—And you made subsequent additions to it from Bombay?
A.—Yes.

Q.—Do you take the responsibility for them?
A.—Yes.

Q.—Had you ever in your life had such a job to do, to make out a plant list of such a large work as this?
A.—Yes.

Q.—Which one was that?
A.—At the Kalagouk Quarries on the Rangoon River Training Scheme.

Q.—But did not Sir George Buchanan do that?
A.—No, I did that very largely myself.

Q.—Anywhere else? Quarries are comparatively small. I mean the whole thing, locomotives, cranes, gantries, road, general lay-out, and all that sort of thing?
A.—Well, I have done a certain amount—in fact a good deal of construction.

Q.—This is quite a big thing ?
A.—Yes, I had one at Delhi. That was a big thing.

Q.—In the way of plant?
A.—Well, there was a good deal of plant there.

Sir M. Visvesvaraya.—You were not in sole control there?
A.—No, I was Superintending Engineer under Sir Hugh Keeling.

Q.—From what year?
A.—1914 to 1916.

Sir Frederick Hopkinson.—What was the work in Delhi?
A.—It was the building of the new capital.

Q.—Did you require locomotives and cranes?
A.—Yes. We had many, many miles of railway.

Q.—What gauge?
A.—It was 2 feet 6 inches.

Q.—That is an unusual gauge, is it not?
A.—I think there was a certain amount of plant available from the Simla Kalka Line. So far as I remember that was the reason why it was used. It meant very big supplies of material, bricks and things like that.

Q.—When you were in London in 1920 did you see any longitudinal section showing the surface of the ground where the storm water drains were to be put?
A.—No.

Q.—Did you take out any quantities for any storm water drains?
A.—No, I did not take any quantities.

Q.—Did you ultimately do that in Bombay?
A.—Yes.

Q.—You had to take longitudinal sections?
A.—Yes.

Q.—Design the actual culverts and devise methods of doing the work?
A.—Yes.

Q.—Do not you consider that was part of Meik and Buchanan's work?
A.—Yes. There was a little confusion about that. At one time it was suggested that that work should not be done by Meik and Buchanan as it was not part of the reclamation.

Q.—Not part of the reclamation?
A.—That is what I was told, and my instructions were that I was to do it.

Q.—Whom did you get those instructions from?
A.—From Sir Lawless Hepper. Then I started on those in 1922. We started making the drawings in 1922. Then when I had practically finished the work, all except perhaps the particular estimates for each particular drain, when the work was really started, I was told that they had come to the conclusion that the work was to be done by Meik & Buchanan. That is when Sir George Buchanan was over there in 1922-23.

Chairman.—Who were " they "?
A.—At that time there was Mr. Halcrow, who is now a partner in the firm.

Q.—Who is " they "? Mr. Halcrow and who else?
A.—Sir George Buchanan.

Q.—What year was this conversation?
A.—I think it was in 1923.

Sir Frederick Hopkinson.—That is three years after you had made out the original plans showing how the work was going to be done.
A.—You mean the main work?

Q.—Yes.
A.—Yes.

Q.—I think you said that the storm water drains were designed in 1922?
A.—Yes.

Q.—That would be two years?
A.—The work started in 1922. I do not say that a detailed estimate and a detailed plan was ready then. Work was started then.

Q.—Does not that account for the dredger not being able to commence work until December, 1923?
A.—I do not think so.

Q.—Was not there a storm water drain right across block 8, 2,300 feet long?
A.—That one down to the south—1a.

Chairman.—Storm water drain No. 1a?
A.—Yes.

Sir Frederick Hopkinson.—Why is it called 1a. Had it been forgotten?
A.—I came to the conclusion that we wanted more at that particular point.

Q.—Therefore it was an interpolated drain?
A.—Yes.

Q.—Covering the site of where the first reclamation was to be made by the " Sir George Lloyd " dredger?
A.—Yes.

Q.—During the time you were in London in 1920 was any programme given you as to how the dredgers were going to work or the general scheme of the reclamation—where they were going to begin?
A.—No, I think that came very much later.

Q.—Was not it known then?
A.—Not in more than a general sense, I do not think.

Q.—Do you not think that the procedure in August, 1920, should have been: " Here are the plans of this reclamation work. We are going to build this wall in such and such a method to this section, and we are going to start the dredger over there, and we are going to begin the reclamation here. Fill up that block and see the work through to a finish." The whole thing could have been done in half an hour. Do not you think you ought to have had some general programme of that kind? Was such a programme given to you?
A.—Well, there have been so many programmes.

Q.—But I am speaking about the early days. We will come to those others afterwards?

A.—No, I do not think there was a programme given to me. I cannot remember one.

Q.—Did Sir George Buchanan ever tell you exactly how he proposed to do the work?

A.—Only in general terms.

Q.—Can you give us any idea of those general terms? Was it anything more than a bald statement that the dredger was going to pump filling into an area enclosed by a sea wall?

A.—Well, I think there was more than that even in Sir George Buchanan's report, was there not?

Q.—Before 25th August, 1920, when Sir George Buchanan went abroad, did he add substantially anything to this report of his of 1919?

A.—I cannot remember that he did.

Q.—Surely you would remember if he had done so?

A.—I do not think he did. That was what practically I had to found any scheme that I made on.

Q.—You were given that report and the few plans that accompanied it and told that you were to get out the details and carry out that work as Chief Engineer?

A.—Yes.

Q.—In the design of these storm water drains they cost 64 lakhs. The estimate for them was 64 lakhs, which is roughly half a million. Two per cent. on half a million is £10,000, is it not?

A.—Yes.

Q.—That would be Messrs. Meik and Buchanan's fee for designing and carrying out these storm water drains, but actually you say they had absolutely nothing whatever to do with that?

A.—I sent them the drawings that I had done, and they sent one letter, I think, with perhaps a hand sketch showing an alternative proposal.

Q.—Is that all they did?

A.—That is practically all the help I got from them.

Q.—We were told that the construction of the work and the designs were going on simultaneously throughout the contract. Is that true?

A.—Yes, substantially.

Q.—Did Meik and Buchanan have anyone in their employment and pay out there doing any of these designs?

A.—None.

Q.—None at all?

A.—No one.

Q.—It was left for the Government of Bombay to pay for the designing of the work?

A.—Practically.

Q.—When did you begin your project estimate?

A.—As soon as I got out.

Mr. Billimoria.—In June, 1920?

A.—No, I left London on the 19th November, and I went all the way round by sea, as I wanted a little rest.

Sir Frederick Hopkinson.—So you would get there about the end of the first week in December?

Mr. Billimoria.—December, 1920?

A.—Yes.

Sir Frederick Hopkinson.—Did you start your project estimate at once?

A.—Well, no, we were not in a state to do it at once. We had to look round and make many preliminary investigations. I was working on that in 1921.

Q.—Can you tell me when you started it?

A.—I could not tell you the exact date.

Q.—Approximately. I do not want to pin you to a day or a month. Was it in 1921?

A.—Yes.

Q.—Roughly when—the middle of 1921 or the end of 1921?

A.—The usual process of Government work is that no expense can be incurred until the estimate has received the sanction of the appropriate authority.

Q.—Although you knew you had been spending a lot of money in London for plant?

A.—Yes, we were told to get on. As there were preliminary things we had to do we knew roughly before we had our estimates we had to incur a certain amount of expenditure, and in order to get the objections to that expenditure raised we made out detailed estimates as fast as we could, and those detailed estimates were sent in.

Q.—For things you were going to do at once?
A.—Yes.

Q.—That is to say, before you went about the business of laying out a quarry, you would have to have a particular estimate for doing it?

A.—Yes. We did not have an approved estimate. We made out our scheme and decided on what we were going to do, and set to work and then made out our estimates.

Q.—When did you begin to make this project estimate?

A.—You can say it was in the beginning of 1921—details of it. Parts of it were done then.

Q.—You began it in the beginning of 1921?
A.—Yes.

Q.—When did you finish?
A.—It was finally finished in May, 1922, I think.

Sir M. Visvesvaraya.—The beginning or end of the month?
A.—The beginning of the month.

Sir Frederick Hopkinson.—So that altogether you were about 15 months over making it, from start to finish?
A.—Yes; and in doing many other things besides.

Q.—It is a very detailed document, and in order to make it you would require pretty complete plans of all the work you were going to do, would you not?
A.—Yes.

Q.—You must have, or else you could not have got out those quantities?
A.—Yes.

Q.—This project estimate extends to 17 pages and represents a very large amount of work?
A.—Yes.

Q.—And a large amount of work that could not be done by your assistant, but had to be done by yourself?
A.—I did a great deal of work on that.

Q.—You had to do the major part of this?
A.—A very great deal.

Q.—If you were on that scheme from early in 1921 to May, 1922, it did not leave you very much time for carrying on the work. It must have hampered you very much?
A.—Certainly.

Q.—Probably you will agree with me that in starting a big work of this kind, opening up quarries and getting everything ready for your dredger, getting your roads ready, ordering your plant, and so on, it takes pretty well the whole time of a competent man?
A.—Yes.

Q.—Therefore, if your attention was diverted from this necessary work to spending 15 months over an estimate, the work would correspondingly suffer?
A.—Well, one could work overtime We were generally doing overtime.

Sir M. Visvesvaraya.—You had the requisite staff?
A.—Well.

Sir Frederick Hopkinson.—I am suggesting that the staff could not do it. This is the work of the individual who was in charge of it. They could do the quantities.
A.—A good deal of the donkey work was done by the staff.

Sir Frederick Hopkinson.—It would take a large proportion of your time?
A.—Yes; a certain proportion.

Mr. Billimoria.—That was necessary to be done—the estimate was necessary?
A.—Yes; the estimate had to be done in order to remove the audit objections, and things like that.

Q.—Apart from the audit objections, for the scheme itself it was necessary?
A.—Yes; we could not go and work in the air.

Sir Frederick Hopkinson.—Did Sir George Buchanan visit the works every year?
A.—Yes; while I was there.

Q.—More than once a year?
A.—In 1923 I think he came twice.

Q.—Was there any special reason for that visit? Was it to see the effects of the monsoon?

A.—Yes; I think that was the purpose.

Q.—Not to see the work being carried out, because the work would be largely stopped?

A.—Of course it was largely stopped at that time.

Q.—How long did Sir George Buchanan stay when he was out there each year?

A.—Well, I have not got the dates. I think the dates of his visits are in the special reports that he gave for each year.

Q.—Did he give the dates?

A.—I think so. I have got an idea that he did.

Chairman.—Sir Lawless Hepper did not give the dates in the Directorate reports.

Sir Frederick Hopkinson.—He said in Sir George Buchanan's reports.

A.—Sir Lawless Hepper sent me some papers. He wrote and told me that I was probably going to be asked to appear before you, and he sent me a certain number of papers to refresh my memory, and among those papers was a printed document.

Q.—Is that it? (*Document handed.*)

A.—Yes; I think he generally opened out by saying that he arrived on such-and-such a day, and the reports were generally put in before his departure.

Q.—Sir George Buchanan says in his report, dated the 11th of February, 1922: "I have now had the advantage of living for two months on the works at Colaba."

Chairman.—He left on the 25th February, 1922. There is no doubt about that date.

Sir Federick Hopkinson.—I do not remember his ever mentioning that he arrived or left on particular days. In 1922 he left on the 25th of February.

A.—When did he arrive then?

Q.—I cannot tell you. The next year he came out in July and left in August, but the works would then be practically stopped?

A.—There would not be much doing then.

Q.—He came out again on the 28th December, 1923, and left on the 20th January, 1924; and in 1924 he came out on the 24th November and left on the 16th February, 1924. In 1925 I have not got the date he arrived, but he left on the 7th January. When he was there did he spend the whole time at Bombay?

A.—He often had other things to do in other parts of India.

Q.—I was given some figures in Bombay which showed that he had been in Bombay an average of about five weeks in a year. Do you think that would fairly represent the time spent on the works?

A.—I should think it would not be far out.

Q.—When he left you had no means of communication with him except by cable or letter to London?

A.—No.

Q.—A letter would take probably five weeks to get an answer?

A.—Something of that nature.

Q.—When the dredger first came out in March, 1922, what was the programme for using it? We know it did not start work until December, 1923. Had you any programme sent out by Sir George Buchanan as to what the dredger was to do when it came?

A.—Well, we knew that it was impossible to use it at that time, and it had to be laid up.

Q.—Did he ever write to you to that effect? Did he give you a programme?

A.—There were many.

Q.—Did he give you a programme before March, 1922? Did he write and say: "Now the dredger is leaving England next week, and will be with you in about a couple of months, and it is to do such and such work"?

A.—No, I do not think so.

Q.—In April, 1921, Sir George Buchanan wrote to you: "My dear Lewis, There is no violent hurry as the earliest the dredger can start work will be at the end of 1922." You replied to that, I think, saying that nothing could be done before the end of 1923. How do you account for his not knowing within a year when the dredger could start? Can you account for it?

A.—No, I think it was being too optimisitic on his part.

Q.—Did not he have progress plans showing how the work was getting on?

A.—Yes, he was kept informed.

Q.—Was he kept fully advised?

A.—Yes.

Q.—Did he have periodical reports?
A.—Yes.

Q.—Is it possible that when he wrote that letter of the 14th April, 1921, he had not thought of the storm water drains?
A.—I could not say.

Q.—At any rate, the storm water drains were not built in April, 1921?
A.—No.

Q.—In fact, you were only just beginning to think of designing them towards the end of 1921?
A.—Yes, we were in the very early stages of 1921.

Q.—You did not design them until 1922?
A.—No.

Q.—Therefore, for the dredger to start work at the end of 1921, the storm water drains, or some of them, would have had to be completed?
A.—Yes.

Q.—Otherwise the dredger could not start. So it really comes to this. The two dredgers, the " Sir George Lloyd " and the " Colaba," were sent out to you without any programme as to when they were going to start, or what they were going to do? There is a letter from Messrs. Meik & Buchanan dated the 25th April, 1921, but that was a year before the dredger got there?
A.—Yes.

Sir Frederick Hopkinson.—That letter says that the dredger will begin work about December or January, 1922. I suppose that means December, 1921, or January, 1922.

Chairman.—It must have meant December, 1922, and January, 1923, because it fits in with the end of 1922. It must be December, 1922, and January, 1923.

Sir Frederick Hopkinson.—Yes, it is evidently a misprint here. December, 1922, or January, 1923—" or even later, if the wall in section 1 is not finished." Which is section 1?
A.—I think it is block 8. When I read some of these papers, I was under the impression that things had got shifted round.

Q.—It must be so, because here is area K, where the dredger is going to work?
A.—Yes.

Chairman.—We were told that plan has got a different numbering on it, and that when he spoke about section 1, it is block 8, the Military area?
A.—That is my idea of it.

Sir Frederick Hopkinson.—It must be so, because it is the nearest point to area K, where the dredger was going to work.
A.—I think those block numbers must have been put on after I left.

Chairman.—It is possible.
A.—They do not seem a bit familiar to me. In fact I do not understand a good deal of the context except on the supposition that they have been changed.

Sir Frederick Hopkinson.—There is one question I omitted to ask you. Did you ever see any estimate for putting in the five pipe-lines across the City of Bombay?
A.—No estimate.

Q.—No separate estimate?
A.—You mean from Messrs. Meik & Buchanan?

Q.—Yes.
A.—No.

Q.—Did you ever hear what they were going to cost?
A.—When I saw the idea of them I was very much afraid of them. What they would have cost I do not know; but I got Sir George Buchanan, one by one, to give up the idea.

Q.—Why?
A.—Well, because it meant such an enormous amount of work and trouble. One was coming right down *here* from Ormiston Road across the Cooperage, through these gymkhanas and out into Back Bay near the Back Bay Baths.

Q.—We want to get this certain. This is what Sir George Buchanan says in his original report: " From Mr. Kidd's plans I see he proposes seven pipe-lines across the Peninsula. I think this number is excessive, and have reduced the number to three." Where is the first one?
A.—Pipe-line No. 1 is through the British Infantry Barracks at Colaba.

Q.—Has that one been put in, or did you alter its position?
A.—That has been altered. It has been taken further south.

Q.—Why?

A.—Well, first of all to get clear of the Barracks; and I think I am right in saying that we had a better place to take off. We had to build out a bank to carry the pipes.

Q.—Was it more convenient and economical to avoid going underneath the Barracks?

A.—Yes.

Q.—Much?

A.—We had a shorter line.

Q.—Do you mind answering my question? It was more convenient and economical?

A.—Yes.

Q.—Then No. 2?

A.—No. 2 is, approximately, where No. 2 is now, that is across the Colaba Road, at the very narrowest point of the Peninsula.

Q.—That is the one which, I think, is in use at present?

A.—Well, I do not know whether that is in use.

Mr. Elgee.—They have not used it yet.

Sir Frederick Hopkinson.—But it is in?

A.—It is in.

Q.—It is going to be used?

A.—It was in in 1924.

Q.—That is in Block 7. What about No. 3?

A.—No. 3 is down Ormiston Road and across the Cooperage, through the gymkhanas, out to a point near the Back Bay Baths.

Q.—A distance of what?

A.—It is about 2,500 feet.

Q.—That is half a mile?

A.—Yes.

Q.—What size of pipe is that?

A.—42-inch.

Chairman.—Taking the exterior measurement, it is more than 42 inches.

Sir Frederick Hopkinson.—Yes; but you always speak of a pipe by its internal diameter. It is a 42-inch pipe. Do you know the site of this Ormiston Road?

A.—Yes.

Q.—Is not it rather high?

A.—It is all on about a general level. There is not much difference of level there.

Q.—It has been described to us in Bombay as being the cost of a Tube railway.

A.—Well, it was very expensive. There is no doubt about that.

Q.—Did you ever make an estimate of what it would cost?

A.—No; the look of it was enough for me.

Q.—You thought it was quite impracticable?

A.—Yes.

Q.—At any reasonable cost?

A.—Yes.

Mr. Billimoria.—There are buildings all over that place. All those buildings would have to be demolished?

A.—No, you could go down the centre of the road.

Sir Frederick Hopkinson.—It is like taking a main sewer down the street, and then ultimately it would have to be taken out again.

Chairman.—What about the bends?

A.—That would have been easily arranged.

Sir Frederick Hopkinson.—It was a fairly straight road?

A.—Yes, there is one bend in it. So far as I remember, it is just about the Taj. The Ormiston Road runs along the Taj Mahal. It is just up there.

Q.—There are tramlines close to there?

A.—We would have to cross the trams. It was going across the whole of Bombay.

Sir Frederick Hopkinson.—It would be the whole width of Bombay. You agree it was quite a considerable distance?

A.—Yes.

Q.—So that if that was included in the original estimate, and has not now been done, it ought to represent quite a considerable saving?

A.—Yes.

Q.—Have you any idea of how much?

A.—I could not say. You see there would have been such a lot of special work there.

Q.—It is 2,500 feet. Can you give us any idea of what it was worth?

A.—No. We have got nothing like it in the contract. There was a short length in Pipe-line No. 2, which went across the road; and I really forget now what that cost. It was not much, but it was a very short piece.

Q.—Was it rock, in this Ormiston Road, or soft stuff?

A.—I could not say.

Q.—You could not give me any idea of the cost of this 2,500 feet of pipe?

A.—No.

Q.—Was not the reason for putting the pipe-line there in order to bring the site of reclamation within a certain limit of distance from the dredger?

A.—I do not know

Q.—In his original report he limits the distance to 10,000 feet, consequently, your pipes across Bombay must be so placed that this 10,000 feet would not be exceeded?

A.—Yes.

Q.—Therefore, if you did away with this pipe on account of its expense, you have got to use one a considerable distance off. What I mean is this. If your pipe is put in along Ormiston Road across Bombay, and has to fill the reclamation at the western end of block 1, and, therefore, if that is more than 5,000 feet, the pipes cannot efficiently do the work?

A.—No.

Q.—Therefore, if you do away with that pipe across Ormiston Road, and if you bring it back in the direction of the Gun Carriage Base, it would make the filling of these blocks impossible by the dredgers, because your distance would be so much greater?

A.—Yes.

Q.—Is that so?

A.—It would be very difficult, certainly.

Q.—It would make it very much longer?

A.—Yes.

(Adjourned for a short time.)

Sir Frederick Hopkinson.—Were you ever interested in a comparison of Sir George Buchanan's and Mr. Kidd's estimates for this work?

A.—No.

Q.—When you got back to Bombay at the end of 1920 you commenced shortly afterwards to make your project estimate?

A.—Yes.

Q.—When did you first come to any conclusion that the estimate of 367 lakhs was likely to be inadequate? Was it early? Was it before you went back to Bombay?

A.—No.

Q.—Had you considered it in 1920?

A.—No.

Q.—When did you first consider it?

A.—I do not know that I can state a date.

Q.—Approximately. Was it as soon as you began to work out any price at all?

A.—Well, I do not know when it was.

Q.—You must have seen, as you progressed with your estimate, that your prices were going to be entirely different from Sir George Buchanan's. Your estimate, eliminating the sale of plant at the end, was about 770 lakhs. Sir George Buchanan's was about 357. That is more than double. Would not you see at a glance almost that Sir George Buchanan's estimate——

A.—Yes. I was trying to fix in my own mind the date, but I do not think I can.

Q.—Cannot you give me any idea? Would not you see it at first almost? If it had been an ordinary difference of 10 or 15 per cent., I could have understood you not seeing it, but it is a difference of over 100 per cent.?

A.—Well, I did see it, of course, but when I saw it—what month—I could not say exactly or even approximately.

Q.—At any rate you did see very soon—you must have seen very soon—that your estimate was going to be much greater than Sir George Buchanan's?

A.—I realised that a long way back. I cannot fix a date now.

Q.—I do not want you to fix a date. I only want you to give me your impression as to whether it was soon after you began to make your estimate that you realised it?

A.—I am afraid I cannot give any date.

Q.—Would not the mere fact that you found the first price which you fixed for any portion of the work was double that of Sir George Buchanan's rather alarm you at once?

A.—We worked out detailed estimates of the things as they were wanted. It was the preliminary works really that came first. I think some time in 1921 I had come to the conclusion that it would exceed very considerably——

Sir M. Visvesvaraya.—Did Messrs. Meik & Buchanan invite your attention to the necessity of starting the preparation of estimates?

Sir Frederick Hopkinson.—Who asked you to make a project estimate?

Chairman.—Did anyone, or was it your own idea?

A.—It was a matter of necessity. It was known by everybody that a project estimate was necessary.

Sir M. Visvesvaraya.—It was known to everybody?

A.—Of course.

Chairman.—It was part of the necessary routine.

Sir Frederick Hopkinson.—It was part of the usual procedure of the Indian Government?

A.—Yes.

Sir M. Visvesvaraya.—I am afraid that this did not form part of the usual procedure of the Indian Government?

A.—It ought to have been done, of course. It ought to have been completed before sanction was given to the estimate, but I found the conditions reversed and that sanction had been given to an estimate which was obviously not in detail.

Sir M. Visvesvaraya.—When the scheme was sanctioned it was not recognised that it was incomplete. There is nothing stated in the correspondence that the 367 lakh estimate was incomplete?

A.—That could not be possibly a working estimate.

Sir Frederick Hopkinson.—It did not comply with the usual requirements of the Indian Government?

A.—No. It was considered more as an administrative sanction than anything else.

Sir M. Visvesvaraya.—Where is any such statement made in submitting the estimate to the Government of India. You took the initiative in revising the estimate, I take it?

A.—I would not like to say that I personally took the initiative, but I recognised that it was a necessity, and I started in with the work.

Q.—You have no recollection that the engineers asked you to prepare the revised estimate?

A.—Sir George Buchanan realised himself that a revised estimate was required.

Q.—At what stage?

A.—He realised it during his visit in 1921-22. I had not got the data. He made one up himself.

Q.—That was in February, 1922?

A.—He made it up during his stay in Bombay.

Mr. Billimoria.—What necessitated the revision of the estimate?

A.—It was not a revision of the estimate. That is a wrong term really.

Sir M. Visvesvaraya.—When you prepare a new estimate for 702 lakhs and the original is 367, what do you mean by saying that it is not a revision?

A.—I never took the original estimate of Sir George Buchanan as a working estimate for the work.

Q.—You may not have done so, but there is nothing on record to show that it was so taken at the beginning. Can you point to anything in the correspondence?

A.—No, I cannot remember all the correspondence.

Mr. Billimoria.—It is called the " revised estimate," if you look at the printed records?

A.—It was a project estimate which we always knew it as.

Sir Frederick Hopkinson.—It is headed " project estimate."

Mr. Billimoria.—I mean the small blue book which Sir George Buchanan signed. It is called the revised estimate there.

Sir Frederick Hopkinson.—I want to see that book, because I believe on that estimate Sir George Buchanan suddenly put a lump sum of £750,000.

Mr. Billimoria.—That is it. You will find " revised estimate " on the top of it.

Chairman.—May I interpose for a moment to call attention to the statement of the 11th February, 1922? We ought to have that now. It is on the second page of Sir George Buchanan's report of the 11th February, 1922. " Under the rules of the Government of India for the carrying out of public works, the approval of my report,

plans and estimates, did not imply more than accordance with administrative sanction to the scheme, and a detailed project estimate giving the fullest particulars under each head and every head should have been submitted before any actual expenditure was incurred. The preparation of this estimate would have taken a staff of engineers at least one year, and when completed would have been valueless for the same reasons that contractors were unable to submit a firm tender, and as time was of importance it was decided to proceed in anticipation of sanction and to prepare the detailed project estimate as soon as reliable data had been collected." Does that accord with your recollection of the matter?

A.—Yes.

Sir Frederick Hopkinson.—Do you know what he means by " reliable data "? Does that mean to throw doubts upon the data given by Mr. Kidd?

A.—I do not know.

Q.—It may have been his own data. Do you know how long a Government would have given a contractor to make up an estimate for work of that kind? Do you think they would have given them more than a month?

A.—I do not know really. I am afraid that is outside my experience.

Q.—Did you ever give a contractor a year to make up an estimate?

A.—I always made up estimates myself.

Q.—Supposing you were letting work by tender, how long would you give a contractor to make it up?

A.—It is usual for the engineer to prepare a schedule, is it not?

Q.—Never mind that. How long would you have given a contractor to have made up an estimate? The engineer gives him a schedule of quantities, and the contractor has to fill in the prices. How long do you think he would be given in ordinary circumstances? I suggest to you not more than a month, or at the outside six weeks. Is that about right, do you think?

A.—I should think so.

Q.—Therefore can you tell me why he should require a year?

A.—You must ask Sir George Buchanan that. It is not a statement of mine. I am not responsible for what Sir George put down there.

Q.—Do you think it is possible that this very low estimate of 367 lakhs was given for the purpose of getting administrative sanction?

A.—I do not know. That was months before I ever knew of the job.

Q.—You have seen this estimate which Sir George Buchanan calls his revised estimate, 1922?

A.—Yes.

Q.—That amounts to 668 lakhs or net 599 lakhs. We have been told that towards the end of making up this estimate Sir George Buchanan suddenly put on a crore of rupees, or £750,000, and they could not tell whether it had been put on the prices or put in in a lump sum. You notice even on this estimate of 1922 he is still 100 lakhs below your estimate?

A.—Yes. Sir George Buchanan made this estimate. I had not full data to give him; I had not them myself, and he might have left the matter to me. It was really my business. According to Indian ideas it was my business to have done the thing, and I had it in hand. I had promised the Government to have it ready by about the end of March. We may have been a little later than that, but I was working on it. I had not got the full data. I was not able to give all the data to Sir George at that time. Nevertheless, he made up this estimate knowing that mine was under way and that it was going to be handed in in a few months.

Q.—Is this Sir George Buchanan's estimate, or is it your estimate?

A.—I had nothing to do with this (Sir George Buchanan's estimate).

Q.—But I rather gathered from what you said a moment ago ——

A.—He asked me sometimes for information and things like that, but I had not got the data all collected together.

Q.—But you evidently gave him some prices?

A.—I gave him certain prices.

Q.—To make up this estimate?

A.—And he made it up on that, yes.

Q.—Then a few weeks afterwards you finished your estimate. I think it was finished in May, 1922?

A.—About then.

Q.—Which amounted to 770 lakhs?

A.—Yes.

Q.—As against his 669?

A.—I do not remember having seen *this* estimate at the time.

Q.—Had he sufficient information other than he had got from you to be able to say that the Kandivli quarry land acquisition was going to cost 20·13 lakhs? Just compare it with some of your figures.

A.—That is lumping the whole lot together.

Q.—It is obvious that you supplied these figures, because take the Gantry, for instance. You say it is 13·68 lakhs 481 rupees and he calls it 13·69 lakhs. Yours is in greater detail than his, and it is difficult to compare them?

A.—He has lumped up a lot of things.

Q.—Which you put in in detail?

A.—Yes.

Sir M. Visvesvaraya.—You seem to have supplied to him some material for his estimate?

A.—Yes. He asked me for certain information, and what I had I gave to him, as far as I remember.

Sir Frederick Hopkinson.—It is very difficult to compare these things. Your Establishment and Consultant Fees come to 66 lakhs. He has got 25. That is an enormous difference to be made out at the same time, is it not?

A.—What is the rate in my estimate for that? Is it 7½ per cent.?

Q.—It does not give it. Then " Unforeseen Charges " you put at 10 lakhs and he puts them at 25. Therefore, although it may be based on yours, he does not take your figures throughout—or probably you had not got to the stage in February of putting those things on?

A.—No, I had not. I had not got anywhere near complete.

Q.—Is it not possible that he has just lumped them together at the end?

A.—I do not know.

Q.—Did you give him a lot of information out there to enable him to find out these detailed prices?

A.—I gave him any information I had.

Sir Frederick Hopkinson.—Did you give him a large mass of detailed information to enable him to arrive at these figures? When you finished your estimate in May, 1922, did you communicate the total to Sir Lawless Hepper?

A.—I handed the estimate to him—or sent it down.

Q.—Was anything said about the difference between the two estimates?

A.—I think Sir Lawless Hepper was prepared for it.

Q.—Then he did not stagger under the blow?

A.—No.

Chairman.—He says that he knew at the time when Sir George Buchanan was handing in the estimate of February, 1922, that Mr. Lewis's estimate was going to be in the neighbourhood of seven crores of rupees. That is on Page 44 of the evidence.

Sir Frederick Hopkinson.—So that in February, 1922, you must have practically completed your estimates. You knew what the total was going to be and you could not know that unless it had been practically completed.

Chairman.—At that time, says Sir Lawless Hepper (that is February), " The sanction project estimate of 702 lakhs was approaching completion, and of course I discussed it on numerous occasions with the chief engineer, and I knew it was going to be in the neighbourhood of seven crores." That is right. Let us get along.

Sir Frederick Hopkinson.—Did you have anything to do with inviting tenders for the wall at the East Colaba end—the first 8,000 feet?

A.—Not beyond getting the specifications printed.

Q.—Then you had something to do with it?

A.—That was all.

Q.—That specification called for a wall built of concrete blocks, nine or ten tons, were they not?

A.—Yes.

Q.—Faced with coursed masonry?

A.—I think that was it.

Q.—In order to do that would it not have been necessary for the contractor to have first of all opened up a quarry?

A.—Yes.

Q.—To have laid roads into the quarry?

A.—Yes.

Q.—To have got plant for taking his stone down to the site?
A.—Yes.

Q.—To have laid a railway line from Marine Lines to Colaba—four miles?
A.—He would have to get it down there; he would have to transport his stuff.

Q.—To have made a concrete block yard for building his blocks?
A.—Yes.

Q.—To have provided a 10-ton crane for handling them; to have provided roads from the block yard to the wall for setting them. You agree with all this—please say so?
A.—Yes.

Q.—To have provided a 10-ton crane for the purpose of setting them?
A.—Yes.

Q.—To have made special arrangements for stone crushers for crushing his stone?
A.—Yes.

Q.—To have made special arrangements for the supply of sand. All of these things were ultimately required for the extension of that wall beyond 8,000 feet, were they not?
A.—The work would have been carried on from the northern end down to 8,000 feet.

Q.—And beyond 8,000 feet. I think this wall was carried on to 11,800 feet?
A.—No, 8,000 feet was then contemplated.

Q.—This opening of the quarry and the laying of the railway to Colaba were all required for the general construction of the work, were they not—the provision of plant, locomotives and trucks, and therefore the whole cost of this would have had to have been spread over 8,000 feet of wall only; whereas if it had been done in the bulk, that is to say, if it had been done as part of the general scheme, a large proportion of that cost would have been spread over the general scheme?
A.—Yes.

Q.—Consequently it was hopeless to expect to get a reasonably low price for the carrying out of that work. It could have been done very much cheaper as a part of the general scheme?
A.—Yes.

Q.—Consequently it was not a proper attempt to get tenders. They could not possibly be acceptable because of their high cost. You must see that?
A.—Yes.

Chairman.—You see what Sir Frederick means—that there was no reasonable likelihood, having regard to the immense amount of plant which the contractor had to get round him to do this work, that the estimate would be a reasonably moderate one. It follows, does it not?
A.—Yes.

Sir Frederick Hopkinson.—Now I should like to come to the dredging. Did you ever go into the question of the sufficiency of the pipe line sent out originally to complete the works?
A.—Yes.

Q.—What did you find?
A.—I found there was not sufficient.

Q.—To what extent?
A.—That is in the correspondence.

Q.—Approximately I put it to you that the original supply of piping was just about half what was ultimately required?
A.—There is a long letter on the subject.

Q.—I will give you the exact figures directly, but that is approximately the position, is it not?
A.—Well, I cannot remember these things. Anyway, it was perfectly clear when we went into it that there was not enough.

Q.—Before the dredger came out, how was it understood that the " Sir George Lloyd " and the " Colaba " were to work? Were they worked together as one unit?
A.—They were to work in series, yes.

Q.—In one unit; that is the " Sir George Lloyd " would do the dredging and pump to the " Colaba," and the " Colaba " would pump to the reclamation?
A.—Yes, where the length of pipe line exceeded the power of the " Sir George Lloyd."

Q.—That was generally the case, was it not?
A.—In most cases.

Q.—Had you anything to do with the purchase of the " Kalu "?
A.—No.

Q.—Do you know what it was bought for?
A.—No, I do not know.

Q.—It was bought in 1919?
A.—It was bought before I came on the job.

Q.—Where was the " Kalu " when you first went out?
A.—She was lying up the harbour.

Q.—Did you take charge of her as part of your plant?
A.—The Port Trust were looking after her at first, and Mr. McMurray, the mechanical engineer of the Port Trust, was looking after her. That arrangement had been made before.

Q.—She was lying up, in other words, under the care of the Port Trust?
A.—Yes.

Q.—When did you actively take her over to your charge?
A.—I really cannot remember.

Q.—Did you ever take her over?
A.—Oh yes.

Q.—When did she first work for you?
A.—She never worked for me at all.

Q.—Then what did you do in the way of taking her over? Did you assume responsibility and put a watchman on board, or something?
A.—I forget now when that was done, but she had to be overhauled. That was done in my time.

Q.—As a matter of fact she did not work until about——
A.—I do not know when she worked.

Q.—After you left?
A.—After I left.

Q.—You left in July, 1924?
A.—Yes.

Q.—She had been bought in November, 1919. Therefore she had been lying idle for nearly five years?
A.—Yes.

Q.—Let us follow the " Kalu " up a little bit. She was bought for £75,000 in in November, 1919. She did nothing for five years. Five years at 6¼ per cent. per annum is nearly a third, so that brings her up to £100,000, or nearly £25,000 loss of interest. That is right, is it not?
A.—Yes.

Q.—Then she was overhauled, and that cost about £25,000?
A.—Yes.

Q.—So that the cost of the dredger by the time she did any work at all was roughly £125,000, and you do not know what she was bought to do. We know that the " Sir George Lloyd " and the " Colaba " were bought to do the total work, which was 25 million yards at five millions a year?
A.—Yes.

Q.—So there was no room for the " Kalu " had the " Sir George Lloyd " and the " Colaba " carried out their programme. Therefore, so far we do not know why the " Kalu " was ever bought. You do not know?
A.—No. That occurred before my time.

Q.—But she was under your care for nearly five years?
A.—Yes.

Q.—You would, of course, take a certain amount of interest in it as you were responsible for it. There was no area ready for the " Sir George Lloyd " to pump into until December, 1923?
A.—That was about it.

Q.—Although the dredger had been delivered in March, 1922. Therefore the loss of interest at that time was pretty considerable. If you take the cost of that, and the pipe line as something like £700,000, it is about £44,000 a year interest. Now, you can tell me something about this. The original intention, was it not, was to do the whole of the dredging from the harbour?
A.—Yes.

Q.—Why was that ever changed?
A.—You mean——

Q.—Why did you ever think of Back Bay as a dredging ground?
A.—As a possible dredging ground? I thought of that because it appeared to me possible that we should get better material from the one place than the other.

Q.—But you did not know what the material was like in the harbour?

A.—I had had a good many conversations with Mr. Mitchell, who was in Bombay and had investigated material obtained from the bed of the harbour.

Q.—I thought he was a chemist, was he not?

A.—Yes, but he had been examining the material in the harbour, I think for the Port Trust, as far as I remember, and I recollect he talked to me about it and expressed the opinion that it would not be good material for filling.

Q.—In what sense not good—too hard, or too soft?

A.—He said he thought it would take a very long time to dry out.

Q.—Therefore he thought it was too soft?

A.—Well, he said there were salts in it which would always attract water.

Q.—Always what?

A.—Always take up water, and he thought it would take a very long time to dry out. Then I knew that there was a great deal of mud, from the sections.

Q.—You would know that from the borings?

A.—Yes.

Q.—By the by, did you ever plot those borings?

A.—Yes.

Q.—Where are they?

A.—I do not know. I left them in Bombay.

Q.—We were told in Bombay that there were no sections of the borings.

A.—Of Mr. Kidd's borings? Yes, they were all plotted on sheets.

Q.—I asked for them, and I could not find them and I had some plotted specially for my own information.

A.—I had them plotted right the way up.

Q.—The whole lot?

A.—The whole lot—anyway, all that could possibly be of any use to us.

Q.—We have not got it very clearly yet as to why you ever thought of leaving the harbour for Back Bay as a site for dredging. In reading through Sir George Buchanan's report you will notice that he agreed with Mr. Kidd that it was not worth while going to Back Bay. There were too many rocks, and it was too dangerous, and there was no supply of material. That is one thing upon which Mr. Kidd and Sir George Buchanan evidently thoroughly agreed?

A.—I did not see that that had been proved, and I wanted to have it proved.

Q.—But why were you dissatisfied with the source of supply?

A.—Of course, these sort of things come on one gradually, it is not at a stroke; the thing grows, and I think it was mainly on account of the disproportionate amount of mud as compared with clay in the section.

Q.—That was all known before Sir George Buchanan wrote his report. You had no additional information of any kind. It was all based on Mr. Kidd's borings and soundings?

A.—Well, that, I think, was what brought me to wonder whether we could not get the material elsewhere.

Q.—Here was a scheme whose heart was the dredging of 25 million cubic yards of material from one place and putting it in another. You suddenly throw this scheme absolutely overboard—a scheme for which expenditure had been incurred to the amount of very nearly £1,000,000. There must have been some very strong reason indeed to have induced you to do a thing of that kind?

A.—I did not throw it over entirely.

Q.—You did not?

A.—Oh, no. I wanted to find out whether there was any other source of supply.

Q.—Why should you want another source of supply?

A.—Because, from the sections, I had misgivings as to whether there would be the quantity of suitable stuff.

Q.—Of clay?

A.—Of clay.

Q.—But we know from the figures on that plan—which I believe came from Sir George Buchanan—that the material at the southern end was almost entirely mud; and that is where the dredger started work. It was mud so thin that it poured away from the reclamation wall.

A.—What we got at first was very good.

Q.—That is one of the puzzles I cannot understand?

A.—It was a puzzle to me. When the dredger was started and we went to see what had come out (and the pumping was stopped to enable us to look at it) I was very agreeably surprised indeed.

Q.—You would be astonished because, according to the borings, there was no clay there for the dredger to work in?

A.—I was very much astonished and very agreeably surprised. I thought that had carried us over a difficulty which I had feared.

Q.—On 21st February, 1923, is it a fact that you had not got the necessary spares for working the dredger? Were you not at that time sending home a long list of necessary spares to enable the dredgers to work?

A.—They were spares we wanted to have. When the order was given the question of spares came up and, as far as I remember (it is in the correspondence), the question of spares was deferred because prices were extremely high then.

Q.—You mean in 1922?

A.—No, in 1920. The question of the spares was deferred. Then when Mr. Spiers came out I went into the question with him, and I think I went into it with Mr. McMurray also.

Q.—Prices all fell in 1922, did they not? They fell to lower than the 1919 level?

A.—Yes.

Q.—Then why did you wait until February, 1923, because, as I read this, your dredgers could not have worked without these spares?

A.—Yes, they could have worked. They were extra spares.

Q.—There is a spare pump shaft. Had not you got one?

A.—I really cannot remember.

Q.—It would not be safe to work a dredger like that without a spare pump shaft, would it?

A.—No, it was a thing which was required.

Q.—You might break down the next day and be stopped for three or four or six months possibly. Therefore, I say they were essential spares?

A.—Yes.

Q.—And you were writing for them in February, 1923?

A.—Yes.

Q.—Whereas the dredger was to have started in December, 1922?

A.—Well, there is a difference about that.

Q.—You were also at the same time writing for 1,000 feet of 42-inch floating pipe line and 1,000 feet of pipe line in 50-feet lengths—that is, 2,000 feet. This, mind you, was nearly a year before you started dredging?

A.—Yes.

Q.—I suggest to you that at that time, February, 1923, you had no programme of any kind whatever for working the dredgers. The Chairman calls my attention to a memorandum of a meeting in your office of the 14th December, between you, Sir George Buchanan and Mr. Halcrow, and it says here: "The general question of dredging was discussed. It was agreed that if sufficient first-class material could be obtained from Back Bay without undue risk to pipe lines and dredgers it would be better to use it rather than the mud and clay from the harbour. There was, however, no indication at present that large quantities could be obtained from Back Bay, and therefore plans must be proceeded with to use harbour material."

A.—What date was that?

Q.—That was the 14th December, 1922. Right up to the middle of 1924 you had no dredging programme whatever. I will give you details of it directly. I find you were making borings in April, 1923?

A.—Those were completed in the spring of 1923—the borings.

Q.—On the 22nd May, 1921, page 9, you will see that in a letter from you to Meik & Buchanan you said: "I do not think that the dredger will pump an ounce of material into the reclamation before the cold weather of 1923/24." Then on page 12 you will notice that in the second paragraph Sir George Buchanan was not prepared to accept Mr. Mitchell's chemical information about the material, "as we hope there will be a great deal of hard clay that will require very little moorum topping." Then in paragraph headed "(d) Reclamation at Colaba end" he says, "We do very strongly feel that on every ground an attempt should be made to use the new dredger for reclamation purposes"—(the new dredger presumably means the "Sir George Lloyd")—"even for a month in 1922/23. Sir Lawless Hepper was appalled when I suggested before I left Bombay that we might not require a dredger until 1923/24. However, that, again, is a matter which you and I can thrash out on the spot." What do you think he meant by "even for a month"? You said just now that you thought it would be a very unwise thing to do because of the expense incident to getting the dredger there, and getting her moorings out, and getting the crew and working for a month. Why should he wish to work it for a month?

A.—I do not know.

Q.—Was it for the purpose of a display, do you think?
A.—I do not know.

Q.—At any rate, you agree it was not practicable business?
A.—Yes. You see that in what I wrote.

Q.—It has always been understood that the "Sir George Lloyd" and the "Colaba" were designed to work together as one unit. Suddenly, on page 13, we get a letter from Meik & Buchanan dated 14th June, 1921. There is a sudden interposition of the "Kalu."

A.—I never understood that.

Q.—He says, "We wish the actual dredging to be done, if possible, by the 'Sir George Lloyd.'" Why should he say "if possible"? Was not the dredger designed to do that work and nothing else?

A.—I do not know what he meant there.

Q.—Had it ever been mentioned to you before that he was going to have a third dredger working to make up the one unit?

A.—No. That was a complete surprise to me, and I never really understood how it was going to work.

Q.—Did that originate with Sir George Buchanan?
A.—Yes. That originated at the London end.

Q.—He says at the very top of the page, "We have discussed—— "
A.—That is Messrs. Simons.

Q.—I know. We have had the pleasure of meeting the gentleman—"the question of utilising the dredger 'Kalu' to obtain additional pumping power, and he and we are of the opinion that the best method of carrying out the work will be to employ the 'Sir George Lloyd' to do the actual dredging work and use the dredger 'Kalu' in the pipe line between the 'Sir George Lloyd' and the auxiliary pumping plant 'Colaba.'" Why should that be necessary.

A.—I suppose that was to get the necessary power in cases where long lengths of pipe were required——

Q.—But there was no alteration from the conditions existing in 1919? The material was in the same place, and it had to be pumped to the same place?

A.—Yes. There was a proposal to go out further.

Q.—But not until after you had exhausted the material within the limits?
A.—Yes. I never understood how it was going to work.

Q.—I want to justify my statement just now that there was no real dredging programme. At this date it was proposed to use the "Sir George Lloyd," the "Colaba" and the "Kalu" as one series. At this time you had no anchor boats capable of lifting anchors, had you?

A.—Not in 1921, no.

Q.—I am speaking of 1922. This is a letter from Mr. O'Rorke dated 28th July, 1922: "We have not got any anchor boat to work with the dredgers capable of lifting her anchors." Therefore, if you had desired to work the dredger you could not have handled the anchors?

A.—No.

Q.—If you look at page 65 you will find there is a letter from Sir George Buchanan saying, "Assuming that the dredger 'Sir George Lloyd' commences to pump from the harbour to Colaba next November, Sir George wished, if possible, that the dredger 'Kalu' should commence about the same time to pump from Back Bay to Marine Lines." This is something quite new, is it not? Was not the whole of the reclamation to be done by the "Sir George Lloyd" and the "Colaba"?

A.—Originally, yes.

Q.—This is something quite new before either dredger had commenced. Do you think it was because they had become tired of seeing the "Kalu" lying idle and that they thought they would like to find her a job? Apparently there was no reason for buying the "Kalu," because she did not enter into the scheme of things at all?

A.—She was there before.

Q.—Before any of the other dredgers were there?
A.—Yes.

Sir M. Visvesvaraya.—The "Kalu" was purchased for the East Colaba reclamation.

Sir Frederick Hopkinson.—But never required there.

Sir M. Visvesvaraya.—They wanted it for East Colaba reclamation first.

Sir Frederick Hopkinson.—She was bought before they got out the plans or anything about East Colaba.

Sir M. Visvesvaraya.—They seem to have transferred her to this work.

Sir Frederick Hopkinson.—What I am suggesting is that she was designed apparently to go on to this work in order to increase the expense only, because the other two dredgers were sufficient to do the work. The " Kalu " was to add another 50 per cent. to the cost.

Sir M. Visvesvaraya.—They did not know where to debit the cost of the " Kalu " probably.

Sir Frederick Hopkinson.—Sir George Buchanan says, " This was admitted, but Sir George said that Sir Lawless Hepper agreed with him."

Chairman.—You had better start earlier on. " Mr. Lewis said he thought it would be better to use both dredgers at Colaba as the land there was of more value to the Development Directorate."

Sir Frederick Hopkinson.—Whilst you are on that, I might say that, obviously, the proper place to begin the formation of the reclamation was at Colaba, for one reason if for no other that directly you got the Colaba end blockade finished, you would receive payment of 240 lakhs, which would cover your capital cost to a large extent?

A.—Yes.

Q.—And save interest. This was admitted, but Sir George said, " that Sir Lawless Hepper agreed with him that it would have considerable moral effect on the whole scheme to complete a section at Marine Lines as soon as possible." You know the circumstances well. You know Bombay. What is that going to have a moral effect on—who, or what? Is it going to have a moral effect on the dredger?

A.—I did not pay much attention to that.

Q.—It is quite clear from this meeting of the 14th December, 1922, that there was no programme at all. You will see that lower down. You agree with that, I presume?

A.—I think there was.

Q.—" Discussion then went on to working of dredgers in series, and it was agreed, if at all possible, this uneconomical method of working should be avoided." Does not that show you that there was no programme?

A.—That was the question of the " Kalu."

Q.—It shows there was no real programme. They did not know what they were going to do, or what it was proposed to do?

A.—Yes, I think we knew that.

Q.—But you did not know if the "Kalu " was going to work there. " The position and lengths of pipe line were gone into "—gone into, in December, 1922. Surely it was gone into in 1919 and settled? If you make up an estimate of that kind you know what you are going to do, broadly. " The position and lengths of pipe line were gone into, and Sir George suggested that some saving might be effected, and it would be more advantageous to put one pipe line across Colaba instead of two, in a position about midway between the present proposed position. These matters were to be further looked into." So really, at that time, you did not know where the pipe line was going to be, or which you were going to use. At this particular time we are speaking of, when the " Kalu " was going to produce a moral effect somewhere, her repairs had not been finished. Sir George Buchanan writes to you, the chief engineer, on page 66, and he reiterates what has been reiterated so many times—that the successful reclamation of the enclosed area by pumping material dredged from the sea bed is the crux of the whole scheme. He further says, " We were aware that you had been investigating the prospects of obtaining material from Back Bay itself, and we agreed that a portion of the area near Marine Lines might most usefully be so reclaimed but that your idea of reclaiming the whole area by dredging from Back Bay was a deviation from the original and sanctioned project which required very grave consideration, the responsibility resting with my firm." That is a suggestion of entirely abandoning the crux of the whole scheme, which was to remove material from the harbour to the reclamation; and that, mind you, is in December, 1922, the month in which Sir George Buchanan said the dredgers ought to start work. Is not that so?

A.—Yes. They could not possibly have started work in 1922.

Sir Frederick Hopkinson.—In paragraph 2 he says: " I remarked that, in my judgment, the first thing to do was to ascertain the precise nature of the material in the harbour by a practical test." This, again, was in December, 1922. He is thinking then that it is essential that the precise nature of the material should be discovered. After he had built a dredger to do the work—namely, by a grab dredger, the " Kalu," or by a bucket dredger borrowed from the Port Trust, and finally Mr. McMurray suggested that the new grab dredger being built for the Port Trust and expected out in a few months and which had to be tested somewhere, might be requisitioned for the work. So that apparently he was prepared to put off an opportunity of discovering the nature of the material until this unbuilt vessel arrived on the scene.

Chairman.—It says so in the next line, " It was then agreed to negotiate with the Port Trust for her use."

Mr. Billimoria.—That was based on the fears expressed by Mr. Lewis, if you read the first sentence of paragraph 2.

Sir Frederick Hopkinson.—Mr. Lewis and the chemist.

Mr. Billimoria.—Because there he says, "Your fears as to the suitability of the material in the harbour."

Chairman.—Then it is backed up, and Mr. McMurray observes that too much credence should not be given to borings, as from his experience at Sewri the borings were found to be unreliable.

Sir Frederick Hopkinson.—He says, "Your programme of work contemplates beginning dredging operations in the season 1924-25, and I emphasise the tremendous importance of starting before that date." Mind you, the scheme was to be completed in 1926, and he is saying here that it is tremendously important that you should begin in 1924-25. "It has certainly been our intention to lay the first pipe line across the peninsula at the earliest possible date and get the dredger to work. It was then agreed that the dredger must begin work not later than the end of the 1923 monsoon."

A.—That was when she did work.

Q.—That was when she did work. You turn out to be an accurate prophet. Originally the dredger was to have started in September, 1922. Then it was to begin in 1924-25. Then it was altered to begin in 1923-24. I want you now to turn to page 100. In a letter to the Director of Development from Messrs. Meik & Buchanan, dated the 3rd November, 1923, they say: "We have the honour to address you on the subject of the completion programme for the Back Bay scheme, as although it may not be possible at this stage rigidly to adhere to the programme, it appears to us that it will assist the administration to have before them even a tentative programme of operations." This is the 3rd November, 1923. So that apparently there was no tentative programme of operations at that time?

A.—Yes.

Q.—Why does Sir George Buchanan say: "It will assist the administration" if they had one?

A.—Well, I do not know. Really, you see——

Chairman.—Really what?

A.—I did not write this.

Sir Frederick Hopkinson.—But you received it?

A.—No; it was to the Director of Development.

Q.—It would be passed on to you?

A.—Well, we had so many programmes.

Q.—I want to refer to page 131, also. If you look at the bottom of that page you will see we have a new development, because in the last paragraph but one he says: "Regarding the booster sets, these have formed the subject of a telegram to you, the confirmation of which is sent herewith."

A.—That was after I left.

Q.—Then you cannot deal with that; but I would like to call your attention to the fact that a new element has come into the state of affairs here. There are two booster pumps spoken of here—not one, but two?

A.—Yes.

Q.—I would just like to run through the various programmes with you. The first is that the "Idloyd" and "Colaba" are to do the work alone from the harbour. Then the purchase of the "Kalu" was made. I have not the quantities, but do you happen to have them so as to know how long you took? Do you remember the quantities of the "Colaba" reclamation? However, that was never seriously undertaken, was it?

A.—No.

Q.—Mr. Elgee says, that it was not possible to fill blocks 1 and 2 from the area in the harbour.

A.—That is the northern end?

Q.—Yes.

A.—No; there would be very great difficulty.

Q.—He says it was impossible. Do you agree with that?

A.—Yes.

Q.—Is not that really what induced you to go to Back Bay?

A.—It may have had some influence.

Q.—Was not it the real reason why you went to Back Bay?

A.—It may have been one of the reasons.

Sir Frederick Hopkinson.—The scheme as designed in 1919: "had entirely broken down." This is the evidence which is given. Mr. Elgee says: "I think it would have been impossible to fill the northern end from anywhere else." That is, from the strips

at the southern end of the harbour. Then the evidence continues: " (Q.) Impossible with the dredgers at your command?—(A.) Yes; because it is very expensive to put pipe lines across the city. (Q.) Of course, it would be a harebrained scheme to run a pipe line across the centre of Bombay.—(A.) I think that was the reason. They wanted to obtain material for blocks 1 and 2 from the nearest end. (Q.) It was not possible to fill blocks 1 and 2 from the dredging area in the harbour?—(A.) That is so. (Q.) Therefore, the scheme as a scheme had absolutely broken down?—(A.) Yes. (Q.) This dredging in Back Bay is the only possible way of getting over something which they had not seen in 1919—(A.) That is so."

Chairman.—That is the point. The point is whether you can show us how it was possible with the dredger " Lloyd " and the booster " Colaba " to fill blocks 1 and 2. It is all a matter of measurement. The suggestion is that you at some time realised that, and that was one of the things which induced you to go into Back Bay if you could.

A.—It may have been one of the things.

Sir Frederick Hopkinson.—You said just now it was—not it may have been.

A.—It may have been.

Q.—You said it was one.

A.—Well?

Q.—I put it to you that it was the real reason?

A.—Well, I think it may have been one of them.

Mr. Billimoria.—What were the other reasons, if this was one reason?

Chairman.—The other, you told us, was the fear that you had that filling in from the harbour would not make a good reclamation?

A.—Yes.

Q.—May I suggest a third reason. The third reason, I suggest to you, was the fact that the Royal Indian Marine and the Port Trust had taken away 15,000,000 cubic yards of material that you regarded as suitable for dredging. That is another of the reasons, is it not?

A.—Yes, that is one of them.

Q.—Anyhow, those are three reasons, at all events, which led you to wish to find out what was in Back Bay?

A.—Yes.

Sir Frederick Hopkinson.—So that we come to this. The original programme was two dredgers working from the harbour That was supplemented by having the " Kalu " working with them, which was on the 25th April, 1921. The next step was to take the " Colaba " into Back Bay. Do you remember that?

A.—The " Colaba "?

Q.—Yes, the " Colaba " was to go into Back Bay?

A.—I think that was after my time. I do not remember it.

Q.—It is page 84. This is a letter from Meik and Buchanan. " A large quantity of suitable material in Back Bay appears to be more than 4,500 feet from the sea-wall, and we, therefore, suggest that the " Kalu " should pump through a shore-pipe line, varying in length as required, to the " Colaba," which, in its turn, would pump the material through 4,000 to 4,500 feet of floating-pipe line to the reclamation." That is dated the 23rd May, 1923, when you were in charge?

A.—Yes.

Q.—I think the " Lloyd " was going to work alone, was she not?

A.—She must have done. She could not have worked with the others.

Q.—What do you think of the idea of taking the " Colaba," a new ship costing nearly a quarter of a million, into Back Bay, where she could not float at low water?

A.—Well, the " Kalu " would have had to dredge a place for her.

Chairman.—The next line says that: " In order to give flotation to the " Colaba " at all states of the tide the " Kalu " will have to cut her way in depositing the dredgings in a position to be selected."

Sir Frederick Hopkinson.—Even supposing that the " Kalu " had dredged this berth, would you think it a wise thing to take a new pumping dredger costing nearly a quarter of a million into an exposed place like Back Bay—shallow and rocky as we know it has been described over and over again. In fact, as you know, the whole place was condemned by Sir George Buchanan in 1919 as a possible place for dredging material. Would you think it a wise thing to take this new ship, the " Colaba," there, because, if anything happened to the " Colaba " the whole scheme is stopped?

A.—Yes, but that was never done.

Q.—I agree, but it was proposed to be done?

A.—Well, that was a proposal of Messrs. Meik and Buchanan.

Q.—I am asking you if you think it a wise and prudent thing to dream of doing? If anything happened to the " Colaba " I would like to remind you that you are risking the crux of the whole scheme?

A.—It was not my proposal.

Q.—I know that, but I am asking you if you think it a wise and prudent thing to do?

A.—I do not think it is a thing I should have done myself.

Q.—If you will turn to page 114 I want to call your attention to the requisition for more pipes. This is from the Development Directorate to Messrs. Meik and Buchanan, dated 2nd May, 1924. This is after the " Lloyd " had been working six months practically. You are asking there for an enormous length of pipe in order to carry out one of these various programmes. At this time you had got 18,422 feet of pipe and were asking for another 1,000 feet floating pipe line for next season. The original programme would be roughly 10,000 feet, but actually by this time you had got 18,000 feet. Is not that so?

A.—I do not follow that last part.

Q.—The original programme called for pumping through 10,000 feet of pipe line?
A.—Yes.

Chairman.—Will you look at the top of page 114.

Sir Frederick Hopkinson.—On the 2nd May, 1924, you had 9,630 feet in stock, but you wanted 15,000 feet. Therefore, you wanted 5,370 feet extra. That is floating pipe line alone.

Mr. Billimoria.—The shore pipe line is 20,400 feet total requirements, and they have in hand 5,820.

Sir Frederick Hopkinson.—So that you are asking for 19,950 feet extra. That makes a total of 35,000 feet roughly. That is partly due to your starting dredging in another place?

A.—Yes.

Q.—But 35,000 as against 10,000 is 3½ times as much?
A.—Yes.

Q.—It cannot be consequent upon that because these boats can only pump 5,000 feet?

A.—The amount of pipe originally allowed for was insufficient to cover the area that was laid down.

Sir Frederick Hopkinson.—It was very largely deficient.

Chairman.—But it was up to the limit of the pumping capacity of the two vessels?
A.—Yes, it was.

Sir Frederick Hopkinson.—Yet they wanted 3½ times the original pipe supplied and this pipe is not little stuff that can be bought for a few pence per foot?

A.—Quite so.

Q.—It is no wonder that the estimate has gone up.
A.—No.

Q.—On this very date, the 2nd May, 1924, they began to talk about another independent pumping station, which was to be done by buying the " Jinga " and making a barge with square ends large enough to take machinery, bunkers and accommodation for staff and crew. " It is considered by this means an independent pumping station could be most cheaply obtained." That is another alteration?

A.—Yes.

Q.—The purchase of the " Jinga " was suggested on the 2nd May, 1924?
A.—Yes.

Q.—What was the " Jinga " to do?
A.—She was to be a second booster.

Q.—Working on which line?
A.—I have forgotten now the exact line; but it was all worked out on the plans.

Q.—It was?
A.—Yes.

Q.—I used to think in Bombay that the " Jinga " was an imaginary ship, because I could never find out what she had done, or where she was, or what she was going to do; and she has done nothing yet?

A.—I do not know.

Q.—We saw her having a new pump put in her.

A.—I do not know anything about it.

Chairman.—In August, 1926, she was still in dry dock in a state of dishevelment.

Sir Frederick Hopkinson.—Unpreparedness, we will say.

Chairman—She was very dishevelled.

Sir Frederick Hopkinson.—Did the " Kalu " work in Back Bay in your time, or was it afterwards?

A.—No.

Sir Frederick Hopkinson.—Do you remember Sir George Buchanan writing and suggesting that she should do this, and saying that from the information he had obtained she had done the same sort of thing for the Sewri reclamation in two or three days?

Chairman.—She had dredged flotation for herself in two or three days?

A.—I think I remember that.

Sir Frederick Hopkinson.—Would you be surprised to learn that she took a whole season to do it in Back Bay?

A.—I heard that, too, I think I was told that yesterday.

Q.—She did 15,340 cubic yards in her whole season which, at her contract rate, is something less than eight hours' work?

A.—Yes.

Chairman.—We must now interpose another witness, Colonel Paddon.

Lieut.-Colonel S. S. W. Paddon was called and re-examined.

Sir Frederick Hopkinson.—Have you any figures we can ask you about?

A.—Yes, I had better give you a copy of these figures, and I will explain them. (*Document handed in.*)

Chairman.—I will ask Sir Frederick Hopkinson to take you over these figures.

A.—Yes.

Sir Frederick Hopkinson.—Do you produce some comparative prices of material for the years 1912 and 1919?

A.—Yes.

Q.—Are those prices that you are personally familiar with, and which have come under your cognisance?

A.—Yes, some; and I have put in the remarks column where I obtained them. About half of them are from my own contracts, and the others I got from various reliable sources.

Q.—Do you give pig-iron? I do not see that?

A.—No.

Q.—That is unfortunate, because pig-iron is the basis of all metal prices.

A.—I have a figure for pig-iron which would probably be considered reliable. It is in the chart prepared by Richards & Sons.

Q.—Can you give us the price of pig-iron in 1912?

A.—This only goes back to January, 1914.

Q.—What was it then?

A.—It was £2 10*s.* a ton.

Q.—That will not help me very much, because we want to compare 1912 to 1919?

A.—Well, most of the figures do not show a great variation between 1912 and 1914.

Q.—I am afraid mine do, because I have got a price of 49*s.* 6*d.* for 1912 for pig-iron.

A.—I am afraid I cannot help you, then.

Q.—Can you give me the prices for 1919?

A.—January, March, June and August it is a flat rate right through of £6, or just over £6. No, I beg your pardon, I am wrong. Pig-iron No. 3 G.M.B. In the beginning of 1919 it was under £5 and remains constant until the end of March, 1919; and then there is a sharp rise.

Q.—What does it go to in September?

A.—This graph only goes to August; but at the end of August it was £8 a ton.

Q.—That agrees with my figures.

A.—Yes.

Q.—So that is, roughly speaking, three times the 1912 prices; but you have only got 1914?

A.—Yes. At the beginning of 1914 it is about £2 9*s.* or £2 10*s.*

Q.—That is all right. That gives us a price of about three times the 1912 prices as the 1919 price.

A.—Over three times.

Q.—Let us call it three times?

A.—Yes.

Q.—Pig-iron is the basis of all metal prices in the way of iron and steel?
A.—Yes.

Q.—Therefore that would govern pretty well all the other prices?
A.—Yes, that is all the curves follow the pig-iron curves fairly.

Q.—It is from 50*s.* a ton in 1914 to 160*s.* a ton in September, 1919?
A.—Yes.

Q.—The price of cement you give as £2 0*s.* 7*d.* a ton in 1912?
A.—Yes; that was a Departmental running contract.

Q.—And £6 3*s.* 2*d.* in 1919?
A.—Yes; that was the only contract we placed, and that was in August.

Q.—Therefore that is three times the 1912 price?
A.—200 per cent. increase—three times the price.

Q.—Steam coal, 15*s.* 8*d.* per ton in 1912 to a maximum of 95*s.* a ton in 1919?
A.—Yes, at the end of 1919.

Q.—That would be six times?
A.—Six times in December.

Q.—Rails, £5 17*s.* 6*d.*?
A.—May I interrupt, because those particular figures for rails, I am afraid, are valueless. I will tell you why. They are actual contracts; and they are actual figures; but in 1919 both contracts happened to be placed early in the year; and you know the other figures that in 1919 prices were rising very steeply.

Q.—You must know the exact date when they are rising so rapidly?
A.—Yes; there was a big rise in January of over £2 10*s.* a ton.

Sir Frederick Hopkinson.—I personally remember buying rails in 1919 at £17 10*s.* a ton.

Chairman.—That is exactly the price as it would be with the increase of £2 10*s.*

Sir Frederick Hopkinson.—Yes.
A.—According to my curves here, they never quite rose to that; but it depends on the section and the weight. The heavier rails are cheaper per ton than the light rails.

Q.—Does not your curve show in 1920 it went up much higher still?
A.—Yes, they were climbing all through, to May, 1920.

Q.—Then steel plates?
A.—I could give you more accurate figures for rails if I might take them from Richards' table.

Q.—They are sure to be reliable?
A.—I think they are quite reliable.

Q.—Then they would be £5 10*s.* for August, 1914, against £14 2*s.* 6*d.* average throughout the four quarters of 1919.

Q.—That is nearly three times?
A.—Yes. Actually it is an increase of 157 per cent. It is just over two-and-a-half times.

Q.—Just mention the figures again?
A.—£14 2*s.* 6*d.* is the average over 1919 as against £5 10*s.*

Q.—It would be a little more than 157 per cent. Three times would be £16 10*s.*, would it not?
A.—Yes; but I think my mathematics are probably quite correct.

Q.—Then steel plates?
A.—For steel plates I know the contract prices are not a very reliable guide, because steel plates vary in price according to the gauge of the plate.

Q.—I am speaking of plates ½-inch thick and upwards, not thin plates.
A.—Nearly all my contracts were for panel plates for railways, and they are very highly finished.

Q.—I do not think that would be much good. What I want is ship plates?
A.—For ship plates I think we get the best possible information out of the "Iron and Coal Trades Review." There is a very good table there showing all the prices from 1896 to 1926.

Q.—Just give us them from 1912 to 1919?
A.—In 1912, beginning in January, £7 3*s.* 9*d.*; February, £7 5*s.*

Q.—We do not want all the details.
A.—The average for the year is £7 14*s.* 10*d.*

Q.—What is it in 1919?
A.—£16 15*s.* 5*d.*

Sir Frederick Hopkinson.—That is about twice.

Chairman.—It is about 2¼ times.

Sir Frederick Hopkinson.—Will you tell me what it was in 1920?

A.—In 1920 the average was £23 13*s.* 4*d.*, an increase of nearly £7 a ton.

Q.—That is when the order for the dredger was placed—May, 1920. Can you tell me what it fell to in the following year?

A.—In the following year it fell to an average of £16 9*s.* 2*d.*

Sir Frederick Hopkinson.—That is a tremendous drop.

Chairman.—What was it in 1922?

A.—In 1922 the average price was £9 18*s.* 4½*d.*

Q.—Call it £10 as against the highest price in 1919 of what?

A.—The highest price in any one month in 1919 was £21 5*s.*

Sir Frederick Hopkinson.—It fell in 1922 to something between £9 and £10?

A.—Just under £10.

Q.—Then traders' waggons; do you say the prices there were 200 per cent. above 1912 prices. That would again be three times?

A.—Yes, three times. Those are from my Consulting Engineers, as I said, Messrs. Rendel, Palmer and Tritton.

Q.—Contractor's locomotives, the prices in 1919 were from three to three and a-half times the 1912 prices?

A.—Yes.

Q.—Five-ton steam cranes were two and three-quarter times 1912 prices?

A.—Yes, two and three-quarter times 1912 prices.

Q.—The dredgers "Oswald" and "Campbell" in 1912 were £57·3 per ton. The "Sir George Lloyd" was £161·58 per ton. That is very nearly three times—an increase of 182 per cent.?

A.—About two and three-quarter times.

Q.—Stone-breakers £67 10*s.* each in 1912 to £163 to £172 in 1919?

A.—Yes. That is two and a-half times.

Q.—Bridge work does not come into it. So that it would appear from those figures that we should not be far out if we took the multiple as being three times in 1919 of what the prices were in 1912?

A.—I should think it is slightly below three times.

Q.—Some of them go above and some of them go below. I think it would work out to pretty nearly, if not quite, three times. For instance, coal, a very important factor, was six times. If you are to take the average, you would probably get a little more than three times. Would you agree with me that three times is about a fair multiple?

A.—I am afraid I do not. I think two and three-quarter times would be the fair one.

Q.—I said about three times; and I call two and three-quarters about three times.

A.—Very good, then, we agree.

Q.—That is near enough for my purpose.

A.—Yes.

Chairman.—We are very much obliged to you for these figures. They are a great help to us.

Mr. Llewellyn W. Lewis, recalled and further examined.

Sir Frederick Hopkinson.—Did you ever test the velocity of the effluent from the pipe from the pumping dredger?

A.—No.

Q.—Did you ever find out the percentage of material it was pumping?

A.—No.

Q.—Did you ever work out the percentage of solid matter pumped?

A.—No.

Q.—We were told by Sir Henry Lawrence when he was here that one of the reasons given to the Government for the poor output of the "Sir George Lloyd" in its first working season was that a machine of this complex character could not be expected to work well in the first season. Would you call a pumping dredger a machine of a complex character?

A.—That was not my statement.

Q.—I know it was not. I am asking you your opinion?

A.—But is my opinion required?

Chairman.—We want your opinion as chief engineer and as an expert. Was the "Sir George Lloyd" a machine of complex character in its pumping operations?

Sir Frederick Hopkinson.—I will put it in another way. Do you know a simpler machine than a pumping dredger for actual dredging?

A.—Than the pump?

Q.—Yes.

A.—It is quite simple.

Sir Frederick Hopkinson.—I will put it in another way. Do you know a simpler than a centrifugal pump?

A.—No.

Q.—Would you be surprised to learn that the cost of the "Kalu's" dredging for the first season she worked in Bombay was 15½ rupees a cubic yard?

A.—Yes; I should be surprised to hear that.

Q.—It would not very well agree with even the project estimate?

A.—It would not agree with any estimate, the project estimate for dredging or Sir George Buchanan's.

Q.—Nor yours?

A.—I did not alter Sir George Buchanan's figures.

Q.—You adopted his figure for dredging?

A.—I adopted his figure for dredging.

Q.—Including the supply of dredging plant?

A.—No; I had the figures for that, but for the general working costs I took Sir George Buchanan's figures.

Q.—You adopted his figures?

A.—Yes.

Q.—That is rather important. Did you know his original estimate for that was six annas a cubic yard, or do you know only what we have seen in his report?

A.—I only know what I have seen in his report.

Q.—Did Sir George Buchanan ever discuss with you the details of what the dredger ought to do in a year, because you know, in his report he says the dredger was going to work 15 hours a day 170 days of the year, and consequently would do 5,000,000 cubic yards a year. Did he ever tell you if he had made allowances for the ordinary daily loss of time on such a dredger?

A.—No; not that I remember.

Q.—The figures at the harbour dredging work out at a loss of time of about 36 per cent. You had had experience of dredging before, had you not?

A.—Yes.

Q.—At Rangoon?

A.—No; not at Rangoon.

Q.—I thought you had a dredger working at Rangoon?

A.—You mean the "Pelican"?

Sir M. Visvesvaraya.—The "Oswald."

A.—That was in Mesopotamia.

Sir Frederick Hopkinson.—Did not you have a pumping dredger working at Rangoon on the training wall?

A.—There was one, but I did not have anything to do with that. That was the "Pelican." When we worked the "Oswald" for two months at three shifts a day I think we got 20 pumping hours actual work out of the 24.

Q.—That is a loss of only 20 per cent.?

A.—Yes.

Q.—Was that in the seaway?

A.—Yes.

Q.—That would make a difference?

A.—Yes.

Q.—You had no moorings carried away by the tide? There was no trouble with tides?

A.—No.

Q.—That would make a considerable difference?

A.—Yes.

Q.—So that was 20 per cent. compared with the 36 per cent. you had there?

A.—I should say 36 per cent. would be quite reasonable.

Q.—Does not that mean in order to get 15 hours' pumping time you have to have the dredger working 22½ hours a day?

A.—I take it so.

Q.—That is a matter of arithmetic?

A.—Yes.

Q.—Did Sir George Buchanan ever tell you it was proposed to work the dredgers 22½ hours a day?

A.—No.

Q.—Who sent out the crew originally to begin the work in December, 1923. Who arranged what crew were to be sent?

A.—They would be sent out by Sir George Buchanan—at least by the High Commissioner or the India Office.

Q.—The High Commissioner would only act on instructions from Sir George Buchanan?

A.—Yes.

Q.—Do you know that he only sent out a single crew sufficient to work the dredger for 8 hours a day?

A.—No.

Q.—Did you never find out. Did he write to you and say that he was only going to work the dredger 8 or 9 hours a day?

A.—I do not remember.

Q.—So that you had no definite programme in December, 1923, of what the dredger was to do. You simply had a single crew and you started the dredger to work with that?

A.—I think that is so.

Chairman.—At all events you had no programme that provided for anything like 15 hours of pumping work per day?

A.—No. I think it was intended to get the crew together—to get the thing to work.

Sir Frederick Hopkinson.—We were told by somebody that they were having an experimental season's work?

A.—I never heard it was an experiment.

Q.—You would not experiment with an expensive plant of that kind?

A.—No.

Chairman.—Do you say you never heard that?

A.—Never heard what?

Q.—That the first season's work should be regarded as purely experimental?

A.—Was that something which was written after I left?

Q.—I want to know from you. Sir George Buchanan apparently stated when complaint was made about the 1923-1924 working that the first season's working in an undertaking of this kind must be regarded as purely experimental?

A.—Yes.

Q.—What do you say to that, as an explanation. What do you think of it. Does it satisfy you?

A.—I have not really considered it.

Q.—Consider it now. You told me yesterday that it would take about six weeks in your opinion for the crew to shake down?

A.—Yes, perhaps it would.

Q.—Knock off that six weeks.

A.—Perhaps it might take more.

Q.—Beyond that is there in your opinion any reason for saying that the working of the plant and the working of the undertaking should be experimental during the first season?

A.—Well, I really cannot justify all that was written by other people.

Q.—You are not asked to justify anything. You are asked to give us your opinion whether that would be an adequate explanation of the failure of the dredger's operation in 1923-1924, to say that the first season must be regarded as an experiment?

A.—I should not look for the best results in the first season.

Q.—Did you regard yourself as embarking on an experiment in 1923 when you began dredging operations?

A.—No, it was a serious undertaking.

Q.—In which you were going to endeavour to get 2,000 cubic yards per hour out of the machine?

A.—Yes

Sir Frederick Hopkinson.—There was nothing new about it?
A.—No.

Q.—With regard to sealing the sea wall, I understand that you saw the dredged material, the mud, going through and you were anxious to stop it. Did you actually see it go through the rubble mound?

A.—I saw the material on the rocks which had evidently come from the dredger.

Q.—That had gone through?
A.—That had gone through.

Q.—Did you look upon that as being at all serious?
A.—There was not very much.

Q.—Did you look upon it as at all serious?
A.—I looked upon it that it was a matter which would have to be dealt with.

Q.—Remedied?
A.—Yes.

Q.—With a view to remedying it, did you propose to put some softer material inside the rubble mound and so prevent the mud washing through?
A.—Yes.

Q.—Did Sir George Buchanan approve of that?
A.—No, he vetoed it.

Q.—On what ground?
A.—I think that is in the correspondence.

Q.—Do you remember?
A.—He said he did not want it done then.

Q.—Was that all?
A.—He said afterwards it might be done later up to high-water mark, neap tides.

Q.—Did he say the material was not worth saving?
A.—I do not remember that. Of course, it is a long time ago to remember.

Q.—At any rate, he was not at all anxious to save it. He vetoed the sealing of the mound?
A.—Yes.

Q.—That showed he did not care about saving it?
A.—I think it is an assumption you can make.

Q.—It did not matter. It was not worth saving money on. We have not said anything yet about the 20-ton blocks. It was originally proposed to face the river wall with 20-ton concrete blocks thrown in pell-mell?
A.—Yes.

Q.—Did you find from experience that was not necessary?
A.—I came to the conclusion it was not necessary.

Q.—And that blocks from three to five tons would be ample for all requirements?
A.—Yes.

Q.—Therefore it follows as a matter of course that that 20-ton crane was not required and the special concrete block-making plant also was not required?
A.—That was so.

Q.—When was it decided to abandon the use of the large blocks?
A.—I think the final decision came in 1922.

Q.—By that time the crane had been bought and delivered?
A.—Yes.

Q.—Whose idea was it that they would not be required?
A.—I think I started that before I left London.

Q.—That meant a saving of something like 40 lakhs, did it not?
A.—It would have made a very big saving.

Q.—Therefore that 40 lakhs should be taken off Sir George Buchanan's estimate of 367 lakhs, after giving him the difference of the cost of the stone blocks you put there?
A.—Yes.

Q.—Therefore his estimate instead of being 367 lakhs would be 327 lakhs?
A.—Well, I do not know the figures.

Q.—Roughly speaking, that is it?
A.—I had considerable difficulty in getting a block yard anywhere.

Q.—That is why I suggested you should have taken moorum from the quarry and made one?
A.—Well, there was a difficulty about that. I suggested that we should first of all see whether we could not get large enough blocks from the quarry.

Q.—Which you ultimately did?
A.—Which we ultimately did.

Q.—And so saved a lot of money?
A.—Yes.

Q.—I think experience up to the present time shows that that alteration was a wise one?
A.—Yes.

Q.—You also reduced the thickness of the concrete wall on the rubble mound from 16 feet to 12 feet?
A.—Yes, on the Colaba end.

Q.—Not at the other end?
A.—No, that was kept at 16 feet.

Q.—You put in a hollow wall instead?
A.—Yes.

Q.—So that you reduced the quantity of concrete considerably?
A.—Yes.

Q.—Therefore the value of that reduced concrete must also be taken off Sir George Buchanan's original estimate of 367 lakhs?
A.—Yes.

Q.—In addition to that you also raised the level of the mound, did you not?
A.—Yes.

Q.—Therefore there is another credit to be given there?
A.—We reduced the depth of concrete in that way by three feet.

Q.—And increased the quantity of stone?
A.—Yes.

Q.—I suppose you would do it from motives of economy largely?
A.—No.

Q.—Partly economy?
A.—Well it was economical to do it and it was more convenient.

Q.—Had you worked the whole reclamation from No. 8 Block, Colaba end, you would not have required all this expensive work on Marine Lines end. You would not have required to increase your quarry output from 800 to 2,000 tons a day. You would not have required to have the plant made out there. Is not that so?
A.—If we had done the work from one end.

Q.—Was not it the obvious thing to finish the reclamation from the Colaba end first of all because it is nearest the dredging, and, secondly, because you get paid for it as soon as you do it?
A.—Yes.

Q.—Was not it to everybody's interest to begin at the Colaba end and finish it as you went, because all that wall you built is now lying there doing nothing at all, except eating up interest. Was there any reason that you knew of why the work should be done from both ends?
A.—The only reason that I knew was to get it done quicker.

Q.—You could not do it any quicker. You built the wall in three years. What is the good of that if your dredging at that time was going to take seven or eight years? What is the advantage?
A.—The dredging was to be done quicker.

Q.—It was to be done in five years but it was not to be started till the end of 1922 at any rate. That would bring it up to 1927. Therefore, what is the advantage of having the wall finished in 1924. It is not like port—it does not improve with age?
A.—It was not going to be finished in 1924.

Q.—It was finished in 1924, except 1,800 feet?
A.—No.

Sir Frederick Hopkinson.—Is not that so?

Mr. Elgee.—No, it was carried on for another 1,500 feet after Mr. Lewis left.
A.—That is at Marine Lines, and considerably more at Colaba.

Sir Frederick Hopkinson.—1,500 feet done at Marine Lines in 1925?

Mr. Elgee.—Yes.

Sir Frederick Hopkinson.—It could have been entirely completed in 1925?

Mr. Elgee.—It could have been.

Sir M. Visvesvaraya.—Did this proposal to build the sea wall from both ends emanate from the administrative side or the technical side of the organisation. Was it your proposal?
A.—No, these are the conditions we started on. That was the condition of the problem when I started.

Q.—You wanted it from both ends?

A.—It was to be done from both ends. I was told that. I was to work it at both ends.

Chairman.—Who told you?

A.—I think that is in the documents——

Q.—Try to recollect—who told you?

A.—Sir George Buchanan told me.

Sir M. Visvesvaraya.—The idea originated in Bombay and not from Sir George Buchanan. Sir George Buchanan confirmed it afterwards.

Chairman.—He is speaking of 1920. (*To the Witness*) : Do you mean in 1920 when you went into Messrs. Meik & Buchanan's office you then understood that one of the integral parts of the scheme was to build the wall from both ends?

A.—Yes.

Q.—That is in 1920?

A.—Yes.

Q.—August?

A.—In August, 1920. That is what I was told was to be done.

Q.—You learnt that in London first of all?

A.—I did not meet anybody who knew anything at all about it until I got to London. It must have been in London.

Sir Frederick Hopkinson.—So that it was part of the engineers' scheme to build it from both ends, so that makes it all the worse.

Chairman.—I do not know about that, but that is the fact. It is the 25th April, 1921. That shows Messrs. Meik & Buchanan did propose to begin the wall from both ends

Sir Frederick Hopkinson.—But the letter about beginning at both ends is July, 1920.

Chairman.—Then you are right, Sir M. Visvesvaraya. This is very important. We must get this quite clear. When you got to London in August of 1920 you found that part of the scheme was to build the sea wall from both ends?

A.—Yes.

Chairman.—We have certain documents which enable us to see how that suggestion arose. We need not trouble you with them. We do not base any question upon it because we know about it; but you are quite right about that. It was in August, 1920, that it was part of the scheme.

Sir Frederick Hopkinson.—In your project estimate you did not provide for these protecting concrete blocks?

A.—No.

Q.—Therefore there is another 38 lakhs to go on to your estimate to compare with that of Sir George Buchanan. Instead of being 702 lakhs, your estimate is 813 lakhs. Do you see the point? Is not that so? Your estimate was 702 lakhs plus machinery, which was roughly 70 lakhs?

A.—Yes.

Q.—That is 770. Your estimate did not include concrete blocks which are 38 lakhs, and therefore your estimate must be increased by 100 lakhs compared with Sir George Buchanan's estimate of 1919.

A.—There is something in my estimate for broken stone.

Q.—I give you credit for broken stone, but not for concrete blocks.

A.—Concrete blocks are not included in my estimate, but broken stone was.

Q.—They are estimated to cost 38 lakhs. My point is, if those are added on to your project estimate your total will be 813 lakhs to compare with Sir George Buchanan's 307. Is not that so?

A.—I think so. I cannot work it out just now.

Q.—Is it the case that up to the 10th August, 1923, you had no tests of cement?

A.—No; the tests of cement were made by J. A. Mitchell & Company at the works from the beginning. There was a definite contract.

Q.—Nearly at the bottom of page 94 Sir George Buchanan writes : " Some time ago we asked to be furnished with particulars of cement tests, but we have not pressed the point because we understood all cement used in the works was thoroughly tested and certified to by Mr. Mitchell, who is an expert in this matter." My question was that Sir George Buchanan did not know of any cement tests up to that date, which is August, 1923.

A.—My answer to that letter is on page 96 : " Lotus brand has been tested by Messrs. J. A. Mitchell & Company and passed as complying with the British Standard specification, which is in accordance with your demand."

Q.—But the point I was making is that Sir George Buchanan did not, apparently, know anything about it or he would not have written that letter.

A.—The tests of cement were sent to my office regularly and filed.

Q.—But not to Sir George Buchanan?

A.—No.

Q.—He did not know?

A.—Well, I do not know. Apparently he did not.

Q.—He could not have written that letter had he known?

A.—The implication that he makes there is that the Lotus brand cement was not tested by Messrs. Mitchell & Company, and in that assumption he was quite wrong.

Q.—The point I was putting to you is that at that date Sir George Buchanan did not know anything about the cement tests, because he says: " Some time ago we asked to be furnished with the particulars of cement tests."

A.—But he understood that all the cement was thoroughly tested and certified to by Mr Mitchell, and that was perfectly true.

Q.—But he himself did not know anything about it. He had not seen the tests?

A.—I do not think the test papers were forwarded to him. They were kept in Bombay.

Sir Frederick Hopkinson.—On page 69 there is this letter or note from you: " Inspection of Mr. Davidge's plan indicates the position of the storm water drains for the area of the reclamation." That is not dated, but it comes after a letter of the 11th November, 1923.

Chairman.—I should think it is the 12th January.

A.—I think that must be it.

Sir Frederick Hopkinson.—On the 18th April, 1923, on page 81, Messrs. Meik & Buchanan say: " We have no information in this office as to the level at which the existing drains discharge."

A.—I think I replied to that later on and said that most of it was given.

Q.—In the beginning of the letter they say: " We have examined the proposed arrangement of storm water drains as shown on the plans handed to Mr. Halcrow, but this was in April, 1923." So that apparently there was nothing done about storm water drains before this date?

A.—Yes.

Q.—He says: " This proposed arrangement of storm water drains."

A.—I forget now when the drains were started. I cannot remember all these things.

Q.—We may take it as pretty definite or he would not have called it " a proposed arrangement."

A.—I cannot say about the date. I cannot remember, but that is a *façon de parler* of Sir George's. I think that is the way Sir George Buchanan put it. The drawings and designs had been made by me.

Q.—There was nothing definite. It was only a " proposed arrangement."

A.—They were definite. Those were plans for definite work.

Q.—They had not been built or else it would not be called a " proposed arrangement " ?

A.—Those were for all the drains, and they were not all built at once.

Q.—Do you suggest some had been built at that date?

A.—I think some of them had been started, but I am not quite sure.

Q.—In block 8 the reason for delaying the dredger to December, 1923, was that the storm water drain had not been built?

A.—I do not think that was the case, quite.

Q.—But the drain had not been built—the 2,300-foot drain?

A.—It is very difficult to give dates at this distance of time without any record.

Chairman.—We will try and help you. At page 142 of the evidence this answer was given:-" So far as we are concerned there was a definite programme of work for each year prepared by the chief engineer. (Q.) Who drew up your programme? —(A.) The chief engineer, Mr. Lewis. (Q.) Was that under Sir George Buchanan's instructions?—(A.) That I do not know. (Q.) But that programme provided for storm water drains?—(A.) Yes; after 1922 when the question of construction was thoroughly gone into. (Q.) Till then the Department was sleeping and never thought of it "—that is, storm water drains—" —(A.) I do not say that. In July, 1921, the work on the designs of the storm water drains was commenced. The work was always going on on the storm water drains after 1921." Does that accord with your recollection?

A.—July, 1921?

Chairman.—So this witness says, but if so, it is curious.

Sir Frederick Hopkinson.—It must have been a very early stage.

A.—No; we did not get down to that.

Q.—You had not done anything by 1921?

A.—No.

Chairman.—What accords with your recollection? Did that programme provide for storm water drains?

A.—Yes.

Q.—After 1922, when the question of construction was thoroughly gone into?

A.—Yes.

Q.—I think that " 1921 " must be a misprint for " 1922 "?

A.—Yes.

Sir Frederick Hopkinson.—That practically agrees with this letter, because this is a letter from London of the 18th April, 1923, after 1922, when they were thoroughly gone into. While we are on the storm water drains, why did you make them all of blocks?

A.—I thought it would be more convenient to build them in that way so that we should not be hampered so much by tide.

Q.—Why did you make them at Kandivli?

A.—Because I had no room to do them in Marine Lines or anywhere else.

Q.—Could not you have reclaimed an area?

A.—Well, I should have had to bring down the bulk of the material from Kandivli.

Q.—You had got to do that even when it was made into blocks?

A.—All the construction people down in Bombay were all very hard at work and very busy. We thought we could carry the work out at Kandivli, and I came to the conclusion that there would not be any great extra expense.

Q.—We noticed that the blocks made in 1923 are still there.

A.—I do not know how that could be.

Chairman.—We were told that £21,000 worth of blocks were lying there idle. That has been given in evidence.

Sir Frederick Hopkinson.—That is at a cost of interest of about £1,200 a year. Do you know when you began working at the Colaba end of the wall?

A.—In 1922.

Q.—Mr. Thomas said that it began in October, 1921; but there is not much in that. I have a note that on the 11th August, 1922, you were getting on with the storm water drains lay-out, so that pretty well fixes it. I think we ought to go a little further about the specification, because Mr. Elgee told us he had no specification at all for building the sea wall, and you have produced one. Do you think he had a copy of this?

A.—I cannot say. I think, as a matter of fact, the work was altered in character so much that that original specification became valueless.

Q.—Was there another one drawn up to replace it?

A.—I cannot say there was.

Q.—So that Mr. Elgee was probably making an accurate remark when he said he did not have a specification?

A.—Quite possibly.

Q.—I asked Mr. Elgee what cement he put in per cubic yard, and he told me that he decided that himself.

A.—I think we settled that all round. That was settled by me after tests, 1, 2½, 5.

Q.—The same with the size of the stone and the quantity of sand to be put in—that was all settled by you?

A.—Yes; after definite measurements and experiments.

Q.—This looks to me to be merely a sort of dummy specification. For instance, it says: " Proportion of broken stone and sand and cement for the concrete required for different portions of the work as hereinafter given, and as described on the drawings is to be applicable to the quantity of dry materials, broken stone or ballast, stone and cement before the admixture of water thereto." So that it does not mean anything—that has no meaning.

A.—When the changes of programme came I did not bother about it any longer.

Q.—Did you think it was not worth bothering with?

A.—No; there were some things that I found useful. It is the usual sort of standard specification.

Q.—" All timber supplied for use in the works shall be of the best description." I do not think there is anything important in it. I would like to get quite clearly from

you that there are no plans in existence which you know of in 1919 other than those in Sir George Buchanan's report.

A.—There were Mr. Kidd's plans. I know of no others besides Mr. Kidd's plans and such plans as there are in Sir George Buchanan's report—not in 1919.

Q.—That is all I want to ask you.

A.—There is one point I would like to mention about the gantry. There is one thing it helped us in, and that was the rapidity of the execution of the work.

Q.—I entirely agree that it is a very convenient way of doing it.

A.—We were able to tip from it and carry on our tipping going ahead. At the same time we were able to do our concreting behind, so that we came on and brought the work up. Instead of having to complete the tipping first and then come along and do our mass concrete wall, we were able to work them simultaneously.

Sir Frederick Hopkinson.—I do not at all dispute that it is a convenience.

(*Adjourned to to-morrow at* 11 *a.m.*)

The Committee Assembled at 11 a.m. on the 15th October, 1926, all Members being present.

54th Witness, Lord Lloyd of Dolobran, P.C., G.C.S.I., G.C.I.E., D.S.O., Governor of Bombay, 1918-23.

Chairman.—I think you arrived in Bombay on the 16th December, 1918?

A.—That is as far as I remember.

Q.—At what date did you first learn that you were going to be Governor of Bombay?

A.—I think it was in August—the August previously, as far as I remember.

Q.—August, 1918?

A.—Yes.

Q.—I suppose thereafter, between August and November, you went to the India Office from time to time to acquaint yourself with the problems with which you had to deal?

A.—I did so.

Q.—Was one of the matters which was specially brought to your attention the condition of housing in Bombay?

A.—It was, I think, actually the first of all. The Secretary of State spoke about that at the very first interview—indeed before I was appointed.

Q.—Was the housing problem regarded as a matter of vital importance by the Government of Bombay?

A.—I cannot say whether it was regarded as a matter of vital importance by the Government of Bombay at that time, although I shall have something to say about that in a moment; but as regards my interviews with the Secretary of State, he pressed upon me the urgency of the problem. I had not until I went to Bombay any knowledge of what the Government there had thought, but he pressed it upon me, saying that the last four or five Governments had failed to deal with the problem, he considered it was vital and I was to take it up with the greatest urgency that I could.

Q.—I wonder whether you would tell us in your own way the information that was given to you in London before you sailed for India, and the conditions which you found when you arrived in Bombay?

A.—Well, subsequent to the very definite instructions from the Secretary of State, which I received before and immediately after appointment to my office in Bombay, which were the results of impressions created upon his mind by his recent visit to India, I was informed that the congested condition of Bombay, especially as it affected the working classes, had long been a matter of concern to the Government of Bombay and the Secretary of State.

Q.—Would you just repeat that?

A.—When I was appointed Governor of Bombay in 1918, I was then informed that the congested condition of Bombay, especially as it affected the working classes, had long been a matter of very grave concern to the Government of Bombay and to the Secretary of State. The official view of the situation and the measures which were under consideration for amelioration of the social conditions are, I think, all set forth in the official correspondence available to the Committee. When I arrived in Bombay towards the end of 1918, in December, 1918, I found there a very strong popular feeling in regard to the need for dealing with this question as an urgent matter. The Municipal Corporation of Bombay, for instance, pressed it upon my attention in the address which they presented immediately on my landing, and in the course of the next

few days several leading citizens of Bombay in interviews which I had emphasised the seriously overcrowded condition of the city. Naturally, I became fully impressed with the grave extent to which congestion in Bombay City had increased during the years of the War. That was obvious. But for over 20 years, since the outbreak of the plague —in Lord Sandhurst's times, as far as I remember——

Q.—1897?

A.—Yes—the authorities had been grappling with this problem of overcrowding. Even before this period the reclamation of Back Bay was, as I think this Committee knows, one of the methods of expansion suggested for the consideration of Government. I think that was under a Committee approved by Lord Reay in 1887. The city of Bombay Improvement Trust was later constituted to deal with some parts of the whole problem; but during the period of the War its activities had been severely restricted by the virtual closure of the Loan market. There is one criticism on the operations of the Improvement Trust which had a bearing on subsequent measures. The clearing of the slum areas by the destruction of houses declared to be uninhabitable and the removal of other property in order to widen streets for sanitary reasons, or for improvement of main and minor communications, were alleged to have intensified the congestion. In 1919 the congestion in Bombay amongst all classes, in my opinion, could be described as appalling. There was infant mortality—I am afraid there still is—of 60 per cent. and perhaps more; that is to say, a great deal more than half of the children born died entirely owing to insanitary conditions. Various estimates have been made of the increase of population at that date, but it is sufficient, I think, as an illustration to give an estimate made at the time by the Municipal Commissioner of Bombay. His estimate of the population, which was, I think, 1,176,000, was 20 per cent. above the Census figures of 1911. The figures of the subsequent Census in 1921, during my period of office, were practically the same as his estimate. I have Government figures given to me as 1,175,000, about; but my recollection is, as I was responsible then for the Census, that the Non-co-operation Movement very much paralysed our efforts in getting an accurate Census. My own view, though I cannot substantiate it, was that the population was probably not quite so low then, but it is very hard to say. The Non-co-operation Movement upset us in that way.

Q.—Some witnesses have put it at about 1,400,000.

A.—It is impossible to say. The Census is, I think, never very accurate.

Sir Frederick Hopkinson.—At least, in India.

A.—In India; but at that period it was less accurate than usual. Careful inquiries were made in order to estimate correctly the degree of congestion. As far as I could I made a personal investigation. Probably, I think, I am the only Governor who has personally been down all through the slums and seen them for himself, as very few leading Bombay citizens have done, where you find four families living in one room, pitch dark, half a swamp in monsoon times, without any light or air very often—in incredible conditions. At the Census of 1911 it was ascertained that 80 per cent. of the population were living in one-room tenements. The figures affecting four-fifths of the population were, therefore, important. In that first year we had raging, the cholera epidemic, which is doubtless remembered by the two of your colleagues, Mr. Chairman, who sit on your right. The figures then of mortality ran to about 600 or 700 deaths a day, probably immensely increased by the foul conditions of the city. The estimate of the Municipal Commissioner was that the total shortage of one-room tenements was 49,000—you must forgive me if I am giving you figures you have already got—exclusive of 15,000 required to replace insanitary huts and tenements unfit for human habitation. The total shortage of 64,000 tenements was almost 30 per cent., I think, of the total number of one-roomed tenements required to house the section of the population living in this type of residence—perhaps residence is too ambitious a word, this type of lodging. Or, to put it in another way, it might be said that over a quarter of a million of the working classes were without proper homes. The Municipal Commissioner supplied a further illustration of overcrowding by stating that in 238 overcrowded houses throughout all parts of the city the number of occupants was found to be 51,500, as compared with 27,300, which was all they were fit to accommodate. I have given some idea of the figures as far as information is now available to me for classes occupying one-room tenements, because they are the largest section of the population. But they are only illustrative. Every section of the population was seriously affected in 1915. The overcrowding of the middle classes was equally intense, and I think, perhaps, none suffered more than the lower middle classes, clerks and so on. I am informed that even to-day there are a very considerable number of people living in temporary hutments in Bombay in a thoroughly insanitary condition, and certainly unsuitable for a town which claims to be, not the second largest city in India, but the second largest city in the whole Empire. I think there is a friendly rivalry with Calcutta as to the figures, but it is always claimed by Bombay it is the second largest city in the Empire. There is very little difference. But, apart from the lower

middle classes, the pressure existed all the way up, and even on Malabar and Cumballa Hills the conditions soon gave rise to the erection of big blocks of flats to replace the more spacious bungalows of the well-to-do. I come now to the Fort area. There the pressure on office and business accommodation was severe. The Rent Act had been passed to prevent exploitation of the tenants of all classes, but evasion was rampant, and large premia were paid for occupational rights, while old and dilapidated properties changed hands at inflated prices. It was urged by many business people at that time that there was a risk of business leaving Bombay on account of the difficulty and the cost of getting suitable office accommodation. Briefly, then, while the bulk of the population of Bombay city was living in 1919, and had done so for years before, under conditions which were a menace to public health and probably dangerous to society, the housing conditions were oppressive to all. I have mentioned the ravages of cholera, and I might have added the more regular scourge of malaria. The congestion in the business area, I have said, was great. The land and the buildings fetched amazing, even ridiculous prices in some cases owing to speculation. The Rent Act acted as a check for sitting tenants, but the evasion I have spoken of and the consequent oppression were rampant, and the Act could only be a temporary palliative. While this is not the occasion, perhaps, for me to explain all the measures taken to deal with the conditions of 1919, if it is convenient to you I would say here something about the Back Bay Reclamation Scheme as an integral part of the general measures. Before dealing with the reclamation scheme as it directly affected the social life and the public life of Bombay, it is necessary to say something about the congestion as it affected the military authorities, of which, so far as I can see, you have heard very little on this Committee so far. The Indian Infantry Barracks on the Marine Lines were condemned. I visited them personally, and they were very rightly condemned. They should have been condemned years before in my judgment. Their condition was a cause of discontent amongst the men, so much so that it was even suggested that discontent might result in disaffection. It was not an ideally peaceful period, as you remember, in 1919, and those matters had to be very gravely considered. In the monsoon the troops living on mud floors had mud very often for several inches, and in some parts of the room I have seen it up to more than that, of wet mud on which to live. The other military offices and properties in the Fort were old, and, as a result of confused growth and lack of town-planning, inconvenient and generally out of date. Concentration therefore at Colaba was for many reasons greatly desired by the military authorities themselves, but, as you know, the space there was already crowded and inadequate. Reclamation at Colaba could be the solution of the problems of the military authorities. I desire to emphasise here that the military consideration was an important one up to a point. The unreclaimed area at Colaba was low-lying and unhealthy, and, apart from other considerations, its reclamation was most desirable for the health of the troops and of the residents in that vicinity. As regards the public generally, the experience of the Improvement Trust had shown the danger of dealing with small and overcrowded areas if adequate provision were not made for housing the dispossessed tenants. That is to say, to put the matter colloquially, we found ourselves in a vicious circle. You could not condemn unless you could destroy, you could not destroy unless you could re-house, and you could not re-house unless you provided new land. You had to get out of that vicious circle. It was not any easy problem, I can assure you. I am not suggesting that the operations of the Improvement Trust did not take a sufficient account of this danger, but the danger was always there. The public were alive to it, and it coloured public criticism. By 1919 the time had long passed for putting the destruction of slum property in the forefront alone. There was already great overcrowding. Extensive provision of housing for accommodation was imperative, and for that purpose land in Bombay had to be found and developed. From the very earliest days a very real development of new areas had been an ever-recurring problem in the Island or Islands, the Heptanesia, the seven islands, as they were, of Bombay. It has been suggested that the housing schemes of the Government in Bombay City, the development of the North of the Island by the Improvement Trust, and the opening up of residential suburban areas in Salsette, were a sufficient solution. (I hope I am keeping myself to the point on which you wish to hear me. Perhaps you will check me if I go beyond the point.)

Sir Frederick Hopkinson.—It is all part of the scheme?

A.—Very much so; but I only did not want to go beyond it. I was saying it has been suggested that the Housing schemes of the Government in Bombay City, the development of the North of the Island by the Improvement Trust, and the opening up of the residential suburban areas in Salsette, were a sufficient solution; but there has always been a very strong body of opinion in favour of the reclamation of Back Bay. The Back Bay Reclamation Scheme was, as you know, not new when I arrived in Bombay—far from it. It had been under almost continuous investigation and consideration since 1907, and assumed its present shape I think in 1912. Even at

that time an unofficial Committee recorded the view that the development of the North of the Island and of Salsette could not meet the difficulties of the Fort area. The Fort has always been an overcrowded locality; and before the war the enormous increase in shop and office rents was burdensome. Perhaps I put it mildly when I say that any action to check the rise in rents and land values had not had very strong support from the local landlords. The opposition to the scheme in 1919 was intensified by reason of the enormously enhanced value of the Fort property at that date. The keenest opposition was made, perhaps is still being made—I do not know—by some who acquired properties in the Fort when prices were at about the summit. I think the Indian members of this Committee know that very well. On the other hand, many enterprising and sagacious business men in Bombay, with large financial resources of their own and under their own control, combined in 1917 for the purpose of reclamation in Back Bay by private enterprise. They were not in that respect entirely philanthropists, and there were no better judges of the needs of that time and of the future. They would not have taken it up unless they had thought it was a good scheme. One of the things which affected the decision of the Government in undertaking the scheme as a public work had reference to the demand for more open spaces. I do not know how much stress has been laid upon that by this Committee, but I think it is of great importance.

Chairman.—We have had the facts put before us; but no great stress has been laid upon that. It has been rather obliterated by the fact that it was assumed that the open spaces would have to be diminished because of the present anticipated cost.

Sir Frederick Hopkinson.—But we see that great allowance has been made for those open spaces.

Chairman.—Yes; in the original scheme great allowance was made.

Witness.—I only wish to make the point that a Government that is responsible for the re-planning of a great city, in which are comprised all the youth of the town, educational establishments on which large sums of money are being spent, are bound in my judgment to provide for the health of their bodies as well as for their minds; and there was very little provision for that. Outdoor recreation and exercises have become popular to an amazing extent nowadays amongst all classes of Indian society; but their enjoyment has been severely restricted by the lack of open spaces and facilities. For the masses there has been practically no provision at all, and there should be provision. The schools had no playgrounds, generally speaking. There are a few on the Front at present, but there is hardly an exception to this state of affairs. Even the mixed and middle class schools have no recreation grounds, and no space was available in the vicinity of the Fort for their further provision. It was a difficult and essential feature of the Back Bay reclamation Scheme to make elaborate provision for what was considered as a vital social need. That is broadly speaking I think all I I have got to say for the moment on the particular aspect of the question which you put to me, Mr. Chairman; although if you wanted me to give further reasons for the essentiality, as we considered it, of the Back Bay scheme as an integral part of the whole of our housing operations, I could very well do so. The point that I want particularly to make is this. The conditions were appalling. Of that there can be no possible question. They had to be remedied. I received those instructions. They had been deferred for years under several Governments; and it seems to me that my Government was fully justified, and they would have been failing in their duty if they had not taken urgent and courageous steps to try and put an end to so grave a social ill. That is all I think I want to say for the moment on that particular head.

Q.—Those were the conditions which you had in your mind that finally decided you and your Government to create the Development Directorate?

A.—That is so.

Q.—Which was a body not merely concerned with the Back Bay reclamation, but concerned with all these other matters, with the provision of chawls and other matters for Salsette and the general expansion of Bombay?

A.—That is so.

Q.—You have referred to 1912. That, of course, is a reference to the examination and report of Mr. Kidd?

A.—That is so.

Q.—That Report having been made in 1912, the next fact of importance with which I suppose you would have been acquainted was a matter of which you have told us, namely, the creation of two syndicates, which ultimately combined in December, 1917, and January, 1918, with a view to reclaiming the Back Bay area as a business proposition on their part?

A.—I believe so.

Q.—The proposal of that joint syndicate was examined by the Government?

A.—You are referring to Mr. Kidd's investigation?

Q.—No; for the moment I am on the proposition of the syndicate, namely, that they should have an option, and should themselves reclaim the 1,100 odd acres. Their suggestions were examined. There was a note by Mr. George Carmichael to which I need not refer you, but the Government of Bombay took up the matter by a telegram of the 16th October, 1918?

A.—That is before my arrival.

Q.—I want to emphasise that. On the 16th October, 1918, which was two months before your arrival, the Government of Bombay sent this telegram to the Secretary of State for India: "Government of Bombay consider a re-examination of Back Bay Reclamation Scheme a matter of special urgency and hence shall be obliged if best qualified man available is chosen and sent to Bombay for that purpose. He should know recent work of the same kind and latest mechanical devices, and be entirely independent of Lowther, Griffiths and Tata Syndicate." No answer was apparently received to that telegram during the period of Lord Willingdon's office. On the 8th April, 1919, at which date you had assumed charge——?

A.—I think so.

Q.—A telegram was sent by the Government of Bombay to the Secretary of State in these terms: "Back Bay Reclamation Scheme. Government of India had asked you to send out best expert available to examine and make final report on above. The Government of India had also asked us to send all plans to Delhi for transmission to you, in order that expert may study them before departure. (1) I think this procedure involves unnecessary delay, in view of the fact that expert must be here to see conditions just before monsoon breaks as well as after it. (2) I have consulted Government of India and Sir Claude Hill concurs with me in proposing you should send expert out at once to arrive Bombay not later than third week of May. (3) All plans and information essential to experts' study now here. (4) Lord Sydenham or W. L. Cameron, late Chief Engineer, Bombay, would advise regarding choice of expert." Then "(5) Failing your ability to find expert in short time available, my Government would agree to use Sir George Buchanan, whose services would probably be available, and whom the Government of India recommends. (6) My telegram has been drafted in consultation with the Government of India and is being communicated to them. (7) Please telegraph immediately whether expert can be found in time to arrive by middle of May, or whether we should proceed with Buchanan"?

A.—I think I remember the telegram.

Q.—I would like you to have it before you. It is on page 8. (*Document handed to Witness.*) You notice in paragraph 5 of that telegram you mention Sir George Buchanan?

A.—Yes.

Q.—You state that the Government of India had recommended him?

A.—Yes.

Q.—Did you yourself go to either Simla or Delhi?

A.—I do not think so at that period; I do not remember.

Q.—Did Sir Claude Hill come to you?

A.—I think he came down to Bombay, but I cannot be sure. I think I did not go up, so far as I can remember, until the late spring, but that was on another matter. That was over the disturbances, so far as I recollect.

Q.—In using the phrase "whom the Government of India recommends," was that the recommendation of Sir Claude Hill on behalf of the Government of India?

A.—I presume so, but I cannot be sure at this distance of time. It may have been a telegram, or it may have been Sir Claude Hill personally. I am afraid I cannot remember at this time.

Q.—At that time did you know Sir George Buchanan?

A.—Yes. I think I had shaken hands with him in Mesopotamia, when I was serving in the military camp. I did not know him, but I think I had actually met him once. I am not even sure that I had met him before, but I think so.

Q.—So that by the first telegram of the 16th October, before your arrival, the Government of Bombay had simply requested that the best qualified man available should be engaged?

A.—That appears to be so.

Q.—You in your telegram also are pressing that the Secretary of State should send an expert out at once to Bombay, but that if he cannot arrive within the time, should you proceed with Sir George Buchanan?

A.—That is so.

Q.—Then on the 25th April, 1919, you received a reply to that telegram?
A.—Yes.

Q.—" Sydenham suggests appointment of Cameron as expert, and doubts whether it is possible to send a new man out in May. I have not sounded Cameron. I could probably secure Frederick Palmer, of Rendell Palmer & Tritton, if you would wait for him till October "—then it sets out his qualifications. Then they put this question: " Is it essential that the expert, if he has already the knowledge of monsoon effects should be present throughout entire period of monsoon? Any such condition is deterrent." Then the Government of India await a reply and ask for a reply on the 25th April. Then we get your answer of the 26th May, 1919: " Reply was postponed in view of impending discussion with Sir Claude Hill and his return to England." Then it speaks about the difficulties of getting the people mentioned: " In view of the difficulty of getting Palmer out before October, my Government decided to employ Sir George Buchanan, who is at present engaged upon the work, and will probably, after concluding his preliminary investigation proceed home to make further enquiries regarding dredging plant and material." I think Sir George Buchanan was notified about the 7th May that he might be wanted to report upon this matter? If you will take that date from me, I think that is right?

A.—I could not say.

Q.—But at all events. we know from his own report that he received a letter dated the 30th May instructing him to give his opinion on certain points in connection with the scheme prepared by Mr. Kidd.

A.—I have that here.

Q.—Your telegram of the 26th shows that he was already engaged on the work. Does your recollection enable you to say about how long he had been engaged then?

A.—I am afraid I do not remember. I do not think long, but I am afraid I do not remember exactly at this length of time. I may be able to turn it up for you.

Q.—Do not trouble about it.

A.—I do not, as a matter of fact, recollect it at this moment.

Sir Frederick Hopkinson.—I should like it if you could do that.

A.—Perhaps you would remember, as regards details, the difference between the Governor and a member of Council in this matter. One does not necessarily come across every detail in these matters. That is left to the member in charge of the Department.

Mr. Billimoria.—If your Excellency would give us some idea of the length of time he was engaged on the job that would be very important.

A.—I could not tell you.

Chairman.—I think it will be found it was on the 7th May, 1919, that the Government of Bombay told Sir George Buchanan that they wanted his services. I think we can fix it beyond doubt that Sir George Buchanan arrived in Bombay on the 19th May and had certainly left by the 6th June.

Sir Frederick Hopkinson.—He left on the 30th of May.

Chairman.—I was saying he had certainly left by the 6th June. There is some correspondence which shows it.

A.—My note that I have prepared merely says: " Finally in May the Government of Bombay decided to employ Sir George Buchanan." I cannot get it beyond that at present.

Q.—Do you remember whether you had any, and what, interview with Sir George Buchanan before he went off to England to make further enquiries with regard to dredging plant and material?

A.—Perhaps it would be convenient if I told the Committee the note I had made in preparation for your question here, which is all the information that I think I can give you without trying to find more.

Q.—Please do.

A.—As you have pointed out, the position when I arrived in India was that my predecessor, Lord Willingdon, informed the Secretary of State in October, 1918, that a re-examination of the Back Bay Reclamation Scheme was a matter of special urgency, and had requested him to obtain the best qualified man available—someone entirely independent of the competing syndicates. In April, 1919, my Government pressed the Secretary of State to send out a man before the monsoon of that year, 1919—I think that you know that already—to avoid losing the whole year's work. My Government also informed the Secretary of State that if an expert were not shortly available from England, the Bombay Government would agree to use the services of Sir George Buchanan. The Secretary of State was unable to secure at the time the services of an engineer in England, and finally in May—that is the only date that I have got that I can recollect—the Bombay Government decided to employ Sir George Buchanan to

prepare the report under the terms of reference already known to the Committee. That is all I have about the dates. I cannot, I am afraid, recollect very accurately after a period of six or seven years.

Q.—We fix the date in this way. We have got a letter from Mr. Mackie to Mr. Ewbank.

A.—Mr. Mackie is Secretary to Government in the Development Department at present.

Q.—" I find a Minute recorded by Sir George Carmichael dated 13th May, 1919, stating ' Please have the papers ready against the 20th instant, when Sir George Buchanan expects to come to Bombay.' " That is the 20th May?

A.—That seems to fix the date.

Q.—There is also a telegram from Sir George Buchanan wherein he stated he would arrive in Bombay on Monday the 19th May.

A.—I am perfectly prepared to accept your dates. I cannot possibly recollect.

Q.—Then there is a Minute of Sir George Curtis dated the 6th June, in which he says: " I did not realise that Sir George Buchanan had taken away the file of the correspondence. We shall have to wait till Sir George Buchanan returns." So that fixes it definitely that he was in Bombay on the 20th and had certainly left by the 6th June. We know from another source also that he left on the 31st May. In those 11 days, from the 20th May to the 31st May, did you have any interviews with Sir George Buchanan?

A.—Yes, to the best of my recollection I had one or two. I cannot remember how many or what dates.

Q.—This question of the proposed reclamation of Back Bay was a most important matter. Did Sir George Buchanan have any interviews with your Ministers when you were present, between the 20th May and the 31st May?

A.—There were no Ministers at that time to be technically accurate. There were Members of Council.

Q.—I am sorry—that is before the Reforms?

A.—I saw before and after———

Q.—Members of Council.

A.—Yes—I have not the slightest doubt, though I cannot absolutely prove it, that he had interviews with the Member in Charge, who would be Sir George Curtis, and probably with Sir George Carmichael, but I cannot say.

Q.—It would appear so from that letter?

A.—I am perfectly confident that he had them with Sir George Curtis, and I imagine that he had them with Sir George Carmichael.

Q.—But not any meeting at which you presided with the Members of the Council?

A.—No formal meeting at that time—I do not think so.

Q.—Between the 20th May and the 31st May?

A.—It would not be our custom to admit anybody to the Council Meetings.

Q.—I think, perhaps, you have missed the point of my question. My question was this. It being a scheme of very great magnitude, what I was wondering was whether you, having consulted Sir George Buchanan, asked other Members of the Council informally to come and discuss it?

A.—Most certainly I discussed it with them, but I cannot recollect in what form or whether we were three together or four together at any particular time.

Q.—Would that be before the 31st May, when Sir George Buchanan left?

A.—I should think certainly, but I can recollect no dates particularly.

Q.—At that time Sir George Buchanan could necessarily have had only a very vague idea of what he would have to report on?

A.—I cannot say as to that.

Q.—He had only 11 days?

A.—Yes.

Q.—And then he left India?

A.—I know too little about technical matters to know of how much he could apprise himself in that time.

Sir Frederick Hopkinson.—It depends upon the individual.

A.—It depends upon the individual.

Chairman.—Have you any recollection of the way in which Sir George Buchanan put the matter before you at any date between the 20th May and the 31st May?

A.—No, I have no particular recollection of any particular points that were made. My concern was merely to get an expert appointed—I could not deal with any technical matters myself—and having appointed that expert, to leave him to make his report.

There was no particular object in having a very protracted discussion before he made his report. It was for him to examine the project.

Q.—There is a letter of the 23rd May written by Sir George Buchanan which shows that you had apparently written to him. It begins: "I duly received your Excellency's letter dated the 20th May."

A.—Is this from Sir George Buchanan to me?

Q.—Yes, to you. "I duly received your Excellency's letter dated 20th May, at which time you had presumably not seen Mr. Curtis since my interview with him." That fixes, as regards Sir George Curtis, that there had been an interview. "I have now gone through all the plans and papers connected with the Back Bay Scheme and have been able to form an idea of the work required. The so-called detailed estimates of Messrs. Lowther & Kidd are very far from complete and the project requires re-casting and re-estimating *ab initio*. So far as the sea wall is concerned there is no engineering difficulty, and I know exactly the strength of work required to resist wave action in the south-west monsoon, but, as I thought would be the case, the crux of the whole scheme lies in the provision and successful working of the dredger or dredgers. I shall have, in another week's time, all the information I can get in Bombay, and I am strongly of opinion, in which I believe Mr. Curtis and Mr. Kent concur, that the sooner I get home and tackle the dredging problem with the builders the sooner you will be able to decide on the best action to take in the execution of the work. I naturally do not wish to go home if your Excellency has other matters in which my advice can be useful, but unless they are of great urgency I suggest I might take them up on my return to Bombay in a few months' time. The proposal I intend placing before you when I have received the Terms of Reference is that I should go home on the 31st May and, having prepared specifications for the dredging plant I consider most suitable for the work, and having obtained full particulars and prices, I should return to Bombay with the whole scheme and estimate ready for consideration by your Government. I would also suggest an inclusive fee to cover all my expenses as well as professional services," and then details of the fees are given. "In the matter of dredgers, the best in the world are made by one or other of four firms in the Clyde district. Some years ago I made a tour of Canada and the United States, in the course of which I inspected myself all the large dredging plant there from the River St. Lawrence to New Orleans on the Mississippi, but I found nothing which came up to our home work. The War may have altered matters, and it is just possible I may find we can do better both as regards price and delivery in America." Therefore, in that letter, at all events, Sir George Buchanan was not binding himself down to any one particular firm of dredger builders?

A.—It would not appear so.

Q.—Indeed, he was not binding himself down to the Clyde district, but also was proposing to investigate the conditions in America. On the 25th May you replied: "My dear Sir George, thank you for your letter of 23rd May, I should wish to leave the date of your departure entirely to your own discretion, and if you think the Inquiry and final report which I am asking you to undertake will be hastened rather than delayed by your getting to England at once, please make your plans accordingly. All I am anxious for is to know as early as possible whether the Back Bay Scheme is feasible, and on present prices, is a desirable enterprise, if not, to abandon it finally and turn our energies into other directions, or if it is found practicable, to get on with the job without another 10 days' discussion. I shall hope to see you on Wednesday next and discuss the matter fully with you." That represented, I assume, your position on 25th May?

A.—Presumably.

Q.—You wished expert advice on two points: whether the scheme was feasible, secondly, whether on present prices it was a desirable enterprise: and then you wanted it hastened on without undue discussion. Going back for a moment to the phrase: "Whom the Government of India recommend," that is Sir George Buchanan is the person recommended, may I ask you this? Sir Claude Hill was not an engineering expert?

A.—I should think not.

Q.—His adviser, we know, was Sir Sydney Crookshank. Do you happen to know whether Sir George Buchanan had done any other work for the Government of India?

A.—Yes, I think he certainly had. My knowledge of Sir George Buchanan was that he had carried to a very successful conclusion a large river draining scheme in Rangoon, and I think it was for that that he received his knighthood, showing the appreciation of the Government of India for the work done. He had successfully re-organised the Port of Basra during the War. I said "successfully" advisedly—because I understand he was thanked by the Government of India also for that work—and had been responsible for dredging operations and considerable reclamation in Mesopotamia. For those services I am told he received the K.C.I.E. He had had large experience with dredgers and in dredging. He knew the conditions in the Indian monsoon and was

particularly well acquainted with labour and other conditions in India. He seemed, therefore, a particularly suitable person to examine such a project.

Q.—At the time when you sent the telegram of 8th April you were aware of all those facts?

A.—I was certainly aware that he had done very successful work in Rangoon. I knew that he was employed by the Government of India during the War in Basra, though I do not know that I was aware that he had been thanked for his work there or how successful it was, but I had the impression it was successful, and I knew that the Government of India, from the facts of the case, held him in high esteem.

Q.—You say you knew he had received his knighthood for some work in Rangoon?

A.—He was quite well known in India as a man of very considerable experience.

Q.—He had received the K.C.I.E. for work in Mesopotamia?

A.—I understand so. He was very well known in India, and, as I have said, not only was the choice a fairly obvious one, but it had the approval of the Government of India who were in a position to know about him.

Q.—Sir George Buchanan having left India on the 31st May had completed his report by the month of Septemebr, 1919, and handed it to the Government of Bombay in October, 1919. Having considered that report your Government wrote the letter of the 4th December, 1919, which you will find at page 10 of the History of the Scheme. You had acquainted yourself with Mr. Kidd's report of 1912?

A.—Yes.

Q.—That was the basis indeed on which Sir George Buchanan was asked to report as to the feasibility of the scheme?

A.—Yes.

Q.—Your letter, so far as the extract that we have here, begins: " Sir George Buchanan has now presented his report and I am to say that this Government understand that the Government of India are prepared to accord administrative approval. The Governor in Council does not consider it necessary to discuss the 1912 project again. As pointed out by Sir George Buchanan in paragraph 28 of his report, Messrs. Lowther & Kidd's plans reveal such an unusual absence of detail that it makes an examination of figures extremely difficult from a technical point of view." May I pause there for a moment. Did you compare the figures of Lowther & Kidd's report with those of Sir George Buchanan?

A.—I cannot say what my Member of Council did. I should not do that work personally.

Q.—You would not do it yourself?

A.—I would not do it myself normally. I may or may not.

Q.—Would not you, yourself, as a matter of interest examine Mr. Kidd's report and Sir George Buchanan's report?

A.—Yes, probably I should, but I cannot answer certainly at this length of time, and I should not be competent to decide upon the technical aspects of it. I should read it almost certainly as a matter of administrative duty and interest, but I should not be competent to judge of any technical matter. I cannot say definitely as to what mass of stuff I read at that date, but I take it it is very probable indeed that I did read it.

Q.—Would you take a copy of Sir George Buchanan's Report? (*Same handed.*)

A.—This is the report presented in 1919?

Q.—Yes. I will tell you at once the point I want to put to you. This telegram says: " Messrs. Lowther & Kidd's plans reveal such an unusual absence of detail that it makes an examination of figures extremely difficult from a technical point of view." I am going to put it to you, to see if I can obtain your concurrence, that in point of fact that criticism applies, and must apply, with almost equal force to the report of Sir George Buchanan. I just want to take you through it, and it will not take more than two minutes. Will you look at page 13? This is a document that must have come under your observation and your close attention. Take Table A and Table B. Table A is one of the parts of Mr. Kidd's report which is criticised as showing an unusual absence of detail. Table B, I think if you will run your eye down it, has the same absence of detail

A.—I am afraid I am not in a position to say what is considered detail and what is not from the technical point of view

Q.—You are in a position to answer this. If Table A contains an unusual absence of detail is not there the same absence of detail in Table B?

A.—I must just look for a moment and compare it.

Q.—Please do.

A.—I do not recollect this, but it would appear to be very much the same.

Q.—Would you kindly pass on to page 29? There you get Sir George Buchanan's revised estimate of the cost of the scheme, which he works out there as 367·61 lakhs.

A.—Yes.

Q.—Without having any technical knowledge does not that revised estimate of the cost of the scheme seem to be rather in a skeleton form?

A.—I really could not say, I am afraid. I would answer it if I could, but I am afraid I cannot answer. It is too technical for me.

Q.—Does it appear to you to have an absence of detail?

A.—I am afraid I really cannot answer that question because on technical matters of this kind I do not know what is detail. That I have to leave to others.

Q.—This puzzles me a little. I am only asking you because here is the telegram sent by the Government of Bombay on page 10, which I have just referred to. Someone who drafted that telegram said that: "Messrs. Lowther & Kidd's plans reveal such an unusual absence of detail that it makes an examination of figures extremely difficult from a technical point of view."

A.—Yes?

Q.—Somebody, therefore, had noticed that with regard to Lowther & Kidd's plans?

A.—Yes?

Q.—If you had compared Lowther & Kidd's figures with those of Sir George Buchanan do not you think that you also would have agreed that Sir George Buchanan's figures showed an absence of detail?

A.—They appear to be very much the same.

Q.—I am not at all putting it forward by way of criticism because there was a necessity to get out the figures as quickly as could be. That is right, is it not?

A.—Yes; the whole matter was to be dealt with in an urgent manner.

Q.—There was a need for haste. Even if there was an absence of detail, if the figures ultimately proved correct no one could complain of the absence of detail. Now I will continue with the telegram on page 10: "In the circumstances the Governor in Council proposes to discard this scheme entirely"—that is, Mr. Kidd's scheme—"and to concentrate attention solely upon Sir George Buchanan's own scheme, which includes the same area as that covered by the 1912 project, namely, 1,145 acres. On the technical aspect of the new scheme the Governor in Council offers no opinion. He is fully prepared to accept Sir George Buchanan's carefully considered views on the practicability of the scheme from the engineering point of view, on the type of wall required for the reclamation and on the method of reclamation." Having stated in the letter that your Excellency offers no opinion on the technical aspect of the scheme, did you obtain advice on Sir George Buchanan's scheme from any of your advisers—from any member of the Public Works Department?

A.—I certainly discussed it with my colleagues in general.

Q.—When you say your colleagues, whom do you mean?

A.—My colleagues are generally referred to as my Cabinet colleagues.

Q.—None of your Cabinet colleagues would have offered any opinion on the technical aspects of the scheme?

A.—I should think not.

Q.—So that there was no one immediately round you, no member of the Council who had any experience, or who could give any opinion of value on the technical aspect?

A.—No.

Q.—Did you consult any outside source, such as the officers of the Public Works Department?

A.—I certainly consulted the late Mr. Kent who, when I first went to India was the head of the Public Works Department. If Mr. Kent was Secretary for any appreciable time after the receipt of Sir George Buchanan's report, the report would certainly have been discussed by me, or by a member of my Council, or by both of us with him; but I cannot remember exactly who was the Secretary of the Public Works Department at that particular period. Perhaps Mr. Ewbank could tell me.

Q.—Mr. Ewbank shows me a letter, which I am quoting from, and that shows that it was sent from the General Department, from Mr. G. A. Thomas.

A.—Yes; that is the letter of the 4th December.

Q.—Yes; have you any recollection of having discussed this matter in its technical aspect with Mr. Kent?

A.—I certainly have a recollection of discussing it with the head of the Public Works Department—that was the scheme before that period. I remember that early on in the spring. Whether I discussed it with Mr. Kent, if he was there afterwards, I cannot remember. The normal course would be that the Secretary of the Public Works Department would come in on his ordinary days, or if there was pressure, on additional days;

and all matter which were relative to his Department would be discussed which he brought before me. A matter of this kind, I should think it would be perfectly certain I discussed with the Secretary of the Public Works Department.

Sir Frederick Hopkinson.—You said in the spring, but the report did not come till the autumn.

A.—I made that point particularly. When I am speaking of Mr. Kent, I certainly discussed the general scheme with him in the spring. I know he was there then. I cannot recollect at this moment when Mr. Kent left, unless Mr. Ewbank can tell me.

Mr. Ewbank.—I do not remember the exact date. He was certainly there in 1918.

Chairman.—There is a letter of the 9th December, 1918, from Mr. Kent.

A.—He was there, I know, for some little time after I was there, and I have that recollection of discussing it with him; but I cannot remember what period, which is what you are trying to ascertain, is it not?

Q.—What I am trying to ascertain is: when you had read this report and were considering what action was to be taken on it, and were considering the terms of your letter to the Government of India, which is the letter which says on the technical aspect of the new scheme, the Governor in Council offers no opinion, did you seek the opinion of any outside person who could really give you a technical opinion of value?

A.—Well, I have given you the best answer I can give. I can only speak generally; that is to say, in the normal course of events I should certainly have discussed it. As far as I know, I did discuss it. I cannot recollect about who was there at the time, and that rather blurs my recollection. Let me speak rather more generally at the moment. On the technical aspect of the scheme I fully accepted Sir George Buchanan's view. You quite understand that the scheme was not a new one. It had been long under everybodys' consideration. A complete report and estimates had been obtained from one expert, and Sir George Buchanan had been called upon to give a second opinion. That was the position. You must end with taking expert opinion at some time. If you are ill and you go to consult a specialist in Harley Street you do not improve matters by going to another specialist on top of it. The end must come some time. It had been going on for some time—18 years.

Sir Frederick Hopkinson.—Sometimes there is no time to go to another expert?

A.—That is not what I intended to say.

Q.—The end comes?

A.—Yes.

Chairman.—It is not quite analogous, perhaps.

A.—The engagement of experts to report on schemes of their predecessors must terminate at some time, especially when the evil is grave. At the end of 1919, after the receipt of Sir George Buchanan's report, the time was ripe for decision. I want to make the general position clear. The work was outside the experience of the Public Works Department. I am sure you will agree on that. For that very reason the reports of two independent experts had been obtained. We had taken every possible precaution in that way. No further enquiries were made from independent engineers except in the ordinary course of my duties. To what degree I discussed the matter with Mr. Kent or another I cannot at this juncture recollect. There were changes, as I say, in the Public Works Department about that period, but if Mr. Kent was Secretary for any appreciable time after the receipt of Sir George Buchanan's report, the report was very probably and almost certainly discussed with him. It was also open—I draw your attention to that fact—to the scrutiny of the technical advisers of the Government of India as well as that of the Secretary of State, who did not have supervising powers for nothing over the Presidency Government; and they had those powers and were bound to use them.

Q.—I think you have answered the question I have put to you. Was there, in fact, anybody in Bombay to whom you could have turned who could have given you an opinion of value on this technical matter?

A.—Better than Sir George Buchanan, you mean?

Q.—Or as good as Sir George Buchanan.

A.—We engaged our expert. I certainly relied on my expert. That is as general an answer and as clear an answer as I can give to you. I think it was the proper thing to do.

Q.—In reading Mr. Kidd's report, and in reading Sir George Buchanan's report, did you notice that there was a discrepancy as regards the description of the clay?

A.—I really cannot say. I should not be very well aware of a point like that. I have noticed in the evidence that there has been a discussion about hard clay and soft clay.

Q.—I put it to you, and I ask you whether such a thing might not have been considered by you as important enough to discuss it with Sir George Buchanan. The

position undoubtedly is this on the documents. Mr. Kidd described the clay as stiff. Sir George Buchanan in his report in one passage describes the clay as hard. When we come to Messrs. William Simons & Co.'s letter of September 12th, 1919, which was appended to the report, we find it indicated that they are going to build a dredger capable of dealing with soft clay?

A.—I am afraid it is impossible for me to help on that. I engaged an expert, and I left the matter to him.

Q.—I think you will be able to help us, because at present I have not put my question; I have only laid the foundation for it. I am putting the matter to you now not as a technical expert but as an ordinary man reading business documents. The clay is described by Mr. Kidd as stiff; it is described by Sir Buchanan as hard, and the dredger builder is talking about soft clay as the material in which his dredger is going to work. Did any one of your advisers point that out to you?

A.—I do not think any adviser of mine pointed it out to me as far as I can recollect, but they would probably point it out to the Member in charge of the Department.

Q.—Did the Member in charge of the Department bring that fact to your notice?

A.—I have no recollection of his doing so.

Q.—There may be nothing in the point, but it is the sort of thing about which a layman might have made some enquiries. You did not?

A.—That would have been the duty of the Member. I take responsibility for all that my officials did. I take full and complete responsibility during my period of office; I wish to make that quite plain. But from the point of view of administration it would have been the duty of the Member in charge of the Department to have dealt with a matter like that.

Q.—Who was the Member in charge of the Department?

A.—Sir George Curtis at that time, to the best of my recollection.

Q.—We have received information from Sir George Curtis that he is extremely ill?

A.—He wrote to tell me so.

Q.—He has furnished us with a medical certificate which shows us that it is practically impossible for him to come and give evidence?

A.—I am afraid he has had a stroke.

Q.—We must accept that, of course. If the matter had been brought to your attention, or if you yourself had noticed it in reading the documents, do not you think you would have discussed it with Sir George Buchanan?

A.—I am afraid that is a very hypothetical question. It would depend on the circumstances. I cannot pronounce on it now.

Q.—If there is anything at all in the point about this description of the clay, it is a striking circumstance, is it not, that the two experts describe the clay, one as stiff and the other as hard, and that the dredger builders were specifying in the plainest terms for a dredger designed to deal with soft clay?

A.—Whether I should have done anything or not would have depended upon my technical capacity to appreciate whether it was an important point or not.

Q.—We are dealing with very simple words in the English language. If you had had any doubt about such a crucial matter as that——

A—But I do not expect that I should have known it was crucial. The whole point depends on whether I was to consider myself as qualified to judge of a technical matter, having appointed my expert; or whether I was to attempt to deal with it myself. I think it was proper to leave it to my technical expert, who had been appointed with full sanction and approval, and to leave him to deal with the matter, and that it was not for me to attempt to deal with it.

Q.—But it would have been within the province of Sir George Curtis to have said to Sir George Buchanan "Look here, will you explain this. I noticed that Messrs. Simons say soft clay. Is their specification quite all right, because you have talked of hard clay and Mr. Kidd has talked of stiff clay." It would have been within Sir George Curtis's province to have done that, would it not?

A.—If he had appreciated the point as a layman, I think it would have been. It depends upon whether he did appreciate the point or whether he did not. I am afraid I do not arrogate to myself such knowledge as you are good enough to impute to me.

Q.—It was on the documents. Anybody could see it reading the documents. The explanation may be a technical matter, but I suggest it is a thing which would strike any business man—the essence of the scheme being the successful dredging, and one expert, Mr. Kidd, talking of it as stiff clay, and Sir George Buchanan talking of it as hard clay, and then the dredger builders, who are going to make the one machine upon which the whole success of the reclamation may depend, talking in terms of soft clay. Without having any technical knowledge, do not you think that that is a matter which might have struck somebody, either your advisers, or indeed yourself when reading it?

A.—I am afraid I think that that is a purely technical matter which was proper to leave to the expert.

Sir Frederick Hopkinson.—Is not everyone an expert in digging clay? If you have ever handled a shovel surely you know what is the difference between hard clay and soft clay?

A.—I have only handled a coal shovel on a ship. I have not handled a clay shovel, so I am even more ignorant about shovels than I ought to be.

Chairman.—I am going to get away from these details in a moment, but I was referring you a short time ago to Page 29 of the report of Sir George Buchanan. Sir George Buchanan speaks of dredging to the extent of 25,000,000 cubic yards. It is item No. 7—" Filling, mud cubic yards 25,000,000 at eight annas per cubic yard; cost, 125 lakhs." That is the item. I am not suggesting, Your Excellency, that you might have worked the figure out, but did no one advise you in your office—either the Public Works Department or anybody in association with Sir George Curtis—that the dredging plant was going to cost at that moment about £650,000? Was that figure ever mentioned?

A.—I think I knew roughly the price—the probable cost of the dredger.

Q.—650,000?

A.—Yes, I think I knew roughly that it was that kind of cost. I do not remember the actual figure.* I knew it was a very formidable cost, and that it was round about that figure.

Q.—If anybody had been interested enough to have worked out the cost of the dredging plant at £655,000, and had ascertained that 125 lakhs was some £937,000,† they would have found out that it would have left only £282,000 for the working of the dredger and booster, the two shifts or the three shifts, the crew, the reconditioning of the vessels, and everything for a period of five years. I am not suggesting that you should have worked it out, but if anybody had worked it out might it not have struck you, if the figures had been laid before you, that they represented a somewhat insufficient provision?

A.—I am afraid I cannot answer that without notice. You did not call my attention to that, Mr. Chairman. There again it is purely a technical matter. I repeat that I placed my confidence in Sir George Buchanan as the expert. I am afraid I cannot add to that in regard to the matter. I think it was the proper course to take, and we followed that course.

Q.—The letter continues: " He is fully prepared to accept Sir George Buchanan's carefully considered views of the practicability of the scheme from an engineering point of view on the type of wall required for the reclamation and on the method of reclamation." Whilst disclaiming in that letter the offering of any opinion on the technical aspect of the new scheme, did it not occur to you to suggest to the Government of India that it might be desirable that experts at home should consider the documents and reports?

A.—It would not have been my duty to have suggested that to the Government of India or to the Secretary of State. It would have been their business to decide what was necessary to be done in that respect, I should suggest.

Q.—If in this letter you had put in, " On the technical aspect of the new scheme the Governor in Council offers no opinion, but, having regard to the magnitude of the work, he would suggest that it might be advisable to take the opinion of experts in England," the Government of India would not have resented a suggestion of that kind, would they?

A.—I have already tried to point out that there has to be some limit to the consultation of experts as far as the Government of Bombay is concerned. Having appointed the expert with the full authority, knowledge and approval of the superior authority, the matter had to end there as far as I was concerned.

Q.—You make your position perfectly clear.

A.—It was for a higher authority to go into that.

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* Lord Lloyd has subsequently pointed out that Sir George Buchanan allowed roughly 3 annas per cubic yard for plant (47 lakhs) and 5 annas for working expenses (78 lakhs) and that the point for consideration is whether 47 lakhs was sufficient under the exchange conditions of that time to cover the sterling value of the plant.

† Lord Lloyd has subsequently pointed out that the estimates were considered in Bombay in terms of rupees. Sir George Buchanan made this conversion at the rate £1 = Rs. 12 which was a perfectly safe rate at the time. In October 1919, the exchange was £1 = Rs. 10, and it was always still more favourable to sterling purchases up to the date of the sanction of the Secretary of State. Further it was the declared policy of the Secretary of State to stabilize the rupee at 2s. gold.

Q.—I understand your position perfectly. Did Sir George Buchanan ever tell you, before 3rd August, 1920 (that is the date when you made the announcement in the Legislative Council of the creation of the Development Directorate)——

A.—May I ask which of the three questions, of which you have given me notice, you are on now? Then I will get my notes. I am not quite clear where we are.

Q.—Did Sir George Buchanan ever tell you at any time before 3rd August, 1920, that the success of the scheme depended a great deal on the nature of the material dredged, and that that could only be ascertained when actual dredging began?

A.—I cannot remember his having done so or his not having done so. I have no recollection of any such conversation. Perhaps you will refresh my memory.

Q.—I must discuss this with you. Sir George Buchanan made a report in 1922, on the 11th February, and in that report, on page 8, the fifth line, he says: "Much depends on the nature of the material dredged, and that can only be definitely ascertained when actual dredging begins." I want your recollection on this matter. Did Sir George Buchanan at any time before you left Bombay ever tell you that a great deal depended on the nature of the material to be dredged, and that that could only be ascertained when the actual dredging began?

A.—I do not recollect any such conversation or any such information.

Q.—You could not have forgotten that, could you?

A.—I do not think so.

Q.—If you had known——

A.—Let me interpose here. Of course, I knew that you had to have a proper material to dredge. I obviously knew that, but I do not recollect any conversation.

Sir Frederick Hopkinson.—You had to dredge whatever material was there?

A.—Precisely, and if that material was not there it would obviously prevent the scheme being successful. That, of course, I knew, but I do not recollect any conversation with Sir George Buchanan on the actual point to which you have referred me.

Chairman.—If such a conversation had taken place you must have followed it up, must you not, and have said: "Well, we must find out with certainty of what the bed of the sea consists"?

A.—Yes, but I had understood that examinations had been fully made before.

Q.—You are aware, as regards that, that he depended entirely on Mr. Kidd's borings?

A.—Yes.

Q.—Sir George Buchanan disclaimed definitely in his report any responsibility for that, saying that he was relying on and assuming the correctness of Mr. Kidd's borings?

A.—I believe that is so, and I believe that Lord Sydenham's Government were completely satisfied with the work done by Mr. Kidd in that respect. Lord Sydenham was an engineer himself, and spoke, perhaps, with unusual authority for a Governor.

Q.—But whatever Sir George Buchanan put into the report, your recollection is that he never at any time told you that the nature of the material could only be definitely ascertained when the actual dredging began?

A.—I do not recollect that he ever did.

Q.—It gives it somewhat the air of an experiment, does it not?

A.—I really cannot answer that. I can only repeat what I have just said to you—that my understanding always was that Sir George Buchanan was relying upon Mr. Kidd's borings for the nature of the material which he was going to find when he dredged. I think that is accurate.

Q.—Did Sir George Buchanan ever tell you that the first season's working would be experimental?

A.—I have no recollection of it. You must remember it is six years ago. A good deal has happened since then. He may have said so or not, to Sir George Curtis. I cannot say.

Q.—You had before you a report which suggests nothing of an experimental character; that is, the report of Sir George Buchanan, in which he said that the dredging would proceed from the first year to the last year at the rate of 170 working days, pumping 15 working hours, and dredging at the rate of 2,000 cubic yards an hour. That was a definite document and a definite statement. Did he ever qualify that to you by telling you that the first season's work would be experimental?

A.—I do not recollect any such statement at all.

Q.—You could not have forgotten it?

A.—No, I do not think so. I say that I do not recollect any such statement. I am trying to answer to the best of my ability. I cannot guarantee anything at this stage of time. I think I should certainly have remembered such a statement if it had been

made, or made in any important way at any rate, especially if he had told me as a warning or anything of that kind.

Q.—Did he tell you that good dredging masters were rather difficult men to get hold of?

A.—I really cannot remember.

Q.—Did he discuss with you the loss of time that there would be each day—any of those details?

A.—No, certainly not that. I have a vague recollection once of talking to him about the kind of crew which he had got for the dredger. I asked that as a matter of interest, and I think I was told that they were a Glasgow crew, but certainly not the latter point.

Q.—Nothing to suggest to you difficulties which might greatly diminish the output?

A.—Not at all. I understood that the dredging was a straightforward matter, provided you got the right kind of dredger and that the material was there, which I understood was there.

Q.—Will you please turn to page 6 of Sir George Buchanan's report, the eighth line, where it is stated: "In Mr. Porter's letter under reply, it is stated that experience of reclamation by suction dredging is limited in Bombay. I am therefore to point out" —and this is the passage to which I want to direct your attention—" that the large reclamations being carried out by the Port Trust afford exceptionallly complete data for estimating work of this kind." I want to get the position. The position was that Sir George Buchanan was drafting a report to be considered by the Government of Bombay as to whether they should embark on this very large scheme, which, in any event, even on his own show, was running into over £2,000,000. Does not the inclusion of the phrase, " I am therefore to point out that the large reclamations being carried out by the Port Trust afford exceptionally complete data for estimating work of this kind," imply to your mind, when you read it, that the data were satisfactory?

A.—The Port Trust data?

Q.—Yes?

A.—Certainly.

Q.—Obviously; and not only that, but that Sir George Buchanan was acquainted with the exceptionally complete data. He is there pointing it out?

A.—Let me read it again. I think that would follow, but I must read the context for a moment.

Q.—The position is this. Mr. Porter was raising a doubt as to whether it was a wise thing to do this reclamation.

A.—Who is Mr. Porter?

Q.—He must have been a Secretary, I think.

A.—Not in my Government?

Q.—No, the Government of India. He was casting doubt as to whether it was wise to do this reclamation by means of dredging, because the experience of the employment of suction dredgers on a large scale was limited, and reclamations on a large scale were limited. That is the context. Then the writer of the letter rebuts that by saying: " I am therefore to point out that the large reclamations being carried out by the Port Trust afford exceptionally complete data for estimating work of this kind."

A.—Yes. Then I should concur in your view which you expressed in your question.

Q.—It was a heartening statement?

A.—I think so.

Q.—At that date I assume you did not know what the Port Trust dredgers had been doing? You would not know?

A.—That was at what date?

Q.—November, 1919.

A.—No, I should not think I knew. I knew that, on the whole, the Sewri Reclamations were being very successful, and I gave some figures in a public speech which I made at the Indian Merchants' Chamber, I think, in which I quoted the accuracy of the Sewri Reclamation returns.

Q.—I hope you did not give the figures of the performances of the " Kalu " and " Jinga," to which I am coming, because they present rather a different aspect?

A.—I have those figures somewhere, I think.

Q.—I will give them to you now. You may take this as a fact, from the documents which have been given to us—that the " Kalu " and " Jinga " were the two dredgers which are indicated in this statement incorporated in Sir George Buchanan's report. I think there will be no doubt about that.

A.—I should be grateful if you told me which broad question you are asking me about now, so that I can turn up my notes. Is it possible?

Q.—I think for the moment that I have perhaps gone a little away from the broad questions.

A.—I have something about those dredgers here which occurred on another question. I will try to find them.

Q.—My question is very simple, and can be answered in a moment. You may take it that it has been satisfactorily proved to us, and that it is not a matter of controversy, that the " Kalu " and " Jinga " were each designed to dredge 2,000 cubic yards an hour?

A.—I cannot say.

Q.—I am asking you to take that from me as a matter not in contest or controversy at all. I am also asking you to take it again as a matter beyond controversy that, according to the figures, instead of those two dredgers dredging 2,000 cubic yards an hour in the whole of their four or five years' work, they averaged 1,126 cubic yards an hour. That is roughly 50 per cent. If you had been told the " Kalu " and " Jinga " had been built by Messrs. Simons, that Messrs. Simons were the proposed builders of the new dredger, that over the four years during which those dredgers had been working they had done about 50 per cent. of their guaranteed output, would not that have struck you as a serious matter for consideration?

A.—I presume it would, certainly.

Q.—And as a matter hardly borne out by the statement on page 6, lines 10 and 12?

A.—I am afraid I cannot add to my previous reply. That would seem to me to be certainly a heartening question, to use your own phrase.

Q.—Take it that that seems to be a heartening assertion. The performances of the " Kalu " and " Jinga " were disheartening, were they not, on that basis of 1,126 cubic yards per hour?

A.—Certainly disheartening in total result. Whether it was due to the crew, or to the management or to the engineering, I cannot say. I am taking your figures. I do not know about them.

Q.—Now I am coming to another point altogether, with regard to Sir Lawless Hepper.

A.—You are coming to the appointment of Sir Lawless Hepper, are you?

Q.—Yes. With regard to Sir Lawless Hepper, you had preliminary discussions with him, he says, in about December, 1919 or 1920?

A.—He would know. I do not recollect. I am sure he would be accurate about it.

Q.—He was at that time in a very important position as Agent of the G.I.P. Railway?

A.—That is right.

Q.—A position needing considerable organising ability, in control of a very large number of men, and a position carrying a very handsome salary?

A.—I cannot say what you consider a handsome salary. He was in a very important position.

Q.—According to him you discussed the question of salary and he made his own conditions?

A.—He had a very good salary.

Q.—He has disclaimed any suggestion that he was employed because of any technical knowledge. What do you say as to that?

A.—I should not agree in those terms. Sir Lawless Hepper, if he had not been an engineer and not had various other qualifications which seemed necessary for the task to which he was going to be put, probably would not have been appointed, speaking in general. Sir Lawless Hepper was selected as Director of Development because the success of the development scheme depended, to a very great extent, on the capacity of whoever was appointed at the head. The work, as you know, was of a very exceptional character, and its operations were on a very large scale. We had to combine in our Director a great many different qualities. It was necessary that the Director first of all should have a very close acquaintance with local conditions. We might have got somebody from America or from a great distance, but it would have taken him two or three years in which to learn the local conditions. It was therefore considered important that we should get a man who already knew the local conditions. It was very important that he should understand traction and transit problems, because the whole of that island problem (not the whole of it, but a large part of it) is a traction problem. He had these two qualifications in a very high degree. He knew the place intimately. He was acquainted with the traction problem, as you have just pointed out. He had had a distinguished career as a railway engineer, and he was then holding a very important post on a railway, as you have also pointed out. He had been further proved during the war by his work as the Local Controller of Munitions, and he stood, I think I can say, exceptionally high in the estimation of the Government of India, and,

what was also of great importance, he stood very high in the estimation of the public of Bombay. We had to raise public loans, and it was very important that the Director of these works should have the confidence of the public from whom we were asking money. The local public, in a narrower sense, had great confidence in him. As a railway agent, as member of the Port Trust and City Improvement Trust, he was very well acquainted with all the local conditions, and, combining those four qualifications, he seemed to be almost unique in experience for that particular post. Those were the considerations which led to his appointment. Therefore, to some extent, his engineering, in a general sense, was a qualification—not very specific.

Q.—I think, perhaps, Sir Lawless Hepper was limiting his answer to the particular problems which the Back Bay reclamation presented when he disclaimed any technical knowledge of those problems. Who was the person, or firm, responsible for the carrying out of the works?

A.—I am afraid I do not quite follow you.

Q.—Was Sir Lawless Hepper the person responsible for the carrying out of the works in Back Bay, or were Messrs. Meik & Buchanan, or Sir George Buchanan, responsible for it?

A.—That is not a question to which can be answered yes, or no. You have taken a great deal of evidence on this question, and perhaps it would be better if I described to you what were his functions.

Q.—The functions of Sir Lawless Hepper?

A.—Yes.

Q.—If you please; that is what we want to get at really.

A.—I do not know if this Committee thoroughly appreciates, for instance, the Department over which he presided, and its constitution and organisation. I think that should be quite clear in your minds, if I may make it so.

Q.—Will you please tell us the organisation of the Development Directorate, and then, if you please, tell us with regard to Sir Lawless Hepper's special position?

A.—I will do my best. In describing the duties of Sir Lawless Hepper, and his relations to the local Government, it is necessary to distinguish between the Secretariat Department and the Executive Organisation, since the term "Development Department," I notice, has been used to cover both. The Secretariat Department, for any activity of Government, is the organisation which deals with the business which comes before Government and through which they issue their orders. I think that is natural and plain. The Secretary is the principal of the Department, responsible to Government for the conduct of business and for the issue of their orders. He is the channel; but the Secretary as such (and anyone familiar with the organisation in India will know it) has no executive powers. The Executive is usually a separate organisation presided over by a separate officer, often known as the head of the Department. In this case which we are discussing the Executive Department was known as the Development Directorate, and its head is the Director. I can give you a suitable analogy in the case of Public Instruction in India. There is a Secretary to Government for Education, who is the channel through which Government deals with education, and the executive head of the Department is the Director of Public Instruction. I hope I have made the position clear. The Secretary to Government in the Development Department was also the deputy of the Director in the Executive Department. Is that quite plain?

Sir Frederick Hopkinson.—It is perfectly clear to me.

A.—Sir Lawless Hepper's relations to the local Government, generally speaking, are the same as those of the head of any other Department. Any difference was largely in the exercise of discretion. In the Back Bay Reclamation Scheme his functions were qualified by the agreement with Meik & Buchanan, who ultimately became responsible for performing the work and duties set forth in that agreement. I need not recite the terms of the agreement, because they are before you. Messrs. Meik & Buchanan designed the works, and the Director was responsible to Government for ensuring that the works were carried out according to the firm's designs by the chief engineer. The programme of work was set forth from time to time by Sir George Buchanan. The relations of Sir George Buchanan and Sir Lawless Hepper to Government might be described in general terms by saying that the former was responsible for the strategy, and the latter for the tactics, of the scheme. The Director was responsible, for example, for organising the staff, though the principal appointments required the orders of Government, while the chief engineer's appointment was subject to the nomination of Sir George Buchanan. These were not watertight compartments, and that is the difficulty of answering your question absolutely precisely. In no great organisation can it be so. The staff recruited in England was engaged by the India Office or by the High Commissioner's Office, and the selections were usually made on the recommendation of Sir George Buchanan. The Director was also largely responsible for obtaining plant accord-

ing to the plans and specifications of Sir George Buchanan. He was the Government watch-dog. That was his main function. It was his duty to see that the organisation was working efficiently and economically. Any departure from the technical proposals of Sir George Buchanan or any proposed action in disagreement with the latter, would have been referred, presumably, to Government for their orders. That is about as precisely as I can give you the relations between Sir George Buchanan and the Director of the Development Department. Does that in any way answer your question?

Chairman.—Yes. On that I might base a question at once. Take your last passage. Suppose Sir George Buchanan had indicated that a pipe-line should be laid along a certain course in Bombay, and suppose Sir Lawless Hepper had thought another position would be more convenient? Whose decision would have been adopted—the engineer's or Sir Lawless Hepper's?

A.—It is rather a hard question to answer, put in that form. It is hypothetical and it requires a good deal of thought. It depends on a good many things. In my judgment, it would depend very much on the importance of the change proposed. Sir George Buchanan's general designs and plans had to be adhered to. He was responsible. In all tactics that were in accordance with the strategy laid down by Sir George Buchanan, I should say that, generally speaking, the Director was responsible.

Q.—But suppose Sir George Buchanan cabled out, "Pipe-line is to be laid along such-and-such a point," was not that decisive as to where the pipe-line was to be laid?

A.—I should think so.

Q.—What had Sir Lawless Hepper to say to that?

A.—I should say he had to fall in with Sir George Buchanan's instructions if they were definite and of anything like major importance. I am speaking generally.

Q. I wanted to get your view of an instance such as that. Will you continue?

A.—That is all I have to say in general explanation.

Q.—Now I want to take you to two statements, one made by Sir Leslie Hudson, as representing the Chamber of Commerce. It is on page 145, 95Z.

A.—Have you done with the organisation of the Development Department for the moment.

Q.—Is there any other matter with regard to the Development Department on which you can help us at all?

A.—I do not think there is. Perhaps you will let me look through it at the end. This is the point about Sir Leslie Hudson's statement, is it?

Q.—Yes. Sir Leslie Hudson's statement was given on the 12th August. The statement is headed: "Written statement of the attitude of the Bombay Chamber of Commerce towards the Back Bay scheme." Sir Leslie Hudson was giving evidence in a representative capacity. The Bombay Chamber of Commerce say this: "In regard to the past history of the Back Bay reclamation, the points which the Committee desire to emphasise are, the wholesome practice of consulting commercial opinion was departed from; the scheme was matured and carried out behind a veil of official secrecy." Will you give us your views upon those statements?

A.—I shall be particularly glad to.

Q.—We invite you to do so.

A.—I may summarise the criticisms made by Sir Leslie Hudson into four. The first is that there was no official summary of the scheme—apparently the Industrial Housing Scheme—published before August, 1920.

Q.—That has reference, I think, to a few pages further on. Perhaps I had better read that so as to get it on the note. I have read No. 1 and No. 2, and I will now read No. 3.

A.—The second one was that the representative of Bombay was not supplied with the information for which he asked the Director. The third one, you have just read out—about the wholesome practice of consulting public opinion, and the fourth is that the scheme was matured and carried out behind a veil of official secrecy.

Q.—Those are the four.

A.—In support of criticism No. 4—that the scheme was launched and carried out behind a veil of official secrecy—Sir Leslie Hudson cites criticism No. 2—that the representative of the Bombay Chamber of Commerce on the Advisory Committee of the Development Department was not supplied with the information for which he asked the Director, and also a lecture by Sir George Curtis before the Royal Society of Arts in July, 1921. The passage in the lecture just referred to appears to be the following:—

> "In order to give effect to the proposal to impose a town duty on raw cotton it was necessary to amend the Municipal Act. A Bill for this purpose was introduced in the Legislative Council by the Governor who made a lengthy speech outlining the whole policy of the Government. Owing to the necessity of preventing speculation in land, great secrecy in the plans of Government were essential, and when His Excellency placed the proposal before the Council, it took

both the Council and the public by surprise Accordingly it was decided to start a propaganda explaining exactly what the various projects were . . ."

That is the quotation which suggests secrecy. It depends what you mean by secrecy, to start with. I do not deny for a moment that there was secrecy at the outset regarding some acts necessary to further the development schemes, but I can assure you unhesitatingly that there was no unnecessary secrecy whatever. Secrecy is essential in the initial stages of some actions of executive Government. Such an occasion arises, for instance, when it is proposed to levy fresh taxation. The closest secrecy is observed. It is seldom that Government can proclaim a fiscal intention before its plans are fully matured. It stands to reason. Sir George Curtis's reference to secrecy specially relates to the Bill imposing a town duty on raw cotton imported into the city of Bombay. It could also refer to land acquisition proceedings. No reasonable person who knows the procedure governing the acquisition of land by Government in India expects the Government to proclaim their intentions before their plans are complete and their notifications ready. It would lead to widespread and wholesale speculation, and land speculation has already been the bane of this particular scheme and has added very largely to the housing troubles. It was entirely contrary to public interest to give such information to the public beforehand. Therefore it is not secrecy that is complained of; it is the degree of secrecy and propriety of secrecy. In my speech at the Legislative Council on the 3rd August, 1920, which is the subject of the first part of Sir Leslie Hudson's evidence to which my attention has been drawn, the Committee will find no reference to the financial operations by which the Bombay Government proposed to finance at the outset, not only their own development schemes, but also those of the Municipal Corporation, the Port Trust and the Improvement Trust. Those plans, also, were certainly secret, and essentially and inevitably so. Governments do not announce their plans regarding loans before they are complete and the time is ripe for inviting subscriptions. Those are two instances where I think the Committee will unquestionably agree that secrecy must, in the public interest, be observed. Especially in the matter of loans the Government of India is also concerned, but subject to such considerations of public interest, and, if need be, the prior approval of the Government of India or the Secretary of State, there was no concealment or secrecy of any kind. Most of the development schemes have been for years the subject of investigation by Committees, and of public discussion. They were discussed after my arrival in Bombay, and before they took final shape, with the leading citizens. So far from there being unnecessary concealment, my speech at the meeting of the Legislative Council on the 3rd August, 1920, makes it perfectly clear that the earliest opportunity was taken of explaining the proposals to the Legislative Council and thereafter of giving the widest possible information to the public. It is a matter which the Indian members of the Committee are as well able to judge as I myself, namely, that I have been constantly told that I was considered rather a bore in India, because every speech I made referred to the Development of Bombay. I certainly spoke annually at the Municipal Dinner when they were good enough to invite me. I do not recollect that I ever made a speech without referring very largely to that question. I think Mr. Billimoria will bear me out as regards that. The Legislative Council were fully acquainted with our project and gave it unanimous approval. I doubt whether there has ever been so large a scheme so fully explained which has met with such unanimous approval. Sir Leslie Hudson's second charge is——

Q.—If you are leaving that, I think, as I read it, the criticism of the Bombay Chamber of Commerce is not having taken the public into your confidence prior to the 3rd August, 1920. On the 3rd August you announce the creation of a Development Directorate as an accomplished fact. I think the Chamber of Commerce's view is that it was prior to the 3rd August, 1920, that some indication ought to have been made.

A.—What was the date on which I spoke to the Legislative Council?

Q.—August 3rd, 1920. It is prior to that date.

A.—That is a most undemocratic comment of Sir Leslie Hudson's. I have a regard for him, but I should regard that as an almost frivolous complaint. The right place to discuss projects of Government is the floor of the House, with the representatives there.

Sir M. Visvesvaraya.—The charge is that the public bodies were not consulted.

A.—But they were consulted for years—over and over again.

Chairman.—The public bodies were certainly not consulted with regard to the Back Bay scheme. Consider Back Bay by itself for a moment. There was never any consultation with any of the public bodies, or any general official announcement. The Government have under consideration the reclamation of 1,145 acres of Back Bay, and then a general announcement of the scheme. There was no previous communication. That is what I take to be the complaint.

Sir Frederick Hopkinson.—They were committed to the scheme by the placing of the order for the dredger.

Chairman.—The complaint, which must be dealt with, is that none of the public bodies were told that the Government had in mind this reclamation of Back Bay, and that on August 3rd, 1920, it was announced to them, without their having been previously consulted. It is true that the reclamation had been in the air for 50 years, but this particular scheme came upon them as a surprise. That is the point.

A.—It had been more than in the air. It was public knowledge amongst all these gentlemen as to what was going on. The proper body to consult, and on which they were represented, was the Legislative Council. I am afraid I cannot retire from that position. That is the constitutional and proper body to decide, and they had their representatives there, and they were there consulted, just as the public was.

Mr. Billimoria.—When you went to consult them, it was an accomplished fact?

A.—Nothing is ever finally accomplished until it is properly sanctioned.

Q.—It had been sanctioned?

A.—I am coming to that in one moment. Sir Leslie Hudson's second charge is that the representative of the Bombay Chamber of Commerce on the Advisory Committee was not supplied with information for which he asked. Although the Bombay Chamber of Commerce enumerated this in a written statement as one of the points they desired to emphasise, their representative who appeared in support of the charge of the criticism did not supply this Committee of Enquiry with a precise account of the information they wanted. All I can say on this point is this—that the Bombay Chamber of Commerce never hesitated during my term of office to let me know of any grievances they had; and the fact that this matter was not represented by them to me in some way indicates that either they did not attach importance to it at the time or that the Director was as justified in refusing the request as he was in refusing to discuss the proposal that the reclamation scheme should be abandoned. Moreover, I attended nearly twice the number of times of any of my predecessors the Annual Meeting of the Chamber. Never on any occasion was any complaint made to me. I was constantly accessible to the Chairman of the Chamber of Commerce at any moment, at any hour practically. I never refused an interview to that body, or as far as I know to any other public body of repute. Therefore it is ridiculous to say that if they had any anxieties or preoccupations in regard to this matter they had not ample opportunity of coming to me and asking for information or complaining that they had not had it. It is true that a copy of Sir George Buchanan's report was not sent to the Bombay Chamber of Commerce for their information.

Chairman.—Or to the Indian Merchants' Chamber or to any of the other bodies?

A.—I doubt whether a similar engineering report and estimate was ever issued for public consideration in Bombay. The plain fact is that by the time Sir George Buchanan's report had been received the reclamation of Back Bay had been discussed nearly to a conclusion. Several syndicates were pressing for a concession and the time was ripe for a decision. Government cannot consult and discuss for ever. I have made that point before. These very charges of secrecy and lack of information are partly due to the unnecessarily protracted discussions on other subjects in the Legislative Council. It is not sufficient merely for Government to supply information. It is most desirable that their policy and action should be discussed at the proper place and time. I make that a great point, because I had constitutional duties to carry out, and it was proper that the Legislative Council should be the scene for the approval of the public. The public had to get used to that being the fact in India, especially as the Reforms had come along. As regards the Back Bay scheme, it came under the review of the Legislative Council at least once a year at Budget time, and it could have been raised at the other session; but the House concentrated their attention on other and what appeared to them to be more, but which appeared to me to be rather less, important matters very often.

Sir Frederick Hopkinson.—The charge has been made that those reports of the Development Director which were sent in annually were extremely meagre and did not give a fair representation of the figures and work?

A.—May I just finish what I was going to say about publicity?

Chairman.—The last point you were making was that this matter came up before the Legislative Council.

A.—Yes, at least once a year at Budget time. If they did not choose to discuss it but preferred to discuss what seemed to me to be less important matters, but which appeared to them apparently to be more important questions, it was not the fault of Government. Furthermore, I think you will find it a fact that never, in five years' office, did I ever on a single occasion refuse requests for extra days for debate when it was in my statutory powers to allow them. I have checked my own recollection with that of my Private Secretary, who happens just to have come home, and he agrees with me that on no single occasion did I ever refuse a demand for extra days. Therefore they had ample opportunity of raising this question even in spite of their own desire to talk on other matters at too great a length. I hope the Committee will notice that

point, because these charges which are brought up now of secrecy were not even suggested at the time, or where they were suggested, they were instantly rebutted. If the Bombay Chamber of Commerce were ever seriously dissatisfied in this matter, I never heard it. When I left Bombay this Chamber gave me an unsolicited testimonial—a public expression in no ordinary terms—of their appreciation of my accessibility and readiness to give assistance. I had been to their meetings far more often than my predecessors. I had been very accessible to them. If further evidence of the intention of Government to keep the public informed is wanting, I invite the Committee's attention to the request made by the Indian Merchants' Chamber and to the responses to those requests, particularly to my correspondence with that Chamber in July and August, 1921, and to my speech to them of the 9th August, 1921.

Q.—I am coming to that in a moment.

A.—That speech was made to them in response to public anxiety. I made a special visit to the Indian Merchants' Chamber. When there was public anxiety on the matter I came purposely down from Poona to address the Indian Merchants' Chamber with full publicity.

Q.—Still, the position is prior to August 3rd, 1920. That, I think, is the point?

A.—I think I have answered that in the first part of my reply.

Q.—That the constitutional method and proper place was the Legislative Council, you say?

A.—Yes, certainly. Long before the revised project estimate was settled I gave to the Indian Merchants' Chamber early and full information of the increase which appeared to be inevitable in the estimate, the amount of interest involved, and the consequent financial position of the whole scheme. Looking back, it was perhaps rather a risky thing to do, but at least it absolves me from any charge of concealment from the public. They had the fullest information. I caused my speech on that occasion, and the correspondence, to be published in full in the Press. At the very outset of my Governorship I took another step which was entirely new. I started the policy of keeping the public fully informed of all Government actions in a way in which they had never been informed before. It was on my own personal initiative that a Publicity Officer was engaged for the first time by the Government of Bombay. His function was to meet public criticism of this kind and to ensure that Government's explanations were effectively published. Further, on my own initiative, Advisory Members were appointed to the Development Department. Every possible and proper method of keeping the public informed was taken. I should like to take this opportunity, as this criticism has been made, to pay a very high tribute to the admirable work done by our Publicity Officer, Mr. Gennings, in this matter as in others. It is a most unfair criticism of his work as regards keeping the public informed. No public was kept better informed of the progress of a project of this kind than was the Bombay public. In our own interests it was necessary to do so, in as much as the public were interested both financially and administratively in the matter.

Mr. Billimoria.—It has been suggested that the original figure of 367 lakhs, in Sir George Buchanan's estimate, was never mentioned to any public body. The first announcement was with respect to the 702 lakh scheme. The Indian Chamber complained about it very seriously. That was only announced in Your Excellency's speech of the 9th August.

A.—I cannot answer that without notice.

Q.—The complaint is that the figure of 367 lakhs referred to in Sir George Buchanan's estimate was never brought to the notice of any public body?

A.—I think I have dealt with that. I said that a copy of Sir George Buchanan's report was not sent to the Bombay Chamber of Commerce and presumably not to other bodies either for their information. I went on to say that I doubted whether a similar engineering report and estimate was ever issued for public consideration in Bombay. You must remember that there was a great deal of land speculation about. There were grave difficulties in connection with speculation, and the attitude of certain sections of the public had to be taken into consideration. I am prepared to accept as possibly true that that was the case, but I cannot recollect whether that was so or not.

Q.—With regard to that point of speculation, it has been suggested in Bombay that there would have been no speculation, since you were creating more land. Rather than speculation, it would ease matters. The public would have felt that there was more land going to be created, and the speculation would disappear. I am simply mentioning what has been suggested.

A.—I cannot myself easily conceive the conditions under which land speculation will cease in Bombay, so engrained has it been for so long, but I think if any prior

warning and been given of our intention to involve the knowledge of the public in areas of land that were likely to come under notification, that certainly would have increased the speculation very largely. I think you are aware of a case which I have in mind. I do not want to mention any specific cases.

Chairman.—I think Mr. Billimoria may have commercial knowledge of it—certainly I have judicial knowledge of it—the extraordinary value which land attains as soon as it is known that Government wish to have it.

Mr. Billimoria.—Quite so, but what the public feel is that when you are going to reclaim 1,145 acres of land, all that land would come on to the market and the high prices would go down, so that there would not be any speculation. It would be the other way about. It would ease conditions in Bombay and not lead to any speculative tendencies. That is what commercial men are suggesting now?

A.—Those are niceties of opinion which may be right or wrong, and governments are fallible like anybody else. Our desire right through was to give the fullest information possible consistent with our duty and our responsibility. I do not think anybody who has examined the speeches which were made, and the publicity which was given, can really be under any doubt that our desire and practice was to take the public entirely into our confidence.

Sir Frederick Hopkinson.—Before you leave that, may I ask if your publicity officer was responsible for the Development Directorate Annual Report?

Chairman.—He was not. Sir Lawless Hepper said definitely that he was the author of the Development Directorate Reports.

(*Adjourned for a short time.*)

Chairman.—I think you would like to go back to the question of the "Jinga" and "Kalu"?

A.—There is one thing that I could not find before in my notes. I only wanted to say as regards the point that I think you, Mr. Chairman, made about the failure of the "Jinga" and the "Kalu," and the performances of the dredgers for the Sewri scheme, the fact remains that the reclamation was successful, and the actual cost was within 5 annas of the original estimate of Rs. 4.7 per square yard. Whether they failed or succeeded the work was done within 5 annas of the estimated cost. If you want the details, I think in the original estimate it was Rs. 2 per brass for pumping, and in the actual cost it was only Rs. 1.4, which is equivalent to Rs. 5.4 per cubic yard. I memorised these figures the other day, and I had them taken out from my speech to the Indian Merchants Chamber in August, 1921, which information was supplied to me by the Port Trust authorities themselves prior to my making that speech. Therefore I am not concerned with the success or failure as a technical matter, of the "Jinga" or the "Kalu." I only want to say what my knowledge was at the time that the Sewri reclamation had come out within a very, very few annas of the estimated cost.

Q.—When you say "at that time" you mean when you were making your speech on the 9th August, 1921?

A.—Yes.

Q.—On the 3rd August, which was the date when you put the matter before the Legislative Council, you did not know that the "Kalu" and the "Jinga" had done together 1,126 cubic yards per hour instead of 2,000?

A.—Probably not, but I knew at that time in a general manner that the Sewri reclamation returns had been very good and very successful.

Sir Frederick Hopkinson.—Of course the important point in relation to that is that one dealt with 1908, 1909 and 1910, and the future work was beginning in 1920. The element of time comes in, and is there the most important thing?

A.—Of course it is for the Committee to use what I have said in the manner that they think appropriate. I wanted merely to make that point clear.

Chairman.—Have you discussed as fully as you wish the statement of Sir Leslie Hudson to which I referred you?

A.—I think so.

Q.—Then may I call your Excellency's attention to the statement made by Mr. C. N. Wadia of the Millowners' Association. Will you turn to page 303 of the evidence given in India?

A.—Yes.

Q.—You see that Sir M. Visvesvaraya puts the question to Mr. Wadia: "You say in your statement," and then there comes this in inverted commas, "A Government with a well organised cadre of engineers ignoring all ordinary precautions and business methods long and successfully pursued by their predecessors." That was a criticism by the Millowners' Association contained in a statement submitted by Mr. C. N. Wadia,

their representative. " Do you refer to the Public Works Department? (*Mr. Wadia*) : I refer to the procedure generally. Whenever Government in the past has carried out a work of this magnitude they have first of all invited the light of public opinion fully, fairly and at length. When they have had that public opinion they have considered these various opinions tendered to them and then they have estimated the cost and put the work out to tender. Instead of this, the Government conceived a scheme, they bottled it and so we knew nothing about it until they were driven to disclose it in Council." I think in your comments with regard to Sir Leslie Hudson you have covered this matter to a large extent. Is there anything that you would like to add with regard to it?

A.—No. With regard to that reference I do not accept Mr. C. N. Wadia, with all respect to him, as an authority on what the Government has done in the past or does do at present.

Q.—He is a representative of the Millowners' Association?

A.—With whom I had a close connection all the time that I was in India, but even so, I should not accept the Millowners' Association as being at all a good authority on the methods of the Bombay Government or any other Government in India. I prefer my own statement to the Committee to that of any representative outside. I think I am better qualified to know that point.

Sir M. Visvesvaraya.—That is the opinion of another representative besides Sir Leslie Hudson. Several witnesses agree that public opinion was not consulted.

Chairman.—Mr. Ewbank has just told me that although he is printed here on page 13 as coming from the Millowners' Association, the Millowners' Association has written to say that he was not their representative when giving evidence. I have only just heard that. Therefore will you deal with it now as a personal statement by Mr. C. N. Wadia, a business gentleman of very considerable position in Bombay?

A.—But not at all in a position to judge as to what the methods of Government had been in the past, or were at present, nor, I think, qualified, although I have great regard for Mr. Wadia, to express such an opinion as he expressed, especially as he was not careful to be accurate. On what does he base the fact that we were driven to disclose it in Council? Who drove us to disclose it? Nobody could have driven me to disclose it in Council if I had not thought it proper to do so. It was done *proprio motu*, in the ordinary course of public business. He has got no evidence for it. It was done voluntarily by my Government in pursuance of their ordinary method of putting everything possible in the public interest before the public.

Q.—Was the question of the creation of the Development Directorate discussed between yourself and the members of the Government before your speech of the 3rd of August, 1920?

A.—I cannot remember the actual date on which the Development Directorate was set up.

Q.—You may take it that August the 3rd, 1920, was the first date on which it was publicly announced that there was going to be such a body created. Will you accept that? That is in your speech.

A.—I can answer it, perhaps, best in this way, that from the very first moment we began to consider the method of carrying out these works, the composition and organisation of the Development Directorate was a matter of consultation between myself and my colleagues.

Q.—I assume that you would not have made a speech announcing the creation of the Development Directorate unless it had been a matter of consultation between you and your colleagues?

A.—Very fully.

Q.—Whatever people may have alleged came as a surprise to the general public, it would obviously be no surprise to the members of your Government, who would know exactly what you were going to do?

A.—Yes; not only the members of my Government, but one of the most brilliant and devoted Civil Servants, who is, alas, now dead, Mr. P. J. Mead, who was Revenue Secretary, and Mr. Monie, who was also a brilliant servant. They were, of course, fully consulted, and also assisted in devising this. I am afraid that I cannot claim complete credit for these things. It was largely done by my colleagues.

Q.—Your Excellency will remember that in the letter of December the 4th you were fully prepared to accept Sir George Buchanan's view on the type of wall required for the reclamation. That is on pages 10 and 11?

A.—I remember seeing it.

Q.—Was that approval as regards the type of wall given in the belief that that wall would retain whatever they pumped into it?

A.—I think so, certainly. I think I may answer that without hesitation.

Q.—Now we come to the other matter, the question of how it was decided to begin the sea wall from both ends. May I introduce it by referring you to page 2 of the Report of Sir George Buchanan, dated the 11th of February, 1922?: "Under the orders of Government, the construction of the new wall is being proceeded with from both ends simultaneously, instead of from one end, as originally schemed, involving an increased expenditure in machinery and plant"?

A.—Yes.

Q.—That is how Sir George Buchanan reports on the matter in 1922?

A.—Yes.

Q.—That it was a departure from the original scheme and one which would involve an increased expenditure in machinery and plant. Would you tell us from whom came the suggestion that the wall should be built at both ends and the reasons for it?

A.—I cannot remember from whom the original suggestion came, but it was a subject of discussion as to how best to proceed with the work between myself and my colleagues and advisers generally. Therefore, I cannot remember exactly who was the inspirer of the idea. It was a thing that would naturally arise for consideration.

Sir Frederick Hopkinson.—Why would it arise for consideration, because the whole thing was settled in the original scheme?

A.—I will explain it if I may. It would arise naturally in my view because any method that could possibly speed up the work would be constantly in our minds in view of the large sums outstanding. It seemed to me a very proper thing to consider from time to time how the work was going on and if there were possible improvements that could be made, but apart from that general consideration, the relief of congestion in the fort required that the area near Church Gate Street Station, which you no doubt know on the map, should be reclaimed and be ready for development as soon as practicable. The land in this locality would be the most valuable and the most readily saleable. It was, therefore, a sound business proposition to get it ready before other areas, in order to obtain receipts, thus recouping capital expenditure and reducing interest charges. This position was modified by the Agreement with the Government of India for the disposal of the area at Colaba, the military area. With a ready purchaser it was even more desirable on purely business grounds to recover the purchase money as soon as possible. It was still true, however, that both for the relief of congestion in the fort and for quick recoupment of expenditure the area near Church Gate Street Station should be developed before the middle blocks. I was informed that from a technical engineering point of view the work should proceed from the Colaba end, although facilities for commencing work were better at the Northern end. Sir George Buchanan agreed that it was practicable to start work at both ends. I think you have evidence of that.

Chairman.—Yes.

A.—I am not aware that any additional cost was incurred. The decision was based on pure business grounds after its practicability had been reported by Sir George Buchanan. The decision was not effected, as I see was suggested by somebody, by any consideration of a spectacular propaganda.

Q.—Sir Lawless Hepper referred to that.

A.—I am afraid that I cannot agree with him, and it certainly did not occur to me. It was pure hard business. Rightly or wrongly, it was considered to be an improvement to do it in that way for the reasons which I have stated. Something has been said in the evidence about additional plant being required in consequence of this decision. I think this must be on the later development. The "Kalu" was originally purchased for the Colaba reclamation. There was a subsequent arrangement by which this dredger, and indeed all plant required for both reclamations, was debited to the Back Bay reclamation. Have you got that clearly? It was to be credited to the proportionate cost of work done for the Colaba reclamation. That is the best reply that I can give to you on that point.

Q.—When you say that your advisers put this matter forward, you had no advisers around you with technical knowledge, had you?

A.—Technical advice of the land department?

Q.—Technical knowledge of an enterprise such as the Back Bay Reclamation?

A.—On the technical side for its possibility and feasibility I relied, of course, upon our technical adviser, Sir George Buchanan. As regards the advice of experts further than that I presume we would refer to people who were qualified to judge as to whether it was a good business proposition to do it in that way or not from the point of view of recoupment.

Q.—A good business proposition, including, of course, the ability to consider the possibility of increased cost; to look at the matter all round?

A.—Yes. We must judge of our capacities there. We had a great many business men with whom we were in constant consultation and discussion. I cannot remember

who they were at this juncture, but we were not living an isolated life, neither my Government nor my advisers. They were meeting people constantly and discussing these projects, and I adhere to the view to-day very strongly. I think that is a good course to pursue from a business point of view to reclaim that area for recoupment purposes.

Q.—Can you tell us at all what person suggested it?

A.—I am afraid I could not.

Q.—The first intimation we have got of it is in a telegram dated 4th July, 1920, which is a telegram from yourself: "His Excellency would be glad of your telegraphic opinion as to the feasibility of beginning work at both ends at the same time. Military authorities concerned in getting reclaimed land adjacent to Colaba are anxious that Colaba end should be reclaimed as early as possible." That was always the intention, was it not, that the Colaba end should be pumped into first of all?

A.—I think so, as far as I recollect. I think that was following upon Sir George Buchanan's original advice.

Q.—That the Colaba end, Block 8, should be pumped into first of all, and the military were going to acquire some 239 acres of Block 8. The original intention was to build this sea wall along, keeping the sea wall sufficiently in advance for the pumping operations?

A.—I think that was certainly roughly the case. I cannot tie myself down to numbers of blocks, because they have altered them all since I was there.

Q.—What is now marked on that map as Block 8 is at the Colaba end?

A.—That is right.

Q.—The agreement with the military would give you over 240 lakhs?

A.—240 lakhs, or rather over, that was the arrangement that I made myself.

Q.—It would give you that money immediately. It was obviously good business to fill that in as speedily as you could?

A.—Quite so.

Q.—And at the same time it was not good business to have a long length of wall lying idle?

A.—I could not express an opinion from a technical point of view.

Q.—Think, to put a lot of money into a long length of wall which was in fact lying idle?

A.—Quite so. It is a matter of opinion purely.

Q.—What opinion have you about that?

A.—I do not wish to offer opinions on technical matters, because they go very far. From a commonsense point of view I should be inclined to agree, but I do not want to be led into giving views on subjects on which I am not qualified to express an opinion.

Q.—There is no danger of that?

A.—I am very flattered to hear you say so.

Q.—Then the telegram runs: "On the other hand, His Excellency believes you considered necessary to start Western end first on account of railway communications." I think we have been a little puzzled by that, because we can find no reference to that in any report or correspondence. Can you tell us at all upon what that belief was based?

A.—No. My recollection is too vague to give you any considered opinion, but I have some vague recollection that it was to do with railway traffic and making room for it at that end. I have a vague recollection of that, and I think I am right in my vague recollection, but I am not sure. I can possibly hunt that up.

Q.—Then we get a reply to your telegram, which is sent from the Secretary of State to yourself on the 12th July, 1920, in which Sir George Buchanan reports that it is practicable to begin to work the Back Bay scheme at both ends simultaneously. Then I pass over a part of it. Then it says: "To begin building the wall in two places will not materially advance matters, unless the reclamation can also be proceeded with, and Buchanan is considering whether the new dredger "—that is the "Sir George Lloyd "—"and the 'Jinga' can work simultaneously at Eastern and Western areas." I think the "Jinga" there must be a misprint for the "Kalu."

A.—Is that so?

Q.—Because the question of buying the "Jinga" had not then occurred. The question of buying the "Kalu" had occurred, so that I shall read it, "Whether the new dredger and the 'Kalu' can work simultaneously at Eastern and Western areas." That was essential, was it not? If you were going to build the wall at both ends in order to hurry on the reclamation, you would have to have at both ends dredging and pumping plant?

A.—Unless you were going to do it by a dry filling process.

Q.—Dry filling had never formed any part of Sir George Buchanan's report?
A.—Is that so?

Q.—That is so, is it not?

A.—I am asking you. I do not know.

Q.—I am quite willing to answer the question. Dry filling had never formed any part of Sir George Buchanan's Report, but he had mentioned the question of moorum in connection with what I might call a top dressing, that is about one foot of moorum to be put upon the reclaimed mud, clay, and so on?

A.—He had not mentioned the question of dry filling at all in his report?

Q.—No, not the total reclamation of any area by dry filling?

Sir Frederick Hopkinson.—The dredgers were to do the whole of the filling; it was their function.

Chairman.—Then on the 17th of July Sir George Buchanan has had time to look into the matter a little more, and he says that the reports have satisfied him that the dredger " Jinga "—again I think that means the " Kalu "—and the new dredger can work together on the Bombay Reclamation, and therefore work on constructing the wall can proceed from both ends simultaneously. " Buchanan asks for very early orders as to whether he is to proceed on these lines, as considerable changes in design and arrangement for execution of work will be necessary." That is followed by a telegram sent by the Governor of Bombay to the Secretary of State on the 29th of July, 1920, saying that work may start from both ends. You left Bombay on the 9th of December, 1923, did you not?

A.—Yes, about then; within a few days of then; that can be checked.

Q.—That is a fact. Do you happen to know whether any calculation was ever made by any of your advisers as to whether it was physically possible to pump into No. 1 and No. 2 Block from across the land at Church Gate Street?

A.—That is the westernmost block but one, is it not?

Q.—It is the westernmost block of all.

A.—Will you kindly repeat your question?

Q.—Did your advisers ever make any calculation as to whether it was physically possible to pump from the harbour into Block No. 1?

A.—I cannot say at this date. I know they were considering filling from Back Bay at that time, because they had been making experiments in Back Bay.

Sir Frederick Hopkinson.—No, that is years afterwards that any reference is made to it.

A.—I was making a statement of fact that the thing was being considered before I left. There was a boat taking soundings in front of my windows for months before I left. I used to look at it every day. That is why I speak with some confidence on the matter.

Q.—I think we are wrong in the dates. We are speaking of July, 1920, not 1923.

A.—I understood you to say that the thing was not considered before I left.

Q.—In July, 1920, no suggestion had ever been made as to pumping from Back Bay?

A.—That may be. I thought you were saying 1923.

Chairman.—I was going to give you the letter. We have the results of the Back Bay borings.

Sir M. Visvesvaraya.—We have full particulars, and complete correspondence.

Chairman.—At the time when Sir George Buchanan sent the telegrams that I have just read, the practicability of the scheme as pronounced by him was pumping from the harbour across the island into Block 1?

A.—That is a technical matter upon which I would not like to answer.

Q.—That is a fact from this document: " Buchanan reports it is practicable to begin work on the Back Bay Scheme both ends simultaneously."

A.—That is a matter, I imagine, on which you would have no difficulty in getting a clear statement from Sir George Buchanan. He is giving evidence, I understand. That would clear up that point.

Q.—But the fact still remains, did any of your advisers, when these telegrams came to hand, suggest to you that Sir George Buchanan must be arithmetically wrong on that, because he could not get across, he could not pump the distance?

A.—No, I do not remember that that was suggested at all. It would have remained in my memory if any of my advisers had pointed out that Sir George Buchanan was definitely technically wrong on any point, and I do not recollect it.

Q.—In considering Mr. Kidd's report, you, of course, would have noticed that he estimated in 1912 that he could do the work for 325 lakhs. The figure is suggested in Sir George Buchanan's report?

A.—Yes.

Q.—That is right, is it not?

A.—I understand so, yes.

Q.—Sir George Buchanan, as we know, put the figure at 367 lakhs as work capable of being done in 1919. On the assumption that Mr. Kidd's figures were right, did it ever occur to your advisers to point out to you that the price had gone up in 1919 as compared with 1912 at least twice?

A.—What price had gone up?

Q.—The price of everything.

A.—No, because I do not think it was the fact, and they did not point it out to me

Q.—They did not point it out to you?

A.—No, because I do not think it was the fact, as I would like to point out, if I may. You refer, I understand, to this point on the general ground that the rise in prices between 1912 and 1919 should have warned my Government that Sir George Buchanan's estimate was too low; is that the point?

Q.—That is exactly the point. Let me put my question quite clearly. If one believes that Mr. Kidd had made a reasonably close estimate of 325 lakhs——

A.—Close in which sense? Do you mean from the Scotch point of view, or from the other point of view?

Q.—If one believes that Mr. Kidd had made a reasonably accurate estimate of 325 lakhs, and had noticed that he had said he was loading the labour with 20 per cent. for possible rises, and that he was loading the price of materials with 20 per cent. for possible rises, and if anybody had thought the matter over, and came to the conclusion that Mr. Kidd's estimate was probably an accurate one, ought it not to have occurred to your advisers, and, indeed, to you, when you were reading it, that if Mr. Kidd could do it for 325 lakhs, Sir George Buchanan could not possibly do it for under 700 lakhs?

A.—My reply to that is: No, I do not think so. I think I have apprehended your point rightly. I am not aware how far the items of Sir George Buchanan's estimate have been actually checked with reference to the rates for labour and materials prevalent in Bombay in 1919. I can only make the general criticism, which is a layman's observation, and say that in the first instance the estimate of Sir George Buchanan was not accepted at 367 lakhs. You are probably aware of that, are you not? That is not accurate.

Sir Frederick Hopkinson.—You put on 10 per cent.

Chairman.—You added another 33 lakhs and you made it 400?

A.—We made it 400. We agreed to add 10 per cent. We did that in view of the increased rates for labour and material. We agreed to add 10 per cent. to this estimate and to take the total cost of the project at Rs.400 lakhs. The increase made seemed sufficient at the time. We have to consider these matters from the point of view at the time at which they were done. So far as the Bombay Government are now concerned, the comparison of Mr. Kidd's estimate should be with a Government estimate of Rs.400 lakhs. I hope that I have made clear the difference between 325 and 400. In the second place, consideration must be had to the original proposal, when Mr. Kidd made his estimate, that his firm, Messrs. Lowther & Kidd, should carry out the work at an inclusive charge of 5 per cent. on the outlay, subject to a maximum of 5 per cent. on the estimate as finally accepted by Government after careful scrutiny, but with a bonus of one-fifth of any saving that might be achieved. It is rather an important point. Up to 1914 at least it was the intention of the Government of Bombay, I understand, to undertake whatever reclamation was decided upon through his firm and on these terms. It was only reasonable to regard Mr. Kidd's estimate as having been framed on lines which would protect his own firm's interest and to consider it, in the light of Sir George Buchanan's figures, as a very liberal estimate. If you would like me to read again the reasons why I say that, I will read them again. The great fact is that he got one-fifth of any saving.

Q.—We know that, of course, from Mr. Kidd's offer.

A.—The deduction there that I make is, of course, a perfectly sound one. The Bombay Government were entitled, in view of those particular conditions, to think that he protected himself very well, and therefore his price was not too low but pretty careful.

Q.—That is right.

A.—Mr. Kidd's ideas of economy in the interests of Government may be gauged from the fact that in January, 1919, he tendered on behalf of Sir William Armstrong, Whitworth & Company, at greatly enhanced rates, including Rs.4 per cubic yard for mud filling and Rs.3.8 per cubic yard for murum filling. I think the latter figure is more than twice the actual experience costs. The Committee can judge of these estimates for themselves, but I think they add point to my suggestion that we were entitled to think that Mr. Kidd was looking after himself and his firm very properly but very well; that it was a liberal estimate.

Q.—That he was not likely to be a loser on 325 lakhs?

Q.—Certainly not. It was a large estimate rather than a low one.

Sir Frederick Hopkinson.—When did you learn these prices that you have just told us?

A.—I suppose we knew them all the time.

Q.—I do not think that Armstrong, Whitworth & Co. as a firm of contractors were in existence at that time?

A.—In January, 1919, my information is that he tendered on their behalf.

Chairman.—In 1919, when Mr. Kidd was a member of Armstrong's, they did put in a tender?

A.—That is my information.

Sir Frederick Hopkinson.—Do you know for what work?

A.—For the reclamation.

Q.—I do not think they did. There may be a misunderstanding about it?

A.—There may be a misunderstanding. The point I wanted to bring out was that he charged this rate for murum filling, which was proved afterwards to be a very excessive rate in practice; that is all.

Chairman.—I think I can clear it up. I think the position was that Mr. Kidd was acting for a syndicate, and it must have been at that time, in or about 1919, at all events, that he did submit a tender for the reclamation. That is what I understand.

A.—I think so.

Q.—Very well, we will clear that point up.

A.—I can clear that up afterwards. That is my information. The point I wanted you to take is whether we were justified in thinking Mr. Kidd's estimate a pretty liberal one. I have given you those two points to show you why.

Sir Frederick Hopkinson.—It all depends whether you got these figures before or afterwards.

Mr. Billimoria.—The subject that His Excellency has mentioned is stated in Sir George Buchanan's Report on page 9, paragraph 27.

Chairman.—" In January, 1919, Mr. Kidd, who had meanwhile left the firm of Lowther & Kidd and become attached to Sir William Armstrong, Whitworth & Co., made an offer on behalf of that firm to reclaim a gross area of 350 acres, but at greatly enhanced rates, the prices for mud filling being increased to Rs. 4 per cubic yard and murum backing to Rs. 3.8 per cubic yard." It was limited to 350 acres?

A.—I think that is what I said.

Sir Frederick Hopkinson.—I think there must be a misprint, because nobody would ever accept Rs. 3.8 per cubic yard for murum filling?

A.—I cannot accept that.

Q.—It is not costing the Government of Bombay half that at the present time?

A.—That is exactly what I say. Those are the figures we have before us which I think justifies me in saying that Mr. Kidd was protecting the interests of his firm, very properly and very liberally. That is the point I am trying to make. I think, as you say, that the experience cost is nearly half that.

Q.—I should say that it ought to be one quarter?

A.—Something like that. Anyhow, if the figure is right my point is good; that is all.

Chairman.—When you made the speech to the Indian Merchants' Chamber of Commerce on the 9th August, 1921, you were no doubt of opinion that 702 lakhs represented the fair price of the work to be done?

A.—That is so.

Q.—Did you ever have any discussion about that matter with Sir George Buchanan as to how it happened that work which in September, 1919, it was said, could be done for 367 lakhs was manifestly in August, 1921, going to cost about double?

A.—I am afraid I cannot remember any particular occasion of any conversations. I am afraid I cannot recall any of them now so as to be able to give you chapter and verse for them. That would be impossible, I am afraid, after so long a time.

Q.—You must have been seeing Sir George Buchanan, I suppose, when he came out in the cold weather year after year?

A.—I was certain to have seen him once or twice on each visit.

Q.—By seeing him I mean having a discussion informally, if you please, but nevertheless a discussion about Back Bay?

A.—I should be perfectly certain that I did have such discussions, but I cannot recollect them or give you the nature of their tenour at this moment, as I have no record of them. If you can find such a record amongst the papers——

Q.—There is no such record. We must leave that. There is another matter about which I want to ask you. Do you remember anything about a Bucyrus steam shovel?

A.—I remember the name Bucyrus steam shovel because I remember that we were using them, I think, to pull down a hill near Worli.

Q.—I will read you these telegrams and ask you a question on them. There is a telegram in April, 1920, which is addressed to you, probably by Lord Furness, I should think?

A.—Was it something to do with the Panama Canal?

Q.—It is sent from Colombo, and it is addressed to yourself, the Governor of Bombay?

A.—Yes, I remember receiving such a telegram.

Q.—I will read it to you. (*Telegram read.*)

A.—I remember that such a cable came. He had been, I think, yachting near Bombay and he went to Singapore. I think that such a telegram did come.

Q.—The next document we have is a wire from the Government of Bombay to the Secretary of State: "Please convey following to Sir George Buchanan (begins) Lord Furness cables two Bucyrus shovels for sale." Then it gives a technical description of them. "These shovels can be loaded immediately. Can you make use of either of these for work in Bombay? If so please cable me immediately." That was an enquiry sent to your technical adviser as to whether a Bucyrus shovel would be of value in the reclamation work?

A.—Yes.

Q.—The reply that you received is from the Secretary of State for India to yourself dated the 12th April, 1920: "Your telegram dated the 9th April, Bucyrus shovels. Buchanan considers smaller shovels very useful for Back Bay scheme and price reasonable. He recommends purchase subject to inspection in this country." That transaction went through, and one Bucyrus shovel was purchased. Did you ever learn that in point of fact it cost over £10,000 and never did a day's work?

A.—No, I am afraid I never heard that. It would be a matter that I would not see. A telegram like that would come to me, you must remember, merely because Lord Furness had met me. It would go on to the Department and be dealt with there.

Q.—That is right?

A.—I never heard that the shovel had been a failure. I understand that we had used them on the Worli reclamation. I went round meantimes to see them. I remember the name of that particular thing because I heard that they were used in Panama. It was a question whether we would get them from Panama where they had done the work, but I never heard that the shovel had been a failure.

Q.—Did you ever go to the quarry at Kandivli?

A.—No, I never went.

Q.—You would have seen the Bucyrus shovels and three others lying there?

A.—You mean our stone quarry?

Q.—The Back Bay reclamation quarry?

A.—No, I was always going and never went.

Q.—The evidence is that the Bucyrus shovel had a wrong gauge for the railway, and in addition to that it never did a day's work for two reasons, one, that there was no sufficient face for the shovel to operate on, and secondly, that there was nobody who was competent to make it work?

A.—That is a thing that I cannot remember the details of.

Q.—All I want to get from you is that you put it up to Sir George Buchanan plainly in terms, "Can you make use of either of these in Bombay," and his answer is "Yes"?

A.—You say so, and I have no doubt that it is true. I have not got the papers. It was our duty, if there was a question of materials in regard to which offers came along, to put the matter up to our technical adviser in case it was any good to purchase them. All materials were not easy to get at that time.

Q.—At that time there was a great shortage of materials?

A.—I do not remember Lord Furness speaking to me about it at the time, but Lord Furness probably saw an opportunity of doing business. He saw the works as he came through; he would know about them.

Q.—He would know what was going on in Bombay, and he sends you a telegram. Then you asked your technical adviser the perfectly plain question, "Can you make use of either of these for work in Bombay." Sir George Buchanan says "Yes," and thereupon the matter goes through?

A.—That is so

Mr. Billimoria.—If it is suggested that the Bombay Government purchased these without enquiry that is not correct?

A.—Obviously. The telegram confutes that. There was nothing purchased in that way at all. Everything went through normal and departmental channels as far as I am aware.

Chairman.—Is there any other matter that you would like to mention to me before I conclude your examination? Is there anything that has been omitted?

A.—No. I would like at the very end to make a few remarks on the general aspects of the Scheme, if I may. I would like to leave that until every member of the Committee has had their fill of such knowledge as I have.

Q.—Did you leave Bombay on the 9th December, 1923, in the full belief that notwithstanding the increased expenditure the reclamation would proceed satisfactorily?

A.—I would like to put it more strongly than that. To the best of my knowledge and belief the reclamation was proceeding without a hitch during my three years' period of administration. I was aware of no serious difficulties of any kind. The work was going on according to the larger estimate, of course, and there was a general feeling of optimism, and I knew of no difficulty. You must remember that of course I had nothing whatever to do with the operations of the dredging. I think they actually started the dredger formally working the morning that I left.

Q.—I hope I made it clear that the day before you left, the 8th December, 1923, the dredger began her work?

A.—I think it was only formally on that day. I remember that I turned the dredger on. I went down to a little function of starting the dredger early in the morning the day before I left.

Q.—The evidence is that she began work on the 8th December, 1923, the day before your Excellency left?

A.—That is right.

Q.—And therefore you can give us no help whatever as regards the details of her work?

A.—No.

Q.—But at the moment when you left Bombay the building of the sea wall and the other works were, as far as you knew, going perfectly well?

A.—I left with complete optimism knowing that there was nothing wrong of any kind, shape or description.

Sir Frederick Hopkinson.—Except, may I point out, that Sir George Buchanan said that the work was going to be finished in 1926 and the dredging was going to take a minimum of five years and the dredger was only started on the 8th December, 1923?

A.—Yes. I think there was two years extra time or 18 months.

Q.—Therefore, you knew that it could not possibly be done in accordance with that original programme?

A.—I may have known that there was some extension of time, but Sir Frederick Hopkinson would know himself, as an engineer of very great experience, that neither as regards estimates nor as regards time do even the greatest engineering firms keep always within the limit. There is some give in all these things.

Q.—My experience is that in my particular branch of business if they do not keep within their estimates they get in a certain very unpleasant place?

A.—In the Bankruptcy Court. You have got to take a reasonable view of a situation like that. We were passing through very difficult times, but I adhere to my view that even if it were the case that there had been some slight increase of time, I was very confident as I am now as a matter of fact.

Q.—You remember, of course, that the dredger had been lying idle in Bombay for 20 or 21 months?

A.—Yes. I do not remember that it was as long as that. I knew it had been lying idle for some time.

Q.—That did not point to any very great success, did it?

A.—I have not prepared any notes about this; I am speaking at random. I did not know you were going to ask me a question about that, but there was a benefit, to the best of my recollection, in buying the dredger before a certain date, as we were warned. The India Office of course is finally responsible for it. It is nothing to do with my Government. We were warned that the prices would go up after a certain date. That was the reason why the order for the dredger was placed rather prematurely possibly.

Chairman.—It was anticipated that prices would go up?

A.—Yes.

Q.—But actually and in fact, if one had been able to look ahead, the prices dropped tremendously in 1921?

A.—Yes, but I think I am right in saying that we were warned by the India Office that the dredger makers said that they would not be able to quote us such low terms unless such an order were placed by a certain date.

Q.—That is the letter of the 12th September, 1919, which is attached to the report?

A.—I think I am right in my recollection.

Sir Frederick Hopkinson.—The only remark I should make about that is that I am wondering if you had not been bluffed?

A.—Possibly. I do not know about that. That is a matter of opinion and I will leave the Committee to decide that.

Q.—We have sufficient information?

A.—We had to consider the matter in the light of our existing knowledge. A lot of people are both foolish and wise after the event, but certainly we can be wise after the event.

Q.—We have quite sufficient evidence about that.

A.—You have plenty of evidence on which to come to your own conclusion about it.

Sir M. Visvesvaraya.—I will put some direct questions to your Excellency.

A.—Do you mean apart from this list?

Q.—They are included in that list in a general way. In the speech that you delivered in Bombay you stated that this was the simplest of all the reclamations undertaken in Bombay.

A.—To whom was the speech made?

Q.—To the Indian Merchants' Chamber.

A.—I know the speech.

Q.—And that they, the Government, had consulted the best experts they could get hold of. May I ask you who were the other experts who were consulted?

A.—Sir George Buchanan. I have already been through all this as regards the experts.

Q.—Who were the other experts?

A.—Sir George Buchanan, such local experts as we had in the Public Works Department, and we had Mr. Kidd's report before us and all the previous reports over the last 10, 12 or more years. Those are what I generally refer to in that speech.

Q.—They were the best experts you could get hold of you have said?

A.—That is what I said and that is what I mean.

Q.—Sir George Buchanan was your only expert?

A.—No. I must repeat exactly what I said. He was not our only expert. We consulted such public works experts as were here available and we had all the experts' views before us of a good many years past.

Q.—Are any of the views of the Public Works Officers on record?

A.—I cannot tell you that I am afraid.

Q.—You did not consult the Port Trust authorities. They are concerned in reclamation schemes?

A.—Those enquiries are generally made not by Governors but by Government officials and I cannot tell you what they did.

Q.—We have looked up the records. The Port Trust was not consulted at the time.

A.—If you say so and you are satisfied of that, I can only give you the answer that I have given you, that that would not normally be done by myself in any case.

Q.—No, but before launching a big scheme of this sort, do you not consult the experts near you?

A.—I have tried to make the point before that the time in our opinion after some 18 years of study had come for decision. It was also a view shared by the then Secretary of State. It was also a view shared by the Municipal Corporation of Bombay who pressed the urgency of the scheme as a general remedy of the situation.

Q.—That was all good, but this was a much debated scheme?

A.—Yes, very much.

Q.—And several people had turned it down. An American firm in a report in 1919 which could not have escaped your notice, said that a scheme like this was going to be a failure.

A.—I think you will find that that American firm disclaimed all ability to discuss the Government's estimates in any way. That rather discounts the value of their remark. I think you will find that that particular American firm disclaimed any ability to discuss the Government estimates in any way at all or express a view upon them.

Q.—That does not discount the value of their opinion on the merits of the case?

A.—I think it does to that extent. Are you making a statement or asking a question?

Q.—I want information. I must explain to you that these questions are put in order to elicit information and not to criticise?

A.—My information is that a firm of New York engineers supplied that opinion, not to the Government but to the firm of Messrs. Tata but whether it was Mr. R. D. Tata or Sir Rattan Tata I do not know.

Mr. Billimoria.—Sir Rattan Tata.

A.—They were an engineering firm who, I think, said it was a mad scheme or something like that—and in spite of their opinion the firm of Tatas were foremost later on in seeking to carry out the reclamation of Back Bay themselves by private enterprise. As regards their criticism, I repeat that you will find they disclaim all ability to discuss the Government estimates in any way, and to that extent I think their views are discounted.

Sir M. Visvesvaraya.—The Government of India also had turned down all previous schemes of reclamation till 1917?

A.—Is that so?

Q.—Yes, and it was only your Excellency's influence that got this scheme sanctioned.

A.—No. I should not flatter myself to that extent. I should think it was very largely the late Secretary of State's very keen desire to look after the masses of the people than to care for the vested interest.

Q.—That is true?

A.—It was his desire that brought it through; that is what I think. The Government were looking all through for the great mass of the people who were living in squalor beyond words. It had been held up. We were fighting for the people here as against vested interests. There is no doubt whatever—I say this with no critical sense—that landlords are apt to look after their own interests. It is very natural the Government stepped in after very long scrutiny of many years, faced with many years experience, with the firm decision by the Secretary of State who had taken a great interest in this great social problem, and if you will examine the period when I was in India, you will find that one thing stands out very clearly. You can see from all the public addresses presented to me and other such evidences that you can get, that such criticism as there was came from a small section, the Indian Merchants' Chamber, a bureau which chiefly represented a certain class, whereas the great overwhelming mass of support, both in money and morally, came from the people whom people had not worried about before, who presented me with an address. I think it was the first time that they had ever presented one to a Governor in Western India. It came from the classes who recognised and realised that the Government had at last tried to do something to ameliorate their condition, so that I do not flatter myself that it was anything to do with me. It was the inspiration and interest which the late Mr. Edwin Montagu had which largely, I think, achieved the result. I was merely a humble executant, a keen initiator and executant.

Mr. Billimoria.—You have referred to vested interests. How did the Indian Merchants' Chamber come in as vested interests?

A.—I said landlords. I have used the word. I think the Indian Merchants' Chamber had members in that Chamber who had personal interests, and very strong ones. If you have not had evidence of that I think you should get evidence of it. It is very easily available. There have been people who possibly have even given evidence before this Committee who have had speculations in land, and who are not interested to see these schemes succeed. There are others who have lost money, and who, from behind the scene, prompted an agitation. I am speaking what everybody knows.

Chairman.—That must occur in every case of a scheme of this kind.

A.—Yes. I am making no reflections on anybody. I am stating the facts in order that the Committee, if I may venture to say so, may be able to have a broad view of the whole thing. We were up against certain difficulties. I do not complain of them. We had to meet them. Those difficulties have remained right through in this scheme. They must not be ignored; they are there. I do desire to emphasise that perhaps for the first time the local Government desired to do what they could to relieve what they knew to be a serious condition, and, perhaps for the first time, they had an enthusiastic backing, and, indeed, initiation almost in its last phase by the Secretary of State for India himself.

Sir M. Visvesvaraya.—The complaint is that the works were started with undue haste; that is the point that I am putting to you.

A.—Anybody who commits a crime against inaction in the East commits a grave crime, but they have to commit it sometimes. I do not know if you think 18 years is undue haste. I have committed that crime, I am afraid, by trying to get something done; I am not ashamed of it; I am very proud of it. I do not consider it undue haste.

Q.—In doing that, certain responsible commitments were made which have resulted in difficulties and loss; that is the next point?

A.—I cannot accept that. I hope that it is not true, and I do not accept it.

Q.—The scheme which was to cost 367 lakhs first went up to 702 lakhs, and it is now in the neighbourhood of 1,000 lakhs. To complete it it would cost about 1,000 lakhs, according to the latest estimate of the Engineers?

A.—I am not willing to accept a figure until the Inquiry is over.

Sir Frederick Hopkinson.—That is the broad outstanding criticism of Sir George Buchanan's estimate in 1919. Without going into details, the estimate of completion is now 1,000 lakhs?

A.—When your have given your final verdict I shall attach importance to it, but I must not accept any figures until this Inquiry is over, must I?

Q.—I think you can take that figure.

A.—I am not quarrelling with it.

Q.—It will not be far out.

A.—I do not know anything about it.

Sir M. Visvesvaraya.—The Royal Indian Marine was also not consulted, I think, and that has led to the other difficulties. Certain portions of the Harbour have had to be excluded from the dredging programme?

A.—I must give you the same answer to that. I think that one of my colleagues certainly did consult the Royal Indian Marine. I cannot be certain, but I have every reason to believe that he did.

Q.—We have made enquiries there, and there is nothing on record?

A.—It may be so. Everything is not on record in any Government where you are very driven. You must remember that we were dealing with a very acute situation in every respect. One had many things to do besides these. It was, I think, agreed by all concerned to be the most critical moment from the point of view of executive Government of any time since the Mutiny, certainly in Western India, where we had a very serious and grave situation to handle from the Military point of view. Therefore if everything is not on record it does not prove that it did not happen. I think probably that one of my colleagues was certainly concerned in it. Anyhow, it would not be the normal course of my duty to do it. It would be done by one of my colleagues.

Chairman.—Who had you in your mind?

A.—I had in my mind Sir George Curtis, who took a particular interest in everything to do with the Royal Indian Marine. I have a very strong memory that he did, but I cannot guarantee it. I was very surprised when I saw it in the evidence that the Royal Indian Marine said they had not been consulted. I remember saying that that was absurd.

Sir M. Visvesvaraya.—The Chief Officer gave evidence before us?

A.—Yes, I saw that. I was very much surprised.

Q.—Sir George Buchanan was sent by Your Excellency to the Government of India to explain matters to get sanction?

A.—As far as I remember; by my Government, certainly.

Q.—A large number of letters and telegrams were sent by your Government to the Secretary of State, and the Government of India, to expedite matters?

A.—We took every possible step we could to expedite matters in order to avoid delay.

Q.—The Secretary of State said he was embarrassed by them?

A.—I had not heard that he was, but I have not the slightest doubt that he might easily have been.

Q.—The correspondence says that.

A.—People always are embarrassed when they are being asked to expedite matters. I am often embarrassed myself.

Q.—It is said that the estimate was imperfect, and not based on correct data, and that the estimate was prepared in a great hurry?

A.—That is your statement.

Q.—That is a public statement.

A.—That has been said by the public?

Q.—I want to know what the truth is?

A.—No, that is not my view. Every possible care was taken, as far as I can tell.

Q.—Even before the estimate was sanctioned, the order for the dredger was placed with a firm here?

A.—With Messrs. Simons & Co.

Q.—Yes. The acceptance of the principle of the dredger ruled out the preparation of any alternative estimate for reclamation?

A.—I should say that was true, yes. That is, as far as I understand, your statement. If you could ask me the question it would be easier for me, perhaps, to answer it.

Q.—What I say is that because a dredging proposition was accepted even before the the estimate was sanctioned, alternative estimates could not be prepared, or were not prepared afterwards, and any alternative method of reclamation was ruled out?

A.—If you mean to ask me whether I do not think that once so expensive a dredger was ordered it committed one to reclamation by suction dredging, my answer to you would be yes.

Q.—That is the point. An estimate of 367 lakhs was quite a good estimate, and quite satisfactory?

A.—That, I accepted from my expert. It was 400.

Chairman.—The estimate of the expert was 367 lakhs. The Government put on the rest.

A.—I thought Sir M. Visvesvaraya was asking on the figure that we accepted.

Q.—Yes, but that was not the expert's estimate?

A.—No, it was what we accepted.

Sir M. Visvesvaraya.—From 400 lakhs it went up to 702 lakhs. Because there were no alternative estimates, the fact that there was a cheaper method of reclamation than by dredging was ignored. By moorum filling the work could have been done much cheaper than 702 lakhs?

A.—I am very sorry, but I do not know what you are asking me. You are making a statement that it is much cheaper to fill it up by dry filling than by dredging. What do you want me to reply to that?

Q.—An expenditure of 702 lakhs had to be accepted because the scheme was unduly rushed?

A.—I do not accept that it was rushed.

Q. -Alternative estimates were not prepared?

A.—I cannot accept the statement, if it is made, that the scheme was unduly rushed after 18 years of preparation, or that any damage resulted from undue haste.

Q.—I do not know whether Your Excellency has heard that in 1865 they had prepared an estimate for reclamation by moorum filling?

A.—I have heard a lot about the history, but I do not remember that.

Q.—If so, an alternative estimate for moorum filling should have been prepared at the time of the sanction. All alternative proposals should be considered before a scheme is finally accepted. What is cheaper is usually accepted, is it not?

A.—I have a rough idea of what you want to ask, but I cannot get the point.

Q.—At 367 lakhs, or 400 lakhs, the estimate was satisfactory. It would not have competed with dry filling?

A.—My view at the time, taking the advice of my experts, was that it was a proper estimate. That is all can say. I cannot go further than that.

Chairman.—And that the reclamation was a dredging proposition, as opposed to a dry filling proposition?

A.—Yes, certainly, except for the dressing. I think we always had under consideration a moorum dressing on the top.

Sir M. Visvesvaraya.—The dry filling was not considered at all. No estimate was prepared for dry filling?

A.—I do not think an estimate was prepared for dry filling. It was considered, because I remember a considerable conversation at that time.

Q.—There is nothing on record about it?

A.—I am trying to give you the maximum information I can, whether it is on record or not. I do remember a conversation in which dry filling was discussed, and I remember certain railway difficulties being rather difficult to overcome as regards the large number of trains every night which had to come in on that narrow area, and so on.

Q.—There again, we are still in the same position, that there ought to be some record, and there is none.

A.—I cannot say about that without notice, I am afraid.

Chairman.—It was obviously in Sir George Buchanan's mind. The letter of the 30th of May invited Sir George Buchanan to pronounce on the suitability of the proposed method of reclamation by means of dredging, or alternative proposals for same.

A.—Therefore, presumably, he considered it all.

Q.—It was left to Sir George Buchanan to have turned down the matter as a dredging proposition altogether?

A.—Or *vice versa*.

Q.—He could have said: "This is a matter which can only be done by moorum filling, or can be done more reasonably." That he did so consider it is evident from page 9, paragraph 29, of his report: "There is an abundance of material in the harbour

for the filling, and it can be deposited in the area to be reclaimed by means of modern suction dredgers much cheaper than in any other way."

A.—That disposes of that point.

Sir M. Visvesvaraya.—It does not. When it came to 702 lakhs the dry filling proposition was much cheaper?

A.—You make that statement?

Q.—Yes, and I make it very deliberately, and it has been made by others also. Sir Alexander Gibb is an authority, and he has also made a statement. Mr. Neilson, the present Chairman of the Port Trust, has stated that this is not a dredging proposition. He is on the spot and he knows the conditions.

A.—Do I understand you to suggest that it was much cheaper to use dry filling than it was to do it by suction dredging at a cost of 400 lakhs, if that be proved to be a success? I ask as a matter of interest.

Q.—Yes.

A.—It would still, even then, have cost less than 400 lakhs?

Q.—That it was a good scheme?

A.—Of course, that was all the information available at the time of our decision.

Q.—The complaint is that fuller information was not collected at the time.

A.—If we had been able to be wise after the event, if we had known that it was going to cost a great deal more than 400 lakhs, possibly the dry filling might then have become cheaper, but with the information at our disposal, or at our experts' disposal, at that time, 400 lakhs was the figure, and I understand that you do not suggest that it would have been cheaper to fill with dry filling at 400 lakhs.

Q.—No.

A.—We were born three years too early. We did not know what we knew two or three years later. Whether we could have known is a matter for the Committee to decide. We did not know. We had to accept the estimate given, and I have given my reason for saying that we had a fair reason for thinking that it was a fair thing.

Q.—The estimate was wrong?

A.—It is not the only one. I think many schemes outside India have been wrong to an even greater extent.

Sir Frederick Hopkinson.—All the more reason for care here.

A.—All the more reason for care here. I am more interested than anybody that it should be successful.

Sir M. Visvesvaraya.—When you sent up the 400 lakhs scheme did your Excellency regard it as a rough scheme, or did you consider it was a final scheme?

A.—I am not one of the world's great optimists. I took it as reasonably final as a figure as that kind of estimate ever is. I hoped there would be no increases, but I could not be sure that there would not. I took it like an ordinary business person would, and hoped that it would be as final as possible.

Q.—I asked whether, when the 702 lakhs scheme was sent up, it was stated that the 400 lakhs scheme was a provisional one, and not final?

A.—It is a question of terminology. You ask me my views, but, as far as I can tell you, that was my impression of it.

Q.—The revised estimate for 702 lakhs was sanctioned by Your Excellency's Government, without reference to the Secretary of State, or the Government of India?

A.—Yes, to the best of my recollection.

Q.—It was not placed before the Legislative Council before it was sanctioned?

A.—We did not have to do that. I understand that the point has been challenged as to whether our attitude was constitutional at that time, and whether, when we found there was an increased price, we should not have referred the matter again to the sanction of the Government of India. Our attitude was perfectly constitutional. The ultimate authority had changed then, and under the Reform Scheme the Legislative Council inherited a good deal of the authority which was vested originally in the Government of India. We took every precaution to see that our attitude was constitutional, and it was constitutional. My view is that it was completely constitutional, and, to the best of my recollection, having got a new authority over us we went to that authority with every reasonable speed for their sanction. I think that that is borne out by facts.

Q.—The 702 lakhs scheme was not actually sanctioned by the Legislative Council, although it was accepted by them later on?

A.—It had to come in the Budget every year. They knew exactly what it was. It was merely a question of method. They had an opportunity of saying No to it, and they were fully aware all about it. You must further remember that I had, whether wisely or not, drawn the matter to the attention of the Indian Merchants' Chamber, and

Bureau. I made them a present of the fact that it was going to cost 702 lakhs, a good deal before that, if my recollection serves me.

Chairman.—In August, 1921.

A.—I do not quite see how that tallies with the criticism that we did not give the public our full confidence when I informed them so very long ahead.

Sir M. Visvesvaraya.—Was it not necessary for the scheme to be discussed by the Legislative Council before it was sanctioned?

A.—Nothing was necessary, except what was done.

Q.—What the public, the critics, say is that the scheme, in the ordinary course, would have gone up to the Secretary of State, and if his control was withdrawn it should have gone to the Legislative Council. It should not have been sanctioned by the Government themselves?

A.—I am afraid that even critics are not always right, and I do not agree with them. I think that the attitude was perfectly constitutional and proper, or else I should not have been a party to it. I was very careful about that, especially at that time.

Q.—Was any statement of financial results considered along with the estimate? Was any profit and loss statement, or profit and loss account, made out when the scheme was sanctioned.

A.—When the scheme was sanctioned by the Government of India?

Q.—Yes.

A.—I cannot at this juncture recollect exactly in what form the figures went up, but I think the fullest possible figures were sent. In proof of that, you may be perfectly certain that the Government of India, and the Secretary of State, would not have sanctioned a scheme of this magnitude unless they had before them sufficient data on which they thought it right to go. I think that is probably before you.

Chairman.—We have got it.

A.—I do not know the actual details.

Sir M. Visvesvaraya.—Was the tender for the dredgers examined by any technical officers of Your Excellency's Government?

A.—It was examined by Sir George Buchanan who was the expert locally, and, of course, the real full authority and responsibility for that must be taken by the Secretary of State's officers here, Sir John Biles or whoever it was there. They sanctioned and we merely indicated the kind of dredger that was required. I believe it was entirely left to the Secretary of State for India to decide what should be done in the matter.

Sir Frederick Hopkinson.—I think the Government of Bombay gave instructions for the dredger to be ordered from Messrs Simons.

A.—I think they indicated their view.

Chairman.—They indicated their view?

A.—They are not in a position to give instructions.

Q.—It almost went to the extent of instructions. The Government of Bombay did indicate the result of discussion with Sir George Buchanan. He had mentioned first of all that there were about four firms on the Clyde who were turning out good work.

A.—Messrs. Simons and Messrs. Lobnitz are the only two firms I remember.

Q.—At some time or other Messrs. Simons' name must have been mentioned and after this report there is a telegram from the Governor of Bombay which does in fact amount to a request?

A.—A request, not an instruction; an indication of their view.

Q.—It is a clear indication of their wish?

A.—It may be so.

Q.—That the dredger should be purchased from Messrs. Simons?

Sir Frederick Hopkinson.—Actually it was the only tender you had.

A.—That was not my information.

Q.—That was so in effect. You had a cable from Messrs. Lobnitz but no other.

A.—I understand that Messrs. Lobnitz tendered a higher price than Messrs. Simons; that was my information.

Q.—Messrs. Lobnitz sent a cable only .

A.—I do not mind whether the tender was in a cable or in a letter.

Q.—It was not a comparative tender?

A.—Is it not true that Messrs. Lobnitz quoted a higher price than Messrs. Simons?

Q.—But they specified a totally different thing; they specified two dredgers.

A.—I understood that the specification really had nothing to do with me.

Q.—No.

A.—I understood that specifications had been sent, at any rate, to those two, if not more, and that Messrs. Simons' and Messrs. Lobnitz were the two replies that we

got. If Messrs. Lobnitz, on having had the same specification as Messrs. Simons, sent an errant reply not conforming to that specification, I do not know why they did.

Q.—We have not been able to get yet what invitations were sent out for tenders.

A.—No doubt Sir George Buchanan may clear that up; that was my memory.

Q.—So far he has refused to inform us.

A.—That was my memory which was very vague, but in any case it was the Government of India Authority who had to decide and take responsibility in that matter. I think you have already had Sir John Biles' evidence, have you not?

Q.—The recollection in my mind is that it was a definite instruction from the Government of Bombay to purchase the dredger from Messrs. Simons?

A.—The Government of Bombay, I must tell you, is not in a position to give instructions to the Secretary of State for India.

Chairman.—We need not argue about this now. There was a request and a clear indication.

A.—That is right. I have already said that there was an indication of view.

Chairman.—If it is not of importance, we might pass away from it.

Sir M. Visvesvaraya.—" In the opinion of the Government of Bombay Messrs. Meik & Buchanan should be solely responsible for the design and construction of the plant." That was the telegram sent by the Government of India to the Secretary of State. The Government of India also suggested or at least were of opinion that other experts in London should be consulted. I suppose your Excellency is not aware whether anybody was consulted.

A.—With regard to what?

Chairman.—We know that they were not from the answers to the telegrams. At once it was taken up. We know from the documents what occurred. It is no use asking Lord Lloyd that because we have got it in the documents.

A.—I think I have seen it in evidence already. I am afraid I am not in a position to say.

Chairman.—We have it quite clearly on the documents.

Sir M. Visvesvaraya.—The dredger was ordered on 4th May, 1920. It is stated that it was ordered too early, and that it was left unused for about 21 months?

A.—I have tried to give the reason already as far as my recollection goes. These, again, are technical matters. It is Sir George Buchanan's business.

Q.—The dredger " Kalu " was also purchased in 1919, and it was lying unused for five years. Why was that purchased so early?

A.—I am afraid I cannot tell you that without notice. It is again a departmental matter very largely. I will look it up for you and try to find out.

Q.—It means a lot of money invested?

A.—I am sorry that I have not got that. If you had asked me I would have tried to find the papers about it. I think you must have knowledge of that.

Chairman.—We know the facts with regard to it.

A.—It was bought, as far as I understand, for Colaba, or was the " Jinga."

Q.—The " Kalu " was originally purchased for the East Colaba reclamation?

A.—That is right.

Q.—Then eventually when that was abandoned it was said: " Very well, if we are going to build the sea wall at both ends bring the " Kalu " in and the " Kalu " will pump into No.1 or No. 8, whichever may be more convenient "?

A.—That is my recollection.

Sir M. Visvesvaraya.—One other statement is that the dredger was not purchased in the open market on competitive terms; that the order was given to one firm only on very slender information?

A.—I am afraid that I do not agree. I cannot tell you any more than I have already told you. All the facts about the purchase of the dredger I know are in your evidence. If I could possibly supply any added information I would gladly do so. The dredger was purchased, I consider, in an absolutely proper way on expert advice after tenders had been called for. If Sir Frederick Hopkinson thinks that there is a point to be made in criticism of that I am not able to discuss that.

Q.—The complaint is that it was entrusted to one expert only, and your Excellency placed too much reliance upon one expert?

A.—Will you tell me how many experts you think in each case we should have consulted. I am very anxious to know that.

Q.—As many as are considered necessary at the time.

A.—How many would you consider necessary?

Q.—Two or three. I should talk it over with two or three people.

A.—How would you talk it over with two or three?

Q.—I would have a private conversation, and then come to a decision upon it. I am asking for correct information. Your Excellency just now stated that the order was placed with Messrs. Simons, Ltd., to the exclusion of other dredger suppliers because they did not give proper tenders?

A.—I did not say so.

Q.—Regular tenders in the open way were not invited?

A.—I am afraid I cannot add anything to my reply. I have told you that I believe the orders were placed in a perfectly proper way, and the ultimate decision rested with the Secretary of State for India. At any rate, my Government was not concerned in that.

Q.—In the case of the dredger also your Government suggested to the Secretary of State that Messrs. Meik & Buchanan should be treated as the sole advisers?

A.—I believe that is the case, certainly.

Q.—Why was that so?

A.—We had to choose somebody. I have given you my reasons for my selection of Sir George Buchanan. I have told you that he had a history of long experience of Indian conditions in the monsoon. He was very high in the favour of the Government of India, and he had a considerable reputation, both for work done in Burmah, in Basra, and elsewhere. He received a knighthood as a mark of the Government of India's appreciation, and he obviously seemed to be a suitable person because he had knowledge of dredging conditions.

Q.—But you do not put all your eggs in one basket. In another speech in August, 1921, in the Indian Merchants' Chamber, your Excellency stated that experts always differ from one another?

A.—That is so.

Q.—Is it safe to trust all your scheme, and everything, to one expert; that is the point?

A.—You must trust somebody. You must take the best opinion you can and then support it and back it up. That is my experience in life. You cannot hesitate. I also suggest to you that you must have a little reasonable courage in these matters?

Q.—That is true.

A.—I think we were amply justified in choosing Sir George Buchanan on the information before us. Until this Inquiry is over I have no reason whatever to change my view. I support all those people who worked so loyally during my administration. I wish particularly to make a point of it.

Mr. Billimoria.—Did all the members of the Government of India recommend Sir George Buchanan, or was there any difference of opinion?

A.—I am afraid I do not know what went on in the Government of India.

Sir Frederick Hopkinson.—Do you really consider that Sir George Buchanan worked loyally?

A.—Is not that rather a leading question?

Q.—It is a very leading question. It is after what you said just now. If you had not said what you said just now I should not have put the question.

A.—I think that is scarcely fair after the question is put to me.

Q.—Then do not answer it.

A.—As it has been put I have to make some answer. That is the unfortunate part of it, if I may say so. The question having once been put I can hardly leave it, because an innuendo is caused. It is very hard on Sir George Buchanan.

Chairman.—Will you take it down to your period in 1923?

A.—I am afraid that I must deal with it as the question has been asked.

Q.—Will you continue?

A.—With all regard to Sir Frederick Hopkinson's opinion ——

Sir Frederick Hopkinson.—I do not mind.

A.—But I am thinking of Sir George Buchanan, who has not had an opportunity yet of coming here. I was merely trying to say that it is my duty as the late Governor to give my support to all those who worked for me, and for whom I have the greatest regard. There was Sir Lawless Hepper.

Q.—You said, " Who worked so loyally " for the Government?

A.—I have no reason to think that they have not worked loyally for the Government. On the contrary I am grateful for the loyal service of everybody, Sir Lawless Hepper and all concerned, and until it is proved to the contrary I give them my support. I want that to be known.

Sir M. Visvesvarya.—That answer, if I may so, does credit to your Excellency's heart.

A.—And also to my brain, I venture to suggest. I take all responsibility. I take the fullest responsibility for the whole administration during my period of office. I

share that with the Secretary of State and the Government of India. None of my officials can be blamed for anything that happened. I take full responsibility. First of all, I am very proud of this Scheme, and I believe that if driven to a conclusion it will be for the vast benefit of Bombay even at the prices to-day. I desire to see it driven through. Above all I desire to support the loyal and devoted services which I have had from my officials, and I include in that until it is proved to the contrary my engineers.

Sir Frederick Hopkinson.—You do not take responsibility for the technical details of the scheme?

A.—No, I cannot do that.

Q.—That is what I mean. I am going into the technical details of the scheme?

A.—Few people have been served as devotedly and loyally as I have been by my officials. I will not see them criticised while I am here. I take full responsibility for all their work.

Q.—But not for the technical work they did?

A.—Sir George Buchanan is a technical adviser who is paid, and he is different to my officials. He will have the benefit of my loyal support until I can be shown that he has done anything against the interests of my Government. That has not been shown until the report of the Committee is out, and until it is shown, he is entitled to that confidence which I give him. That is all that I have to say. If I speak with a little heat you will forgive me, but I have been fortunate in having very fine officials.

Chairman.—You have put it in the most correct and proper manner, and the only way in which it can be put, that everybody who worked for you has your loyal and determined support until facts are brought to your attention and conclusively proved which show that in any particular instance that support ought not to be continued. That is the position.

Sir Frederick Hopkinson.—It is a point of view with which I entirely agree.

Chairman.—We must all agree with that.

Sir M. Visvesvaraya.—We are all agreed.

A.—I am sorry if I spoke with a little heat.

Sir Frederick Hopkinson.—I think it is a most excellent way to look at it. I could not wish you to put it in a better way.

Sir M. Visvesvaraya.—We are now concerned with things which have gone wrong. It is in connection with that that these questions arise. Sir George Buchanan in his specifications for the dredger has put soft clay in place of hard clay. He has put soft clay where he should have put hard clay?

A.—You make that statement; I cannot accept it. He can speak for himself.

Q.—Another statement made is that in placing the order there were no proper guarantees to ensure that the dredger gave the required output. The dredger has failed to give even 40 per cent. of the output promised, and now somebody must be responsible for the failure. You would not object to our inquiring who was responsible, and how it came about?

A.—I am here to show you that I welcome every necessary inquiry, but I cannot accept a whole series of statements made by you, Sir M. Visvesvaraya, in the course of conversation, and I cannot be led to accept them. I have tried to answer a great many cognate questions. You say that the dredger has failed. You say its output is so much. I must not be held to agree with you. I must be careful about my replies.

Q.—Shall we place the necessary reports before you. Your Excellency must have seen the papers?

A.—Which papers?

Q.—The reports?

A.—I am afraid that I have not read all the reports.

Q.—We can give you any facts or figures you want?

A.—If there is any specific point on which you want my opinion I will certainly try to give it to you if you ask me.

Q.—I suppose you are aware of the fact that the dredger is not giving the required output?

A.—I have not seen any papers, but I have been informed that the dredger during the last two years since I left has given an extremely disappointing output. I have not been informed as to why that matter was not corrected at a very early stage, because it was so important. I have been informed that since the bonus, for instance, to the crew, which is only information that I have got second hand, has been settled the output has been very much bettered, to what degree I do not know. I have a great many responsibilities other than that at the moment, and I cannot deal with two things at a

time, I am afraid. More than that, I have no information, but I think you have it, so that I do not know that I can assist you in that matter.

Q.—Of course, the dredger did not begin to work till you left?

A.—It was a day before I left, I think, to be accurate. Whether it functioned the whole day I do not know.

Q.—I am coming to another point on which probably you might take a different view. Did not the Government weaken the efficiency of control by creating the new department and by superseding the Public Works Department?

A.—No. On the contrary it did not supersede anything, and I think it added to efficiency. A good many Public Works Department officers wherever suitable were appointed, and the new department was absolutely essential to the carrying out of the co-ordination of the various housing schemes in the suburban as well as the urban area of Bombay. The task, very complex as it was as regards land notification, as regards the driving of great thoroughfares, as regards the reclamation, and as regards actual housing, was not one that any ordinary Public Works Department could possibly have taken on its shoulders. I am very glad that you asked me that question, as I should have forgotten to have given you some of the reasons which may interest the Committee as to why we set up that department. As I have no doubt you are aware, the question of giving a contract for Back Bay was considered. There was no firm of Indian engineers who were nearly large enough or competent to carry out so large an undertaking, and with the national feeling that was running so highly at that time the outcry which would have ensued if the Back Bay contract had been given to a British firm of engineers, or a foreign firm, would have made it impossible for us to raise the money on the loan market in Bombay. There was at that moment a very highly political movement which would have ruined all chances of our raising the necessary funds for the purpose. Therefore, it was decided that the Government was the best agency. The Government is as a rule not the best agency for those purposes. Ordinary commercial enterprise in my experience is almost always better than a Government for those purposes, but in these particular circumstances there was no alternative. What was then the next best best thing to do? We could not put this huge task upon the Public Works Department for the reasons that I have already adumbrated. We desired to get a Department responsible to Government, but working—I say it with no disrespect to Government—with perhaps rather fewer red tape methods in some respects than Government, but with no new authority; something on the lines of the relations the Munitions Board had to Government during the War. The new Department had no new powers. I desire to emphasise that. It did not interfere with the local bodies in Bombay City, nor did it assume fresh powers over local authorities in the suburban area. The existing rights of local self-government were unimpaired. In internal organisation it also had no special powers. It was subject to the same codes of Regulations as the Public Works Department, and other Departments of Government. Its technical personnel was largely temporary, but the Public Works Department itself engages large numbers of temporary engineers when large schemes like the Sukhur Barrage are in progress. So far as men were available and suitable, the resources of the Public Works Department in personnel were utilised, and several of the higher staff, including the first Chief Engineer, Mr. Lewis, of the Reclamation Scheme, were permanent servants of Government in the Public Works Department. On other D. D. schemes were Mr. Harvey (Chawls), Mr. Browne (Suburbs), and Rao Saheb Advani (Suburbs). Two important modifications of the usual Government organisation were made to secure effective financial control. Financial control was in the first instance exercised through a special Financial Adviser who was an officer of the Government of India. In the second instance all payments were subject to pre-audit so that any irregularity was checked before it could be committed. For accounts and audit a specially selected officer of the Government of India was appointed. For these reasons, as well as a great many of a minor character with which I will not weary the Committee, I do not think that the setting up of this Department was an improper thing to do, or that it in any way weakened or impaired the machinery; in fact, I venture to think that it was exactly the contrary, and that was the reason we set it up.

Q.—The general feeling is that to maintain sound practices it would have been a great advantage had the Public Works Secretary been associated with the scheme?

A.—Your most praiseworthy loyalty to your old Department must not lead your heart to govern your head in this matter.

Q.—I left the Department eighteen years ago?

A.—But " absence makes," &c., I think. Anyhow your loyalty is obvious, but you must be a little more hard headed about this proposition than apparently you are. We used, as we consider, the best parts of the Public Works Department, and we grafted them into another Department specially framed to grapple with this large variety of most complex problems It was the best machinery, as I still think to-day. We all make mistakes, but I do not think that was a mistake. I can conceive of no better organisation

than the one we did set up for this purpose. You must remember, as I say in conclusion upon this point, that this is probably one of the biggest and the boldest housing schemes that has ever been conceived. It was done because there was a necessity to meet. It was or is an extremely complex and difficult thing to do. You cannot expect perfection anywhere. I do not suppose there has ever been a more difficult housing problem except, perhaps, in New York, and there the local conditions were easier than this Bombay housing problem. The mere fact that it defeated all my predecessors shows that it was no easy task. Peculiar circumstances demand special measures. This Development Department was one of them, and I desire to defend its position very strongly before the Committee. I think it was the best that could be done, in the circumstances.

Sir Frederick Hopkinson.—The ultimate test will, of course, be the results, will it not?

A.—That is right.

Q.—And the only reliable test?

A.—That is right.

Sir M. Visvesvaraya.—It has not yet showed that it has succeeded?

A.—Nothing will be finally proved until, I suppose, the Judgment Day. In this case not until another ten or twelve years, I should think, will the vindication of these schemes come, and, indeed, probably not for longer. Very few of us have the good fortune to have our big works vindicated in our lifetime. I am quite confident about the future of this one.

Q.—We have had three witnesses here, Sir Henry Lawrence, Sir Stanley Reed, and Sir Sidney Crookshank. All of them were in favour of Public Works Department organisation. There is a difference of opinion, I suppose?

A.—I cannot say that even, because I do not know their views.

Q.—They have said that the Public Works Department would have done better?

A.—I am afraid that I cannot accept anybody's view as preferable to our own, because I do not believe anybody had greater experience than those of us who were governing, and who knew the machinery perfectly.

Q.—These gentlemen have had many years' experience?

A.—Very great experience. There are probably few men who have had a greater experience of Bombay, generally speaking, or a more intelligent one, than Sir Stanley Reed, but I could not even accept him as an authority as regards the machinery in Government. I have been inside it for several years, working about 14 hours a day, and I think I must know more than Sir Stanley Reed, even. Mr. Ewbank and I, probably, know more than Sir Stanley Reed about it.

Q.—Then the Consulting Engineers and their agents in Bombay were made responsible for the purchase of plant and machinery?

A.—To whom do you refer as the Consulting Engineers?

Q.—Or the Engineers, Messrs. Meik & Buchanan?

A.—Yes.

Q.—They were the Engineers, and they were interested in the purchase of plant and machinery in England. There was no Government officer who scrutinised their indents?

A.—I am afraid that I cannot accept that. Are you making a statement, or asking me a question?

Q.—I am asking why this happened?

A.—But it did not happen.

Q.—I am asking why it happened that the purchase was entrusted to a private firm?

A.—I have explained already how purchases were made, partly by the Stores Department, partly by the High Commissioner in India, and partly by the Bombay Government, but practically, not at all by the Bombay Goverment, as far as I know, except the local materials which were required for Back Bay. It was done, practically entirely, I believe, by the Stores Department, or through the Stores Department. I expect that there has been some evidence about that?

Q.—Yes.

A.—I have not made a note of that. Anyhow, I saw nothing of that. That was all done by the Directorate Department.

Q.—Why was the purchase of plant and machinery in England entrusted to the firm of Meik & Buchanan entirely, and why was not supervision exercised on behalf of the Government by any technical officer?

A.—I am afraid that I cannot understand the question. I must not accept those as facts. I cannot even understand the question. Can you put it more clearly?

Q.—Messrs. Meik & Buchanan are a private firm. Orders for the purchase of machinery and plant in England were entrusted to them. They selected the machinery

and prepared the indents, and sent them up to the Director-General of Stores, and that officer ordered them on the authority of the High Commissioner.

A.—If I may interrupt you, you do not suggest, do you, that Director-General of Stores should have chosen what kind of machinery Sir George Buchanan was to use in Bombay. Sir George Buchanan had to indicate what he wanted, and then it was ordered through the proper official channels, so that the thing should be properly done. I cannot conceive anything improper in that.

Q.—The Director-General of Stores merely placed the order?

A.—What else should he do?

Q.—The indent for materials should have been examined by a permanent officer of Government before it was passed on to the Director-General of Stores.

A.—Do I understand you to make the criticism that the stores ordered by the Stores Department in England were never properly examined?

Q.—Their duty was merely when an order came to see that the materials supplied were good. That was all right, but the tenders were invited by Messrs. Meik & Buchanan and placed before the Director-General of Stores. He had merely to sanction a contract accepted by Messrs. Meik & Buchanan. They recommended a certain firm and, unless he had any serious objections, the order was placed in their hands. My point is, that the Government entrusted purchases of enormous value to a private firm without any supervision on their behalf by a Government technical officer. If it had been the Public Works Department, some officer or other would have done this. In this case the Government Director did not attend to this essential duty.

A.—If that concludes the statement—it is not a question—I cannot agree that the Government did leave the whole purchase of important material to a private firm in London without supervision. My information is that the stores were bought in a proper manner by the proper authority, and, so far as I know, with proper scrutiny. Anyhow it is entirely outside the orbit or ambit of my activities. I am most anxious to give you all the information I can, but it is nothing whatever to do with me. I do not know anything about it. It was all done in London.

Q.—I am coming to the point that your Excellency selected a firm of engineers and entrusted everything to them?

A.—I did not select. My Government selected a firm of engineers. Having consulted our experts we did give them our confidence. It was nothing personal. It was the Governor in Council.

Q.—We do not suggest that it was personal.

A.—I have given you all the reasons for the appointment of Sir George Buchanan, I hope, quite clearly.

Q.—As regard the organisation, we find that the duties of the Development Director, and of the Engineers were not properly defined. The result is as the evidence before us shows that the Development Director divested himself of all responsibility for technical work. Messrs. Meik & Buchanan visited the works only occasionally, and the result was a policy of drift. Things tended their own way, and there was not definite control. The Development Director has stated that he had no responsibility for technical work, and the technical advisers were not in Bombay but in London. Even Mr. Lewis yesterday admitted that it was not a satisfactory arrangement, and that was one of the reasons why things drifted.

Chairman.—Are you basing your question on the evidence?

A.—I must not be taken as accepting any evidence.

Sir M. Visvesvaraya.—The work was started in a hurry, and much of the correspondence has been unofficial or demi-official. We were told in Bombay that some of the correspondence has been brought here by your Excellency. Is any of that correspondence available?

A.—I am afraid that I do not understand you. What were you told in Bombay?

Q.—We were told in Bombay that much of the correspondence on this subject, where the work was done in a hurry, was unofficial or demi-official?

A.—I should like to see evidence of that, if I may. I do not understand it.

Mr. Billimoria.—Some files had been taken away by your Excellency when your Excellency left Bombay?

A.—Who stated that I took any files?

Chairman.—I was not present, but I think it was only your Excellency's private file?

A.—I should like to be quite clear. Is it suggested that I have abstracted my file?

Sir M. Visvesvaraya.—No, your own files. It may be usual to take away files?

A.—It is certainly never usual to take what is Government property.

Q.—Demi-official correspondence and unofficial correspondence?

A.—No, it would be most improper to take any of the Government files.

Q.—Then the information placed before us was not accurate?

Chairman.—Let us get what the information was, and then you can put the question.

Mr. Billimoria.—It is in Mr. Cowasji Jehangir's evidence.

Chairman.—Would you proceed to some other question?

A.—I should like rather to clear this up, because I am not quite sure of the tenor of Sir M. Visvesvaraya's question, and I do not want to leave it there.

Q.—That is why I want to see what was said?

A.—I want to know what Sir M. Visvesvaraya means.

Sir M. Visvesvaraya.—What I mean is that the work was done in a hurry.

A.—What work was done in a hurry?

Q.—The scheme was got into existence in a hurry?

A.—I do not agree.

Q.—Much of it must have been done by demi-official and unofficial correspondence.

Chairman.—Lord Lloyd does not agree that it was done in a hurry. You had better question him on that if you want to get it as a basis for your question. He does not agree that it was done in a hurry.

Sir M. Visvesvaraya.—The general public accept that.

A.—I am afraid that I do not accept the general public view. On the contrary I think the general public are very stout supporters of this scheme. Their representatives unanimously sanctioned it in the Legislative Council. They are not very vocal, but there are a good many thousands of them, and such evidence as we have is strongly in support of this scheme.

Q.—We want to consider the views of the vocal people also?

A.—Quite so. Perhaps you would know what exactly you did mean by that question.

Q.—The statement is in the evidence. I am only basing my question on that.

Chairman.—You must read the evidence. I am trying to find it. I thought it was in Mr. Cowasji Jehangir's evidence?

A.—I will give you the answer, because the answer is perfectly simple, but I should be obliged if you would kindly let me know what the original of that question is, and what was meant by it? Of course I have no papers that do not belong properly to me except my private correspondence and private telegrams, but the question being asked in that manner I shall be glad if you will get it withdrawn if it was put in that manner.

Chairman.—This is the question. "Are there any files missing?—(A.) Not missing. (Q.) Any records on the private files of the Government House about the inception of the scheme?—(A.) Sir George Lloyd, I believe, had a private file; he must have written demi-official letters; we have not got those. He has taken away a good deal of private correspondence with him. We have not got them all. (Q.) Anything that you have left here that would help us?—(A.) I have not got all those letters. Unless I read them I cannot say whether I can help you."

A.—Do you suggest, Sir M. Visvesvaraya, that the private letters of the Secretary of State and myself should be given to any outside body? It has never happened yet as far as I know. It is most improper.

Sir M. Visvesvaraya.—He replied that some of the correspondence was unofficial correspondence?

A.—Do you ask me whether I have in my possession public documents which I should not have?

Mr. Billimoria.—Will your Excellency kindly read the question?

Sir M. Visvesvaraya.—Yes. Personal and official letters on this subject. We want to know whether we can see them?

A.—I should have hoped that it was unnecessary for you to ask me that question at all. I have given you the reply. Of course I have no files which do not properly belong to me. I have private correspondence.

Q.—We accept that answer.

A.—I do not quite understand why the question was put.

Q.—The question was whether the file referred to there had been brought here. Who made the appointments for the reclamation works generally?

A.—Am I aware who made the appointments?

Q.—Yes?

A.—Yes, I am.

Q.—Who made the appointments?

A.—I have already given evidence to-day to the Chairman of the Committee when I was explaining the composition of the Development Department. Do the Committee desire that I should go through it again?

Q.—No.

A.—Some appointments were made in London and some were made locally, and some from the Public Works Department.

Q.—May I ask why some of the Public Works Department officers were not employed?

A.—I could not give you the reasons why any particular officers were not employed at this time. It probably never came within my purview. It would have been most improper if it did. I had more important things to see to than personal appointments. It was left to the director and other officials.

Q.—It was said also that the appointments were left to the firm of engineers?

A.—Certain appointments were made on the nomination of Sir George Buchanan; others were left to the director.

Q.—What is suggested is that the engineers were given unusual latitude to handle Government purchases and appointments?

A.—If that is suggested I do not agree with the suggestion.

Q.—It is also suggested that the engineers were not themselves controlled properly by Government?

A.—May I ask you by whom it was suggested; what is the authority?

Q.—The public?

A.—Has it been given in evidence?

Chairman.—No, it has not been given in evidence. None of these matters have really been given in evidence.

A.—That is why I was wondering whether we must go outside.

Q.—They are not in evidence at all?

A.—I was going to ask your ruling, Mr. Chairman, as to whether it is necessary to go outside to general rumour.

Chairman.—My opinion is very definite that nothing whatever except on the evidence is material.

Sir M. Visvesvaraya.—I only want to go into one other matter.

A.—If we are going to put every absurd rumour about this or that appointment we shall never finish.

Q.—We want to know the truth about them?

A.—I am very anxious to give it.

Q.—That is the best way to dispel wrong impressions?

A.—Will you kindly put your question? I am trying to answer it, but perhaps you could confine yourself to something better than a rumour.

Q.—When funds were being canvassed it was said that the work was in Bombay, for Bombay, and by Bombay. One of the witnesses before the Committee has stated that out of 20 posts at a salary of Rs.2,000 and upwards, 19 were non-Indians. We asked for a contradiction of this statement in Bombay, but none was forthcoming. I wish to bring that to your notice. Have you any remark to make?

A.—If you will kindly put me a question it will assist me very much.

Q.—The question is, your Excellency has stated that you are anxious to encourage local firms?

A.—Yes.

Q.—Can you tell us to what extent that promise has been redeemed? This individual witness says that out of 20 posts carrying salaries of Rs.2,000 and upwards, 19 were non-Indians, and only one Indian?

A.—Indian engineers and Indian personnel were appointed so far as was possible without in any way damaging the taxpayers' money. If it came to a question of politics at the expense of the taxpayer my Government would probably think that improper. Appointments were made on their merits, and with a view to having as many Indians as we gradually could, and a very considerable number, much more than those which I think came in your figures, were employed on the whole housing scheme; it was a very large number.

Q.—This statement was taken from the reply given on behalf of the Government in the Legislative Council, that 19 were non-Indians out of 20?

A.—In what year?

Q.—I cannot give you that?

A.—It may have been so at the beginning, but I do not think it was so later.

Sir Frederick Hopkinson.—After what you have said as to so many of the questions being technical and rather outside your province, and as I am mainly interested in technical questions, I think there is nothing that I care to ask you.

Mr. Billimoria.—I will not keep your Excellency very long, but I shall be obliged if your Excellency will answer a few questions which will clear the atmosphere of doubt which exists in the mind of the public in Bombay. Your Excellency agreed to undertake the work of reclamation believing in the reasonable accuracy of Sir George Buchanan's estimate?

A.—In the accuracy of Sir George Buchanan's estimate.

Q.—It has been suggested that Sir George Buchanan's services have been of very little value, and that the result of relying on his advice at the commencement has proved financially disastrous. Has your Excellency any remarks to offer to that?

A.—I have nothing to say, except that all those like Sir George Buchanan who were retained by my Government to carry out this work certainly retain my confidence until anything is shown which will cause me to retract that confidence. That has not occurred up to date, and therefore my answer is that I cannot agree to that statement about Sir George Buchanan. He has had my confidence.

Q.—That is a statement made by the present Government?

A.—I wish to make no comments on the attitude of the present Government of Bombay. I think it is entirely unsuitable for me to do so.

Q.—Did your Excellency's Government consider it safe to accept an expert's report which was made within a period of two or three weeks of that expert arriving in Bombay?

A.—Yes, in the circumstances we certainly did. You must remember that a very, very great deal of work, as has been pointed out, was already prepared, and for the reasons I think I have already given in evidence we did consider that it was perfectly proper to act as we did.

Q.—Did Sir George Buchanan at any time suggest to your Excellency, or to your Excellency's Government whether an independent investigation or survey was necessary before the scheme was launched?

A.—I am not quite clear as to your question; a survey of what?

Q.—Some borings being taken, or an independent survey being made before the scheme was launched?

A.—No, I do not recollect his giving me any such advice. If Sir George Buchanan advised me that fresh borings were necessary before he gave me expert advice, naturally we should have accepted his advice at once. I do not recollect that being done. Sir George Buchanan, Lord Sydenham and others considered that the work done by Mr. Kidd on the borings was amply sufficient and good.

Q.—No member ever suggested to him that he should accept Mr. Kidd's figures as accurate and reliable, and base his estimate on those figures?

A.—No. We were not acting as advisers to Sir George Buchanan. Sir George Buchanan was acting as adviser to us.

Q.—That fact has been proved from the very nature of the reference made by Sir George Buchanan as to the practicability of the scheme from an engineering point of view—" the suitability of the type of wall proposed with alternative suggestions for better types, and the suitability of the proposed method of reclamation by means of dredging or alternative proposals for same."

A.—So careful was I not to dabble in matters with which I was not competent to deal that I included in my despatch to the Government of India words to the effect that I could express no opinion on the technical side of the matter. The way to get on is to choose the best man and trust him.

Q.—It is some years since you left Bombay, but I am quite sure that your close connections with that city must have given you some idea of the fact that the conditions there to-day are not entirely the same as they were in 1919. We are passing now through stress of depression in commercial activities.

A.—I am sorry that is so.

Q.—You must also be aware that several syndicates and public companies which were floated in the boom time have come to grief in recent years?

A.—I have heard rumours of that, yes.

Q.—Therefore, merely because two very powerful syndicates came forward and supported the launching of a scheme of such vast magnitude as this, does not indicate that they considered it would eventually prove to be a financial success. Nobody could be a prophet?

A.—No, but you are not suggesting, are you, that those gentlemen in those syndicates were insane? I should be very far from suggesting anything of the kind.

Q.—I do not suggest anything of the kind. They were the very best business men, but it is the fact, is it not, that some of those business men have burnt their fingers very badly during the last few years?

A.—That is so. The only inference I draw from it all is that it was reasonable to suppose that able business men of that period, outside Government, themselves believed that the scheme was likely to be a commercial success. I must remind you here that the Government was never for a moment taken up with the question of the commercial success as such of Back Bay. It was not put forward because it would be a commercial success. It was a contribution to the whole housing problem and a necessary and an essential corollary of it.

Sir Frederick Hopkinson.—It was stated that it would be a huge financial success?

A.—Precisely. I was one of those who hoped it would be, and I have not given up hopes yet. If it is pursued without irresolution, and if it is carried on actively and with strong handling, the scheme can perfectly well be a great success still. I should take too long to tell you all my reasons for thinking that, but at the end, if I may, I will give you a few of them. What kills any scheme of this kind more than anything else is irresolution and halting. When you have large sums of money out, get on with the job, and do not talk about it. It was necessary in this case—and I accept the fact—owing to public anxiety (the origin of which, and how it was allowed to grow up, is another matter) an enquiry of this sort was presumably necessary. Normally speaking, however, delay kills a scheme of this kind. That is what we have to consider.

Mr. Billimoria.—With regard to the remarks which have fallen from your lips, may I remind you of the despatch which you sent to the Government of India in which the words are used: "It is evident that the proposed scheme will be immensely profitable to Government." Therefore, you and your Government at the time did fully believe in the financial success of the scheme. I agree that you are not responsible for the subsequent results.

A.—I am not prepared to accept responsibility for the delays which may have occurred since I left, or for any faults of the administration, since I left. I do not desire to express any opinion on it; it has nothing to do with me. I still think, however, that, properly conducted, the scheme is likely not only to be of vast indirect benefit to Bombay city (I think it is vital), but I think it is perfectly possible to make it a commercial success in spite of the increase in cost, and anticipated increases.

Q.—I want to bring out one fact, namely, that the Secretary of State and the Government of India were induced to sanction the scheme because of the statements made by your Excellency's Government to the effect that it was going to be immensely profitable?

A.—No, Sir, I am quite certain that the Government of India and the Secretary of State were not misled on that point. The scheme throughout was advocated and urged as an essential part of the housing scheme, and it was as such that they accepted it. It was our bounden duty at the same time, in dealing with the financial side of it, to state what our anticipations and views were. I do not believe that the Government of India or the Secretary of State decided to do it because there was going to be a profit on it, or because they believed there was going to be a profit on it. It was done because it was essential to the problem. It was an essential concomitant ancillary to the others. One could not be done without the others.

Q.—If the figure had not been 367 lakhs, but had been three times as large, do you think the Secretary of State would have been induced to approve of the scheme?

A.—That is a very hypothetical question. I cannot give you a definite answer. Much depends on the state of the cotton industry and whether the mill owners are going to put their mills in order and conduct their business on modern lines. Much depends on the tariff question, and other things. The whole of the future of Bombay is bound up with it. I am not prepared to give a definite answer to your question, but I should certainly have been content to have put forward that scheme at a considerably higher figure than 4 crores.

Q.—Having regard to the political situation then existing, the military requirements in the Colaba area were of vital importance?

A.—I will not say vital. If I used the word "vital" I overstated it.

Q.—You used the word.

A.—If I did I will correct it and say "of very great importance." In times of great stress you naturally look to the disposition of your troops perhaps with a keener eye than in quiet times. In any case it was most improper to house troops worse than animals. It was disgraceful.

Q.—That was one of the reasons which led to the Back Bay scheme?

A.—That was one of the contributory factors in our decision.

Q.—You were aware, during the period of your office, that there was a large area of land available in the city, in the northern part of the island?

A.—I was, yes.

Q.—It has been suggested that when there were lakhs of square yards of land ready for building, it was unnecessary to take on this huge scheme. Why was it undertaken? Was it for somebody's benefit, or was it going to benefit the masses?

A.—It was for the benefit of the people as a whole. I think the point you wish me to answer is this, is it not: Is Back Bay any real contribution to the housing problem?

Q.—Yes, that is the point.

A.—Could not the people have been housed just as well, and could not the problem have been solved, without Back Bay? I do not think it could. In a public speech of mine you will find that I stated how grave were the hesitations of anybody who had to take up a scheme which had had such a chequered career and after so many attempts in regard to it had been made; but every expert opinion was to the effect that it was essential to the problem in hand. It was not so much an actual vital necessity to the industrial housing problem in itself, as an essential concomitant. I hope to give you some of my reasons for stating that. I should take too long to give them all, but I hope some of them will be enough for the Committee. First of all, congestion existed in the Fort as well as in the industrial centres. We were dealing with a completely congested area. If you doubt that I will give you evidence of it. Open spaces were urgently required. They could not have been provided, for instance, in Salsette, because the traction did not exist. The distances were too great. Furthermore, the malaria question, especially in parts of Salsette, was very grave. The malaria chart ruled the whole of that area out. We had a special enquiry into that. Another reason is that the housing problem is a fluid problem. Relief in one quarter produces relief all down the line; that is to say, if you erect buildings of an office character on Back Bay, you are going to relieve the office area in the Bazaar, and other people are going into that area and get better housing than they had before. Another reason was that the Government was working not only to catch up, but to overtake the congestion problem in order to meet not only existing needs, but, while the machinery and organisation was at hand, to try and meet as far as possible, in a very modified way, reasonable future needs, so that we should not be caught again in the terrible vortex in which we had been caught for the 10 or 15 years before. Then there was another reason of which far too little, I venture to think, has been made by witnesses at this Committee. Perhaps they were not as aware of the problem as those of us were who had to study it closely. The essential need of this scheme is destruction and not construction. I do not wish to discuss the policy of the present Government of Bombay at all, but I may tell you my views as the author of the plan. We were out to try to remedy gross insanitation and over-crowding. For years before I went there we had tried to get the Bombay Municipality, for instance, to set up by-laws to give us an angle of light and air fit for human habitation, but never would they set up those by-laws until I practically drove them to do so. I say it in no disrespectful sense, but by the urgency of my plea (I will put it in that way) and, indeed, by their shame, I think, that they had not done it before, and by hammering at it always in public, eventually we got the angle of light and air, which was necessary to human life, agreed to. This Committee can scarcely appreciate the appalling conditions in which people were living. They were living in worse conditions than any animals could live in. Heroic measures had to be taken. Destruction was therefore one of the essences of the problem. We had to consider in my plan (which must be before the Government to-day), driving great roads and clear spaces through some of the most crowded parts of the present-day Bazaar. It was not possible to notify to the public all our plans of destruction years before we could take them up, because it was necessary in each area to notify to that effect. Some of these blocks are on very valuable land. We could not make all our plans public; the prices would have run up fantastically. The public are not aware to-day of what our destruction plans were. Some destruction has taken place. I drove out great roads to the north to give the first traction out and back, and in order to assist the electrification of the railways which I produced afterwards on either hand. When I first went to Bombay, on the western side of the island there was only a little narrow lane winding through palm trees. Yet that was the main entry into Bombay and the main causeway. You know now that great avenue leading into the city from the G.I.P. causeway. What was it when I first went out there? There was no great avenue of traction down which you could get the people in and out quickly. There to-day is a great trunk road. The first part if it had just begun when I went there and I did not see its ultimate completion, but I am sure it must be completed now. But even that road ends up against a block in the Bazaar, through which we cannot afford to penetrate yet, before it reaches the open sea. Therefore when you refer to the Back Bay problem, as I refer to it, as an essential concomitant, it is because people have not realised that if we are to carry out our purpose and make that city worthy of our rule in India, destruction has got to go on. Destruction has to continue if we are to breed up a race of healthy children instead of the feeble children which are now born there. We have got to destroy, and destroy widely, and during that decade of destruction you will find that not only the chawls which are being built now, but which have been built, will certainly fill up. I have no hesitation in making the prophecy that directly trade revives all those chawls will fill up,

and that an excess demand will come. The moment the mill industry revives, the moment the mill-owners put their house in order, and the moment Japanese competition is fixed by a tariff perhaps, then the Maratha population will come rushing down again to the city, as we have seen decade after decade. It has always been the same story. Remember, never once in the history of Bombay's expansion has the tide ever receded so far as it came in. Each time it grows and grows. Fluctuations occur; you get this tremendous expansion; then the tide recedes for a while, but the high-water mark is always left higher. Let me give you another reason——

Q.—Before you proceed to your other reason, may I interrupt you to ask you whether these working classes to whom you have been referring were expected to go and live on the reclaimed area of 1,145 acres?

A.—I am afraid I must have explained myself rather badly. I have tried to explain that it is a fluid problem. In trying to solve it you cannot only cater for one class of needs; you have to cater for all needs. It is absurd to suppose that the mill-hands would go to live on Back Bay. There was congestion of that class of population. There was also the fact that one day we should have to destroy, which would then create a demand for more and more office accommodation; and into some of the areas which were vacated in the office area, the lower class of workman would go and have better habitations than they had before. We made provision for industrial housing in one area; for commercial housing in another area, and for the middle classes in another area. We tried to connect those up with great roads, and by electrification, in order to solve the problem. We followed the experience which had been gained in other suburban areas in order to achieve our object. We studied the problem of Liverpool. If you do the same you will learn exactly how many miles you can afford to take the daily bread earner to and fro economically. If you want to relieve congestion in the city you take him out as far as you possibly can economically, but if you take him out beyond a certain point it means something additional on top of his wages, which indirectly his employer has to pay, which means another tax on business, and so on. There is a limit to which you can do that. The limit in Bombay Island was laid down by virtue of climatic and other conditions—the putting down of drains and so on, which owing to municipal discussion (I will put it in that way) proceeded very slowly. One of the great drawbacks of the housing scheme to-day is the drainage question, which has hung fire in the Bombay Municipality.

There is one other matter of a general character. As you break up slums you have to expand somewhere else. The people are turned out from the places you destroy. You have to provide for an extension due to natural development of trade and industry and also due to the growth of population. After consultation with a very great many people who knew a great deal about this question, and after reading an infinite amount about housing, we took the course we did, and I am quite convinced to-day that it is the right course. No doubt minor mistakes have been made, but, broadly speaking, I believe that what we have done has been for the lasting good of the city. Without it there would have been a ghastly scene in the last few years, and if this scheme is not pursued to its end it will, I think, be very serious for the repute of the city.

Q.—We want to know what made your Excellency launch this scheme. Does your answer imply that there was an immediate necessity for 1,145 acres of land in the reclaimed area?

A.—Yes, I think so on the whole. That is a very fair question, if I may venture to say so. The balance was 452 acres; that is to say, the military at Colaba were to take about 265; open spaces 187 (which I thought was too small a figure) and roads about 240 acres, leaving about 452 acres, or 22 lakhs of square yards of building land. I do not suppose I ever thought that all this land would be taken up immediately. It would be a gradual process. I do not think that, given reasonable trade, it will hang fire very much. Then there is the pressure from the ruling Princes, which may or may not have been mentioned here, for sites in Bombay. That is a political matter which perhaps I ought not to enter into, having left India, but there will be a great demand. There is no doubt the demand will be very great, and must be met from Back Bay. I think the open spaces ought to be greater. I hold very strong views about that particular question. I think you will find that the Bombay people desire above all things to get hold of a piece of Bombay land. Once the land is there, I am certain you will find it will be taken up much more rapidly than anybody thinks. We have seen these things happen so often.

Q.—I very much appreciate your emphasising the necessity for open spaces. That question has been neglected for a long time. I believe your Excellency still desires that there should be sufficient open spaces for the better health and amenities of the city of Bombay?

A.—Very much so.

Q.—Those open spaces could only be provided in the reclaimed area?

A.—That is right.

Q.—There is one point which has been suggested with regard to this reclamation, namely, that our heads were turned in boom time, and, now that we are passing through a period of depression, we ought, as ordinary prudent business men, to have thought in 1919 that the boom was not going to be permanent.

A.—Are you sure that heads have not been turned on both occasions? Those of us who tried to steer our very difficult ship, tried to take a long view over a period of years. I believe probably nobody has " bumped up " against such a cyclone of post-war finance and its difficulties. No one could tell, for instance, that the Government of India were going to stabilise the rupee at 2s., when it fluctuated from 1s. 4d. to 2s. 11d. in a few weeks. Such a thing does not make it easy for those who are conducting big operations of this kind. We may have under-estimated a little the depression. If you want to know the figure, we took 15 years for the depression. We may have under-estimated the gravity of the depression; I think probably we did, but I am not so sure that our estimates are going to be so very wrong, provided you go ahead and have a little courage and do not stop half way. I have great confidence that this will be successful. My answer to your question is that I think the tendency has been to take an exaggerated view in both periods—both the boom time and the depression time.

Q.—If you will pardon me, I will just make a few observations. Unfortunately I have been seriously misunderstood here. I have been understood as if I have been insinuating something against some of the witnesses who have appeared; but my only object in asking questions bluntly has been to put on the record the facts as they are, so that whatever misapprehensions may have existed in the minds of the public in Bombay may be dispelled or otherwise, and so that the various charges which have been made from time to time may either be substantiated or not. With that object in view I will trouble your Excellency to remark upon the charges which have been made against your Excellency's Government.

A.—I have not seen any, but I should be delighted to hear them.

Q.—There are charges made in this little book.

A.—It depends by whom they are made as to what value is to be attached to them.

Q.—Whether they are made by enemies or friends, I think it is very desirable that you should clear the ground. " Charges made. The mildest form of charge is that the scheme was pushed through with undue haste and sanctioned without a sufficiently careful examination in its engineering and financial aspects."

A.—I think I have dealt fully with that.

Q.—Yes. The second charge is " The scheme was launched mainly with the object of placing orders in England for expensive plant, and the employment in highly-paid positions of a number of Europeans." You will be the best person to say something about that charge.

A.—The only answer to that is that it is positively ridiculous. The whole history of our régime in India forbids such an interpretation by any reputable or honest person. The mere fact of the Secretary of State's own personal interest, and the fact that the Municipality of Bombay themselves begged us to take up these schemes at once when I first arrived, practically getting my promise before I had landed that I would take these up, gives the lie to that assertion. We did exactly what their own Municipal representatives asked us to do. Further, we did what their own Legislative representatives unanimously approved of. It is rather absurd, surely, to say that we did it for our own narrow British ends, and in order to get a few people a few more jobs. I do not think any serious person would consider that, would they?

Q.—The third charge is, " The order for the dredgers was decided by the fact that Sir George Buchanan received a large commission on the order."

A.—I am perfectly certain there is not a word of truth in that, but you will have to ask Sir George Buchanan himself about that.

Mr. Billimoria: You will understand that this is not a charge emanating from me.

Chairman: There has been not the slightest suggestion of it in any of the evidence at all. All that Mr. Billimoria is trying to do is to bring to your Excellency's attention some statements which have been made before this Committee.

Witness: I know Mr. Billimoria and his reputation well enough to be satisfied that he would make no such charges himself. He is only trying to do a public duty. I think you will find that Sir George Buchanan would very much resent such a suggestion, and very properly resent it. He is in a position to give a definite answer, but I should deny it most indignantly from all I know of him.

Mr. Billimoria: Before you assumed charge of the office of the Governor of Bombay, I take it you had interviews with Mr. Montagu, the Secretary of State for India?

A.—Yes.

Q.—You had some instructions to go ahead with this scheme?

A.—I must be more accurate than that. I cannot say that the Secretary of State authorised me, and charged me straightly to carry out the Back Bay scheme. He charged me very straightly indeed to deal most urgently with the housing problem as a whole. I can show evidence, preferably to the Chairman, because there are some private letters, proving his complete approbation and keenness of the Back Bay scheme particularly, but he did not charge me to do that; merely with the general scheme.

Q.—The memorandum which was submitted to us did use the word that you were "charged"?

A.—I think, as a matter of fact, from an office note which I believe has been put before you, that the Secretary of State subsequently did say he charged me straightly to carry out this scheme; but in the early conversations I had with him, I cannot remember his emphasising the Back Bay scheme, although we discussed it. I cannot claim that he ordered me to carry out the Back Bay scheme more than any other. We discussed the housing scheme as a whole. We discussed Back Bay, and he gave me instructions to proceed to the examination and execution of such things as were necessary to solve the problem with as much speed as possible.

Q.—Did you know Sir George Buchanan before he came into contact with you in this connection?

A.—I do not think I can say I knew him, in the ordinary sense of the word, but I believe I actually met him in Basra during the War. I had no acquaintance with him.

Q.—This morning, in the course of your evidence, you mentioned that you left it to a higher authority to consider the technical aspect, but from the evidence which Sir Sydney Crookshank gave before us, he said he looked at the scheme only superficially and that he did not go into the details of the figures submitted in the report?

A.—I am afraid I cannot answer for what Sir Sydney Crookshank did or did not do.

Q.—But he was the higher authority to which you referred?

A.—I referred to the Government of India and the Secretary of State.

Chairman: You would be entitled to assume that the Government of India, its servants and agents, did their work with care?

A.—Yes, just as I hope this Committee will assume that my Government did the same.

Mr. Billimoria: It is also a suggestion made, both in the Press and by the public, that the dredger "Sir George Lloyd" was consigned to your Excellency in your personal capacity?

A.—Rather a big parcel!

Q.—That has been the suggestion, and I shall be very glad if you will clear it up.

A.—I never saw a package with any steel or iron. It certainly never reached me. It seems to me a most frivolous point. The name of the dredger was the "Sir George Lloyd," and I believe they always paint the name of the boat on packages. If anybody suggests that I was getting consignments of dredger steel addressed to me privately, all I can say is that I was not the happy recipient of them. It sounds to me a most frivolous objection. I cannot clear it up. You must ask somebody else. With all respect to the critics, it is a very absurd suggestion. Whether it is true or not, I do not know. The implication is ridiculous. I need not pay any serious attention to it.

Sir Frederick Hopkinson: I suggested, when we were sitting in Bombay, that the gentleman who made these various accusations ought to be prosecuted.

Chairman: Is there anything you would like to say in conclusion, Your Excellency?

A.—I want just to make sure that the Committee understand one thing. I expect you realise that the story which you are examining to-day is nothing new. It is not until one understands the history of the growth of this really very wonderful city by bold schemes of reclamation that one appreciates the importance of this scheme to Bombay. The history of the reclamations from the very earliest days of British rule I can put in a very brief form, if you will bear with me for a moment. At the outset Bombay was a conglomeration of seven islands separated from one another and from the mainland by creeks and wide stretches of swamp land. The low swamps were believed to be the chief cause of the terrible mortality among the early servants of the East India Company and, even in the 17th century, the Court of Directors urged upon their Council, then at Surat, the necessity of reclamation. The first large reclamation scheme was effected by the dam at Mahalahshmi now known as the Hornby vellard. Work on the first dam was stopped in 1727 apparently on financial grounds, but sufficient was then done to reclaim thousands of acres between Dharavi and Girgaum, which are now an important part of the modern "island" of Bombay. It is perhaps significant that the

dam was not made finally effective till some fifty years later under the Governorship of William Hornby. This work effected a remarkable change in public health and led to an increase in the population. The first causeway, from Sion to Mahim, was built at the beginning of the 18th century and Bombay was first connected to Salsette a century later, in 1803, when the Sion Causeway was constructed in the Governorship of Jonathan Duncan. It will interest the members of this Committee to know that till 1838 Colaba was still separated from the rest of Bombay at high tide. The last causeway, at Mahim, was not opened till 1845. At the time of the Civil War in America the overcrowding in Bombay was intense. In 1838 the population was estimated at 236,000; in 1872 the figure recorded was 644,400 and a census in 1864 registered, under abnormal conditions, a still larger figure. It was natural that relief from the congestion of the day should be sought by investing the wealth which then flowed into Bombay in fresh reclamations. Six million pounds sterling are said to have been utilised and by 1872 900 acres had been reclaimed. Those figures, translated into present-day values, would not show very much difference from the figures under discussion now either in acreage or money. What Bombay would be to-day without these 900 acres and the Hornby vellard reclamation it is difficult to imagine. I will conclude by saying this, if I may. The criticism comes from a section. The support comes from the masses of people. I and my Government have worked for them, because they need it very gravely. It depends what British standards are going to be set up in India. Bombay is the prime city of India—where one first lands, and where the conditions matter for our repute; and they are not fit to-day to bear the stamp of British workmanship or of British guardianship. You may take a narrow view and say that because this scheme may or may not have been properly handled in detail therefore this, that or the other may have to be done. All I care about to-day is that these schemes (to which I gave a great deal of my health and time in very difficult circumstances, and which needed a great deal of courage and hard work) should be pushed through to the end for which they were intended. I have said what I have said in order to give you a sense of proportion over the years. You see that the same schemes were embarked upon even 40 years ago. We are spending approximately the same amount of money and adding the same amount of land to Bombay with successs in each period. In each period there have been doubts and hesitations and possibly public clamour (perhaps for the same reasons as exist to-day), but each time Bombay has swept on and has become a bigger city. Unless you make it a cheap port it will never keep a great port. Our object was entirely hostile to the interests of those who criticise the scheme now. I have never hidden it from them, as my Indian colleagues here well know. I have always spoken quite frankly. The landlord interest, as such, so long as it was delaying the better improvement of the housing conditions of the people had to go. I never hid that from them. I said it openly in public over and over again. That is still our purpose—that nothing should stand in the way of better housing accommodation and cleaner conditions of living. I am not talking of a thing about which I do not feel extremely strongly, and I am not talking sentimentally. Nobody who has ever seen the Bombay slums will ever forget them, and those are conditions which I am not prepared to have any responsibility for after the instructions I was given; and whoever takes responsibility, if anybody does, for sweeping those slums away, at least I shall always be proud that, whether mistakes have been made or not, at any rate my name will be connected with the movement as having tried to do something in a much needed cause. I only hope this Committee will reflect very gravely before they interrupt the work which, I believe, if driven through with courage, energy and skill, will still be a success, socially and financially.

Sir Frederick Hopkinson.—Have not you already seen that we have made an interim report?

A.—I have, but I am rather a greedy person. I do not want half; I want all.

Sir Frederick Hopkinson.—Wait until the proper time.

Chairman.—The report is interim.

A.—I know, but this is perhaps the only occasion on which I shall have the honour of addressing this Committee, and therefore I do want to make my plea. I still believe not only in the material success of the scheme but in its great necessity from a social and moral point of view.

Chairman.—We are very much obliged to you, Lord Lloyd, for the evidence and the assistance which you have given us.

(The Witness withdrew.)

The Committee Assembled at 11 a.m. on the 16th October, 1926, all Members, except Sir F. Hopkinson, being present.

The examination of Mr. Lewis was continued.

Mr. Billimoria.—You have told us that you were engaged on this task from the 11th June, 1920, until the 12th July, 1924. You were in Bombay on the 11th June?

A.—No, it was not June.

Q.—You were engaged on the task from the 11th June, 1920, to the 12th July, 1924, were you not?

A.—I left Maymyo on the 20th June, and I arrived in Bombay somewhere about the 27th. I was in Bombay for a few days, and I think I left in the first week in July. I am perfectly certain that the 11th June, 1920, is a wrong date.

Chairman.—It is the 11th December, 1920. That appears in the history of the case.

A.—June was the month in which I arrived in Bombay from Burma.

Mr. Billimoria.—That is what I took from your evidence?

A.—It was not the 11th, because I did not leave Maymyo till the 20th.

Q.—You have told us, in the course of your evidence, that you had been preparing the project estimate in December, or early January, 1921?

A.—Yes, I had to begin it immediately.

Q.—You have also stated that it took you about 18 months to get that project estimate ready?

A.—Yes. Of course, I was not employed only on that.

Q.—I understand that, but with your own engineering skill and knowledge, coupled with the assistance which you received from your department, it took you about 18 months to prepare that project estimate?

A.—Yes.

Q.—For a scheme of this magnitude, a carefully prepared estimate was, of course, essentially necessary?

A.—Yes.

Q.—In any case, you would have devoted a sufficiently long time to consider all the aspects, and make sure of your figures? You could not have given any figure haphazardly. You wanted to be sure of the figures which you were submitting in your estimate?

A.—Yes.

Q.—Take it as a hypothetical proposition. Supposing you had been appointed by the Government of Bombay, or were asked to be responsible for the scheme, and were called upon to submit a report and estimate, you would have taken some months on the survey and borings, and would have gone into the matter very thoroughly before you had submitted your report, would you not?

A.—Yes.

Q.—If you had not done so, if you had submitted a report without a careful study of the whole situation, you would rightly have been accused of incompetence or ignorance?

A.—Well, that is a statement which you make.

Q.—You will agree with that?

A.—I might not have been ignorant, and I might not have been incompetent; I might merely have been careless and negligent.

Q.—You would have failed in the discharge of your duty if your figures had eventually turned out to be incorrect?

A.—No, I would not say that. You say, if I had not taken sufficient care to see that they were right in the beginning?

Q.—Yes.

A.—Well, as right as they could be. An estimate is only an estimate. It is not the final bill.

Q.—Of course, it may vary by a few per cent. here and there?

A.—I will not say that; various circumstances might occur.

Q.—If the figures had been based upon something, and they turned out to be incorrect in the end, you would rightly be accused either of incompetence, negligence or ignorance?

A.—You are usually supposed to be able to work within 5 or 10 per cent. of an estimate. I am not quite sure, but I think the rule in the Government of India is that if the excess does not exceed 5 per cent., no particular explanations are called for.

Q.—Five to 10 per cent. is usual in estimates for contingencies. That is always so?

A.—Yes; you usually allow 5 per cent. for contingencies.

Q.—You have told us that it took you about 18 months. If we take it from early 1921, it would be about the middle of 1922 that you got your estimates ready?

A.—Yes.

Q.—In fact, it was in May, 1922?

A.—I think it was in May. There was a tremendous amount of investigation and finding out about things when we started to work, and I could not say when we actually first put pen to those detailed estimates. We were told to go on, and we had to scheme out things, and leave the estimates. We had to make up our minds how we were going to proceed; and the making up of the estimate, instead of coming first, was left till afterwards by force of circumstances. It was not what I wanted. It was extremely inconvenient to us, because we were rather working in the dark.

Q.—What I want to get at is this—that at about May, 1922, this estimate was complete?

A.—Yes.

Q.—Then I am a little puzzled with regard to some of the dates. I find that Mr. Monie, the Secretary to Government, supplied the figures to the Indian Merchants' Chamber a long time before May, 1922, and that it was on those figures that His Excellency the Governor, in August, 1921, made a public speech before the Indian Merchants' Chamber.

A.—I will tell you how that occurred. Mr. Monie came to me and said, "His Excellency the Governor is going to make a speech, and he wants some figures." I said, "Good gracious, I have not got the figures." "Well," he said, "we must have something. We must have an approximate figure." We set to work on the spot to make out, entirely in a rough way, a very preliminary estimate. I do not know what the date was; any way, I had not my figures complete, and I made up this estimate. I have forgotten now what the figure was, and I do not know where the estimate is, but I handed it to Mr. Monie, and I said, "Now, you must understand that this is an estimate drawn up in a few hours." I was given a day, or at the outside a day-and-a-half or two days, to do the thing, and I said, "I must decline to be held responsible for the accuracy of this estimate. I am not sure of all these figures, but, as far as I can see, I think it will cost about so much."

Chairman.—It turned out to be a very accurate forecast of your eventual figure.

A.—It was, as far as I remember. When I finished the second estimate, I had the first one in a drawer of mine, and I took it out and, as far as I remember, the difference was about 30,000 rupees. But that estimate was only preliminary. I expressly said that I could not be held responsible for it, because I had not then got the data which I should require in order to make an estimate for which I could be held responsible.

Mr. Billimoria.—You know that Sir George Buchanan submitted his report in September, 1919?

A.—Yes.

Q.—And that no work actually started until a considerable length of time after that date? In fact you did not, as you say, come in until December, 1920, and no work had started then?

A.—No.

Q.—Can you tell us what were the circumstances which led to the estimate being revised to nearly double within a few months of it having been prepared?

A.—It was not so much a question of revision as of the provision of an estimate for the carrying out of the detailed work. The accounts of a work are kept according to the heads of the estimate. It would be utterly impossible, from an accounts points of view, to keep the accounts on *this*. (*Sir George Buchanan's original estimate.*)

Q.—That means you have to classify or subdivide the main heads?

A.—Yes.

Q.—I am not on that point. What I am on is this. Here the figure is 367 lakhs. In your estimate the figure comes to 702 lakhs. What were the circumstances intervening between that short interval of a few months which led to the figure being doubled? Never mind the details. For instance, take the first item, concrete. You may have several details which may bring you up to that figure, or to a little less or to a little more. I am not concerned with that. I am concerned with this: taking it as a whole, in September 1919 the figure was 367 lakhs. When you started preparing your estimate the figure came to 702 lakhs. Was there any abnormal circumstance intervening in that period which could have doubled that figure?

A.—No. When I came to look into it I found that things were required which increased that figure, when I worked it out.

Q.—Normally were the circumstances very materially different between September, 1919, and December, 1920, in the way of prices or otherwise?

A.—I could not tell you.

Q.—Then can you explain how the figure——

A.—That was done in 1919, was it not?

Q.—Yes.

A.—I did not know anything about Bombay in 1919.

Chairman.—But that is not your figure. The 367 lakhs is not your figure?

A.—No. My figure of 702 lakhs was obtained by going as carefully as I possibly could into every detail, as I foresaw it, and providing for what was required, as I could see it at that time.

Mr. Billimoria.—I will put my question in a different form. When you prepared that estimate, were the prices ruling at the time the same as in 1919, or had you any knowledge or information that they advanced by cent. per cent.?

A.—I really do not know now. I had come from the war. I cannot tell you exactly as to prices. I was here the other day and heard Colonel Paddon's evidence with regard to the difference in prices, and I can give you no evidence which can better that, or even confirm it—except from general knowledge that prices were extraordinarily high.

Chairman.—We are getting rather away from Mr. Billimoria's point. He wants to know how it came about that an estimate of 367 lakhs in September, 1919, became, in the course of 15 or 18 months, 702 lakhs. That is the question—just the reason why?

A.—I think the main reason is that it was gone into in greater detail.

Mr. Billimoria.—Therefore if, in the original estimate, greater care had been exercised and all the details had been gone into, that estimate would not have resulted in a figure of 367 lakhs?

A.—I do not think so. As far as my experience goes, it could not have been done. When I did go into the matter as thoroughly as I could, I found the figure came to 702 lakhs.

Q.—So the figure of 367 lakhs was an impossible one?

A.—The work could not have been done for the price.

Q.—Have you before you Sir George Buchanan's report and the project estimate? Will you kindly turn to page 29. Items 1 to 6 in Sir George Buchanan's estimate amount in the aggregate to 118.11 lakhs—sea wall?

A.—Yes.

Q.—Now will you kindly turn to the project estimate prepared by yourself on page 7, items 1 to 9, and total this up. I will give you the figure, which is absolutely accurate. It comes to 2 crores 35 lakhs, 21,275.

A.—Yes.

Q.—The headings, as far as the sea wall is concerned (barring those greater details in your figures or estimate, perhaps) are just the same. Can you explain why a crore and a quarter more were provided for in respect of the sea wall in your project estimate within 15 or 18 months of the original estimate? You have all the details there in the supplementary statement?

A.—The details?

Q.—If those details are correct, the figure of 118 lakhs cannot possibly be correct?

A.—No. It is entirely inadequate.

Q.—Then if you will kindly look at items 7 to 11, reclamation, in Sir George Buchanan's estimate at page 29 they total up to 1 crore 66 lakhs 52,000. Your figures for items 10 to 13 amount to 2 crores 51 lakhs 33,946—a material difference, nearly 90 lakhs over and above?

A.—Yes.

Q.—Your items 10, 11, 12 and 13, corresponding to items 7, 8, 9, 10 and 11 in Sir George Buchanan's estimate?

A.—Yes.

Q.—Then item No. 12 in Sir George Buchanan's estimate is 75 lakhs, and your items 14 to 16, under the same heads, come to 2 crores 11 lakhs 90,000—a crore and a quarter additional.

A.—Yes.

Q.—Was the estimate of 75 lakhs an adequate provision?

A.—No, obviously inadequate.

Q.—That indicates that the main item of storm-water drains was not taken into account at all. You have provided for it in your estimate at 64 lakhs 28,100. It was not thought of in the original estimate?

A.—In the original estimate apparently Sir George Buchanan has taken that from somewhere else *en bloc*.

Q.—I am taking these figures as they are, and they account for the material difference. If there is a rise of 120 lakhs, that one item of 64 lakhs accounts for a material difference. Then item 13 in Sir George Buchanan's estimate, with regard to establishment, is 17 lakhs 98 thousand?

A.—Yes.

Q.—You work it out under headings 17 and 18 to 66 lakhs 67 thousand?

A.—Yes.

Q.—That is half a crore more for establishment?

A.—Yes. The figure is taken at 7½ per cent. Sir George Buchanan took 5 per cent.

Q.—Even if you had taken 5 per cent. on the lower figures they would have been very much higher, so that the figure is hopelessly inadequate?

A.—As a consequence.

Q.—No provision has been made, on Page 59 of Sir George Buchanan's estimate, with regard to unforeseen charges or contingencies. You put yourself very wisely on the safe side by including a 10 lakhs figure for contingencies?

A.—Yes.

Q.—Your item No. 19 which brings up your total to 7 crores and 75 lakhs, compares with Sir George Buchanan's figure of three crores 77 lakhs?

A.—Yes.

Q.—Therefore these figures distinctly and clearly prove that the figure of 377 lakhs was very inadequate?

A.—Yes.

Q.—In the course of your evidence you mentioned that the commencement of the sea wall from both ends was done under certain orders. Will you please explain whose orders?

A.—The orders I think were issued by the Government to Sir George Buchanan. That was brought out yesterday, was it not?

Q.—You carried it out under orders. I want to know under whose orders you carried it out?

A.—Well, it was the scheme. When I arrived on the scene the scheme had been settled on. It was that the work was to be carried out at both ends. It was on that that I started and carried out the work.

Q.—When you refer to "orders" were you told by anybody particularly?

A.—It is a long time ago. It was a sort of talking it over. One would say "How is this going to be done" and the reply was that you were going to begin at both ends.

Q.—You do not remember exactly as to who gave you the orders?

A.—It is obvious. Obviously it must have been Sir George Buchanan in talking it over, and he had instructions from the Government of Bombay.

Q.—May I just tell you that it has been suggested in Bombay that the starting of the sea wall at Marine Lines was for merely propaganda purposes—for advertising the scheme?

A.—I do not know anything about that.

Q.—Would not that be so—because financially it was a very unwise proposition?

A.—You are better able to judge of that than I am.

Q.—You are not aware of any propaganda?

A.—No. It was a question not of propaganda but of getting the work done.

Q.—You have told us that you began to feel doubts as to the material in the harbour in 1921?

A.—Yes.

Q.—Soon after you arrived?

A.—Yes. I think that is so.

Q.—Did you report the matter to Government? Did you bring it to their notice directly or through any official concerned in a Government Department, either in writing or in any conversation or interviews or conferences? You cannot remember?

A.—I cannot remember. Those sort of things grew; they came slowly. It is very difficult to specify.

Q. It is very important for our purpose. If you felt doubts that the material was not going to be suitable as far back as 1921, it is not surprising at all that the scheme should have failed, is it?

A.—I will not say I had doubts or misgivings about it, but I must say that I was not absolutely sure in my own mind.

Q.—You are not certain of your having mentioned it to anybody thereafter?

A.—I cannot say.

Q.—Can you fix any date—the earliest, or the latest—at which you brought it officially to the notice of Government? Cannot you remember?

A.—No. I cannot remember. I should have to go through whatever there is here and search it out.

Q.—I will go to another question. To what do you attribute this failure—the dredger or the material? Is it because the dredger has not been proving its capacity, or is it because the material is not what it ought to have been? The material could not have changed?

A.—No. Of course you must remember that I have not been there for two and a half years. We got a very great deal of very good material at the beginning in the first year. I do not say that the quantities were what we expected, but the material was very good.

Q.—The material for the purposes of reclamation was good?

A.—In the beginning.

Q.—Subsequently it was very disappointing?

A.—I do not know anything about that.

Q.—The figures prove that. During your period of office as chief engineer the output was not satisfactory?

A.—No, the output was not satisfactory.

Q.—It has been said that it is the fault of the material, like a bad carpenter quarrelling with his tools. That having been said, should not the investigation have taken place before the dredger was ordered? Should not the suitability of the material have been enquired into? It is not the ink which is going to hold the ink-pot. It is the ink-pot which is going to hold the ink?

A.—I think Sir George Buchanan accepted the result of Mr. Kidd's investigations.

Q.—Without enquiry as to the suitability of the material for which the dredger was built?

A.—I think he accepted Mr. Kidd's statement on that point too.

Q.—Mr. Kidd's statement does not indicate soft material. If you will refresh your memory you will find that he says " stiff and unctuous clay "?

A.—Does he not say " eminently suitable " somewhere or other?

Q.—Suitable in the sense that the clay was stiff and unctuous?

A.—I had an idea in my mind that the material was judged to be eminently suitable.

Q.—You can take it from me that Mr. Kidd has described the clay as stiff and unctuous. He has not described it anywhere as soft.

A.—I am under the impression that it was said by Mr. Kidd that it was suitable. Yes, here you are. Mr. Kidd says " It has been completely established that there is available more than three times the quantity required of suitable material."

Q.—That does not indicate soft clay. He does not use the phrase " soft clay " at all. There is no doubt that there is material in the harbour, but the point is whether the dredger which was built was suitable for that material or for something else?

A.—Here Sir George Buchanan says: " On the assumption that Mr. Kidd's survey and borings are correct—and I see no reason to doubt their accurancy as a great many borings were taken—I accept his conclusion both in respect of quality and quantity of material."

Q.—The quality which Sir George Buchanan discusses in the latter part of his report is hard clay. Nowhere in no one of these pages does he ever refer to the words " soft clay." In a few minutes I will come to some of the correspondence which passed between you and him where he refers to this material as hard clay. Did Sir George Buchanan at any time complain either verbally or in writing about the inefficiency of men or extravagance of Government while you were in office? You cannot tell us for the period subsequent to that, but during your period of office did he ever complain to you verbally or in writing about the inefficiency of men or extravagance of Government, or of your Department?

A.—In the reports which Sir George Buchanan wrote on his inspections, there are in some cases points which he raised. He said on one occasion, as I mentioned the other day, that we had exceeded the quantity of stone required to be placed in the first section of the Marine Lines wall by 50 per cent.

Q.—That would happen in the ordinary course of engineering work?

A.—No, it was a mistake. It was not 50 per cent. There was a small excess, but not 50 per cent.

Q.—There was a small excess; that is evident and natural. That is an every-day occurrence?

A.—You have asked me whether he complained about things.

Q.—About extravagance. Would you call that extravagance?

A.—In ordinary circumstances to use 50 per cent. more material than necessary would have been extravagance.

Q.—Was it a fact that you used 50 per cent. more material than was necessary?

A.—No, we did not.

Q.—So that it was not extravagance?

A.—No. I think the use of the small amount of extra material which we did use was justified by the circumstances which ruled at the time.

Q.—Would you call your Department inefficient for that reason?

A.—No. I do not think anybody has ever told us we were inefficient.

Q.—I will now ask you kindly to direct your attention to the item of storm water drains. It is perfectly plain from your letter of the 10th December, 1923, at page 104. Have you got that?

A.—Yes, 5491.

Q.—The last paragraph but three says " As these are exceedingly important items of the work, the omission detracts from the value of the proposal." You are talking of the storm water drains there. I will read the whole paragraph: " I notice that Messrs. Meik & Buchanan in their letter make no mention of storm water drains. As these are an exceedingly important item of work, the omission detracts from the value of the proposal." This may remind you of the fact that storm water drains were not thought of when the original estimate was prepared?

A.—Well, I am not quite sure what this was about.

Q.—It is clearly about the storm water drains, if you read the whole of that paragraph?

A.—Yes, that particular paragraph, but I think it was a question of the programme.

Q.—If you are in any doubt about it will you kindly turn to Page 66. If you look at Paragraph 2 you will see it says: " It is understood that you have fears as to the suitability of the material in the harbour." Then he says, " I remarked that in my judgment the first thing to do was to ascertain the precise nature of the material in the harbour by a practical test, and we discussed the various methods short of beginning the reclamation, viz., by grab dredger," and so on, and if you turn to Page 67, under the heading of " storm water drains," in the memorandum, Paragraph 2, you will find: " The original idea in respect to storm water drains was to continue the existing drains from their present outlets to and through the new sea wall, and in your project estimate you showed five outlets," etc. That is a clear indication that those storm water drains were never thought of by Sir George Buchanan. This is a memorandum signed by Sir George Buchanan, dated 10th January, 1923. His estimate was in September, 1919. Is not that clear from this?

A.—It seems he had some idea as to storm water drains.

Q.—Not of the design or the construction, or what ought to be suitable for this reclamation—or, at any rate, not such as would cost 64 lakhs for storm water drains alone?

A.—The number of drains that come into Back Bay from the town is very great. We have had to connect them up in many cases. What was your original question?

Q.—That the storm water drains were omitted from the original estimate, and these letters give that indication?

A.—Unless the storm water drains are included in that figure of 75 lakhs.

Q.—If you want to qualify that, I will ask you whether 75 lakhs would be sufficient to cover roads, lighting, sewage drains and storm water drains?

A.—No, it would be inadequate.

Q.—Therefore they were not included. That would be the natural conclusion?

A.—Yes.

Q.—Will you kindly refer to page 12 of this document of correspondence, where you will find a letter from Sir George Buchanan dated 22nd June, 1921, in which he says, in the second paragraph on that page, " We hope there will be a great deal of hard clay that will require very little moorum topping."

A.—Yes.

Q.—So he never thought of soft clay. This was 1921, two years after he sent in his report. He did not think of soft clay at all?

A.—He said he hoped there would be a great deal of hard clay. That does not preclude exactly the presence of soft clay, does it?

Q.—I see. I want to make a point out of this Supposing anybody had discussed with him that the dredger was built on the assumption that there was going to be soft clay, would it not have influenced him in any part of the correspondence, apart from his report, so that he would have stated somewhere that there was the existence of soft

clay and not hard clay? I have not come across a single letter of Sir George Buchanan, or any paper, in which he indicates soft clay?

A.—No.

Q.—If he therefore knew that he was basing his estimate on soft clay, and ordering dredgers to pump out soft clay, he would not have called that material hard clay, even at that distant date in 1921, would he?

A.—No.

Q.—Then will you turn to page 14: the first line: "We were not only the engineers for the machinery, but for the execution of the entire work."

A.—Yes.

Q.—Thereby indicating that they were not consulting engineers, but that they were the responsible engineers for the work?

A.—That has been Sir George Buchanan's position.

Q.—That attitude is taken throughout 1921?

A.—Yes.

Q.—Now will you turn to page 66. You will remember you told us that you felt doubt about the suitability of the material in 1921? Sir George Buchanan confirms that, in paragraph 2 on page 66, in December, 1922. So that you must have had some conversation with him with regard to the unsuitability of the material, and Sir George Buchanan knew it?

A.—Yes—well, as regards the suitability of the material.

Q.—In that paragraph he says that the first thing that should be done was to ascertain the precise nature of the material. Do you put the cart before the horse, or the horse before the cart? Which is the proper time to investigate the matter—after you have found you are in the mud or before you take a jump into it?

A.—Usually before.

Q.—Then on page 103 there is your letter dated 21st November, 1923, in which you say, "the whole show has busted."

A.—No, I do not say that.

Q.—There it is.

A.—No, no.

Mr. Billimoria.—That is what I find in the printed document.

Chairman.—Read it.

Mr. Billimoria.—"What inference is the man in the street going to draw—that the whole show has busted."

A.—I did not say that the whole thing had busted.

Q.—Will you kindly read the whole paragraph: "I would point out that we are by no means sure that the filling from the harbour is going to be of use as a means of reclaiming the area." That is your letter is it not?

A.—Yes.

Q.—"If it proves unsuitable the fact will become common property about the time the work on Marine Lines will stop. What inference is the man in the street going to draw?—that the whole show has busted." Can you explain that? What had you in your mind before you wrote that letter?

A.—I am afraid I was very upset at that time by having the whole of our year's programme cut down by half. We had made full provision for the work for the whole year, and we were suddenly told to stop it, and I was trying to get that decision reversed from the construction point of view. It seemed to me that by deferring the extra 1,500 feet of gantry for one year we were not going really to save much.

Q.—Did that lead you to make that observation?

A.—This was a note written with the object of securing the withdrawal of the orders to do only half the season's work.

Q.—It is a very interesting observation, is it not?

A.—Yes. Perhaps I ought not to have put it in that way.

Chairman.—But why not? It exactly expresses your view?

A.—Yes.

Q.—What is the objection to it?

A.—It is perhaps a little bit colloquial.

Chairman.—But it hits the mark, does it not?

Mr. Billimoria.—Will you kindly turn to page 115. I want to ask you something about your recommendation for the purchase of the "Jinga."

A.—That was only a suggestion.

Q.—Do you know that she has never been used up to now?

A.—I do not know anything at all about it.

Q.—She has been lying in the dry docks for over 18 months and has not been used. Expenses are running on every day, and the possibility of her ever being used seems very remote.

A.—I was studying the question of how the work was to be done with Mr. Brims, who was the officer in charge of the dredging, and we worked out many schemes. The lengths were very great, and we came to the conclusion that some more power would have to be obtained to get the material to where we wanted it. This letter was accompanied by two or three plans which showed the position exactly, and which really would make this understood very much easier. That was merely a suggestion. It seemed to us to be necessary to have another boosting station, and that was a suggestion as to how it could perhaps be done.

Q.—Did you think she was a suitable boat to be purchased at that cost?

A.—What we suggested was that the engines should be used.

Q.—Did you work out what it was going to cost in the end?

A.—No. It was only a preliminary suggestion. I say here " it is suggested."

Q.—You are an engineer of repute, and you must know that when a ship is lying in dry dock it is an expensive process.

A.—But has she been lying in dry dock?

Q.—Yes, for eighteen months. Have you heard of such a thing before in your experience as an engineer of a vessel being in dry dock for eighteen months?

A.—The " Kalu " was in dry dock for a certain length of time, but it was nothing like that.

Q.—Will it not surprise you now to find that she has been lying there, with all the expenses running up day by day irrespective of the interest on the original cost?

A.—Yes. I did not know that.

Q.—If you will refer to Page 124, your letter No. 2203, dated 6th June, 1924, you will find that in Paragraph 4 you say " Sir George Buchanan will be able to see for himself that the mistakes have taken place and that the complaints made in my letter were justified "?

A.—Yes.

Q.—Sir George Buchanan had knowledge himself of the mistakes that had been committed?

A.—Oh no. That refers to a particular matter.

Q.—If you turn to Page 112 you will find what that matter is.

A.—Some plates were sent out wrong for the pipe line. I think they were for floaters. There were certain patterns of plates. All these floaters were the same. Instead of an equal number of plates of each description being sent out, some were in excess and some were in defect. That letter was written in answer to a letter from Sir George Buchanan in which he forwarded the indignant repudiation of Messrs. Simons & Co. and the inspectors to my remarks that the things had not been properly inspected. The things would not fit. We had, say, 25 of one to 30 of the other. The figures are all in the correspondence.

Q.—So your remarks were absolutely justified?

A.—Yes, but that is a particular case.

Q.—Even taking that particular case, your remark that Sir George Buchanan himself knew of the mistakes was justified?

A.—No, no. You are trying to generalise that, are you not?

Q.—No. I am speaking so far as the complaints made in your letter are concerned.

A.—But that was a particular case.

Q.—I am reading this paragraph of your letter—that your remarks were justified?

A.—As far as I know, my remarks were absolutely justified. What was the final result, Mr. Elgee, do you know?

Chairman.—I think Messrs. Simons stood to their position and said " This complaint has no foundation because we have taken the greatest care to mark everything, and there is a misunderstanding at your end."

A.—What happened was that these floaters and pipes came out in plates and were put together in Bombay. They were put together by the dock people, and when particular plates came in we found they did not fit, and we had to make alterations which cost us something like 5,000 rupees.

Mr. Billimoria.—Therefore the statement you made in your letter to Messrs. Meik & Buchanan was justified?

A.—Oh yes; in my opinion it was quite justified.

Q.—So far as you know, there has been no other explanation offered; your remarks have proved to be correct?

Chairman.—I think you must be cautious about that, because I believe there is another letter in which Messrs. Simons stick to the point and say " This will not do; it is a mistake at the other end."

A.—Everybody said that.

Mr. Billimoria.—Did you find that there was a mistake in India? Did you make mistakes?

A.—No. We had to rectify the mistake which was made in England. It was a question of inaccurate work and inadequate inspection, as it seemed to me.

Chairman.—What page are you on?

Mr. Billimoria.—Page 124. It is letter 2203 of the 6th June.

Chairman.—That is Anderson's letter; that is right.

Mr. Billimoria.—As far as you are concerned, we will take it now, Mr. Lewis, that your observations were absolutely justified, inasmuch as Sir George Buchanan knew for himself that mistakes had been committed?

A.—Sir George Buchanan had not looked at the thing at that date when we found this out, and in my letter—I do not know where it is now—I complained of those mistakes.

Q.—I think your letter is at Page 112?

A.—Yes. " There has been trouble in the re-erection of the 20 to 50 feet length floaters for the new 42 inch pipe line for the " Kalu." The pipes have, as shown on the re-erection drawing received by you from Messrs. W. Simons & Co. Ltd. on the 13th December, 1923, been marked with re-erection numbers. For the set of 20 floaters 33 have been received marked (144) (145). These are all constructed to the details of this particular section. Of end section (143) 21 were received giving a surplus of 1 section. But of section (144) (143) only 15 were received, being 5 short; of (140) (141) 17 were received, being 3 short; of (141) (142) 15 were received, being 5 short." So, you see the various kinds of plates were indicated by the numbers, and instead of there being 20 of each of these plates they sent us out an excess of some of them and an insufficiency of others.

Q.—Then you proceed to say " As this is due apparently to carelessness in the manufacture and lack of inspection, I presume the supplier and inspector will be prepared to make good the extra cost "?

A.—Yes. That was the ordinary suggestion to make.

Q.—So that after having gone through your letter again you now confirm the view which you held at that time—that those remarks were justified?

A.—Yes.

Mr. Billimoria.—We will now turn to Page 128.

Chairman.—You had better refer to Page 123, at the bottom, where Mr. Anderson says " I do not, of course, doubt the good faith of the writer of the letter, but can only conclude that he has been misled."

A.—I had not been misled.

Chairman.—One was saying so and so, and the other was saying something else, and that is how the matter rested. Mr. Lewis supports his case by saying he had to get the things altered in Bombay.

Mr. Billimoria.—What is the position? Who is at fault? Where you at fault, or the makers?

A.—The makers and the inspectors.

Q.—On page 128, in your letter to Messrs. Meik & Buchanan dated 14th July, 1924, you say this at the end, " As these figures diverge considerably from the five annas per cubic yard at which you estimated the work would be done I send them for your information as soon as obtained." So that you supplied the figures showing that it was impossible to work at five annas a cubic yard?

A.—Well, that we had not succeeded in that season's work.

Q.—At page 129, in a letter addressed to you by Messrs. Meik & Buchanan, they express very great surprise : " We cannot say that we are surprised at the figures of quantity, as calculations made some time ago in this office showed that at the present rate of progress the reclamation would be completed in 35 years." In view of what has happened, is there any doubt left in your mind, or is there any surprise, that the reclamation could not be completed within the stipulated period, from the events which have transpired? It was anticipated that the whole thing would be completed by 1926. We are now at the end of 1926.

A.—I think very shortly after we had gone into matters we extended that date.

Q.—" The essential feature of the reclamation being the capacity of the dredger to reclaim at the rate of 2,000 cubic yards per hour, Government naturally view with great

dissatisfaction the slow progress, which threatens most seriously to prejudice the financial prospects of the scheme that was undertaken on the recommendation of Sir George Buchanan."

A.—We are now getting to beyond my time.

Q.—But the facts are there—that the scheme was undertaken on the recommendation of Sir George Buchanan?

A.—Yes.

Mr. Billimoria.—On the basis that the dredgers were to pump out 2,000 cubic yards per hour for 15 hours a day. That having failed, the project and the slow progress are viewed by Government with great dissatisfaction.

Chairman.—Where is that? What you have given us is a very correct summary, but I do not see your actual phrases.

Mr. Billimoria.—I do not know whether I have prepared this summary myself or whether it appears on the document. I will find out and give you the exact page. The scheme, having been based on Sir George Buchanan's estimate, which in turn was based on the assumption that the dredger was going to pump 2,000 cubic yards per hour for 15 hours a day, and that having failed, is it not natural that the Government should view with dissatisfaction the slow progress of the work? It is on page 160, in a letter of the 28th August, 1925. I will read the passage. " I am desired to emphasise the very unsatisfactory nature of these figures, and to state that Government view with great dissatisfaction the slow progress of the work, which threatens most seriously to prejudice the financial prospects of the scheme. Government undertook the reclamation on the recommendation of Sir George Buchanan contained in his report of September, 1919." It goes on to say, " If dredging alone is carried out, at the rate obtained last season, it is now estimated that the work cannot be completed until the year 1943, and that the cost, excluding interest charges, will amount to Rs. 11 crores," and so on. Will not you, as an engineer of repute and vast experience, having served Government for over 25 years, agree with the view that the Government now hold, namely, that this slow progress threatens most seriously the financial prospects of the scheme?

A.—It is obvious that the dredging, not having come up to anticipation, does spoil the scheme.

Q.—Can you, from your experience, engineering or otherwise, suggest any means by which this tremendously heavy loss can be reduced?

A.—I have not thought about it. I have retired.

Chairman.—There is one matter about which you might be able to help us, and it is this. It might be prudent to get rid of the dredger at the end of say, next year, and to see what price can be obtained for her. It might be prudent to have the locality all round Bombay inspected with very great care and ascertain whether there is sufficient dry filling, and to finish this job as a dry-filling proposition. You would not want very much plant for the dry filling, would you—only a certain increase in the rolling stock, and some help from the railways as regards transport?

A.—Is the B.B.C.I. now electrified?

Sir M. Visvesvaraya.—Yes.

A.—That would probably help matters.

Chairman.—Can you help us at all by telling us where you think there is dry filling?

A.—I cannot give you any information of any value. I did not go into the question myself.

Sir M. Visvesvaraya.—I find I am wrong. It is the G.I.P. Railway which is now electrified.

Chairman.—At all events, it means the possibility of being able to make some arrangements with the railway by which you can get an increased number of trains?

A.—Yes.

Q.—What I am particularly anxious to get your help upon is that one point. Do you know of any place in the neighbourhood of Bombay where there would be likely to be an amount of moorum to fill up the remaining blocks?

A.—I think if I were in Bombay, and had to go into the matter and investigate it, I should go to Trombay first.

Q.—We have had evidence about Trombay. A very limited quantity was given us as being available at Trombay.

A.—I never investigated that question; but, as I say, if I had to investigate it, that would be one place to which I would go.

Sir M. Visvesvaraya.—From Dadar the two railway lines diverge?

A.—Yes.

Q.—Are there any places within five or six miles of Dadar where you could get moorum from? Mr. Kidd said it was possible to get enough moorum from within 10 miles of the reclamation site?

A.—I do not know.

Q.—You are not particular what kind of moorum you get for filling?

A.—No, not for the filling.

Q.—You could get abundant material in the open country on the G.I.P., and also on the B.B.C.I. Railway. If you do not get hills of moorum you could dig into the ground?

A.—Yes.

Q.—There are places full of earth to be had either from the hills or from the ground?

A.—There is a great deal of trap rock underneath.

Q.—But you only have to avoid the places where the trap rock is?

A.—It would mean working in pockets.

Q.—It means avoiding the trap rock and digging where you can get moorum?

A.—That might or might not be feasible, as the trial pits would show. Before you started on an object like that you would have definitely to have a very large quantity of the material at hand.

Q.—Five miles from Dadar you have got nothing else but earth, moorum or rock?

A.—That means you would get it from the island of Bombay.

Q.—Beyond the island?

A.—In Salsette?

Q.—In Salsette on the other side, near the big reservoir.

A.—There was a lot of stuff got from there.

Q.—There are hills of rock or moorum there?

A.—I really could not give you any information which would be of any value.

Q.—There is nothing but moorum or rock.

A.—If there is nothing but moorum there, and it is of sufficiently good quality, it might be possible to obtain material for filling.

Q.—What else could there be in open country?

A.—I do not know. When you dig you often find what you do not expect to find.

Q.—All that would be available for the reclamation?

A.—I did not get much general experience at Bombay, but we found at Kandivli that the bed-rock was not far from the surface.

Q.—That is slightly different.

A.—You must remember that all that moorum is broken-down rock, and you never know when you are going to come on to a great stretch of rock that has not disintegrated.

Q.—You can take trial pits?

A.—But even trial pits, on a reasonable scale, would hardly allow for that.

Q.—Is it not quite an easy thing to dig pits?

A.—Yes, but how close are you going to dig? If you are going to do it at 200 feet apart, you have plenty of room for nice big rocks underneath in between them. When I went to Bombay in 1920 for the first time, as I said, one of the P.W.D. engineers had investigated the question of rock supply and quarries, and he mentioned two hills—Andihri was one, and Gilbert Hill, or some name like that, was the other. He remarked that a great deal of moorum and a great deal of rock would be required, and that both those were found in these hills. It was just that admixture that made me shy off those hills, because what we wanted was clean rock unmixed with moorum. We would not want to come across the large rocks when we required moorum.

Q.—You would have no objection to earth?

A.—Not if earth could be found in quantities which could be easily handled by machinery.

Q.—There is nothing in that area but moorum or rock or earth, and you would only have to find out what the depth of rock is?

A.—It would mean investigation.

Q.—I want to put to you one or two questions about the organisation and management of the works, which we discussed three days ago. Yesterday the question came up again. You said you had to serve two masters—the Development Director and the Engineer?

A.—That was obvious.

Q.—You have had wide experience of public works in India. In your experience, do you know of any instance in which the engineers, or the consulting engineers, remained in England and the work was carried on in India?

A.—No. All work done by the P.W.D. is done by the officers on the spot. The only case at all analogous to that was Delhi, where the architects were in London.

Q.—They were not engineers?

A.—No, but they were the architects, and their position would be the same as the engineers.

Q.—They prepared the designs and inspected the works once a year?

A.—But they had their office on the spot.

Q.—And their representative on the spot?

A.—Yes.

Q.—Here they have no representative?

A.—No.

Q.—Unless he regarded you as his representative. You were not paid by him?

A.—No, I was paid by the Government of Bombay.

Q.—So you know of no exactly similar case?

A.—No.

Q.—I know the Delhi works, and I was on a committee dealing with those works for some time.

A.—I was there as superintending engineer.

Q.—The engineer went there and stopped for a few weeks. He sent in his plans and he approved of all the detailed plans, did he not?

A.—All the detailed plans, or nearly all, were drawn in London.

Q.—And sent out?

A.—Yes.

Q.—But that was not done in your case?

A.—No, we had very few drawings from London.

Q.—Do you know of any cases, whether in India or in England, where estimates for works are sanctioned by the authorities concerned without the approval of the engineers?

A.—That occurred during my absence on leave. It was what the Government did. If I had been there I should have asked that the matter should have been referred to Meik & Buchanan.

Q.—That shows the amount of work they did for you. If they did not insist on examining the estimates—and they were responsible engineers, as they themselves stated —they could not have been in close touch with the works, could they?

A.—I think a copy of the estimate was sent to them very soon, because I remember discussing some points with Mr. Meik when I went to see him while I was on leave in 1922.

Q.—They were the engineers and they had to do some work?

A.—They were informed. They received copies of it. How soon I do not know.

Q.—But the engineers who were responsible would not allow an estimate of 702 lakhs to go through without their knowledge or consent. You will agree to that. You were a Public Works Officer for many years. Do you know of any work in any part of the world where you engage engineers and staff for a few years and entrust them with the power to make purchases amounting to a million pounds or more without scrutiny and without check by any permanent official? Was there any provision for check?

A.—Do you mean purchases?

Q.—I am saying nothing against you; I am merely concerned with the system.

A.—Ordinarily, as you know, when machinery is required you state your requirements on an indent. That indent was sent to the India Office. It is now sent to the High Commissioner. The Department of Stores then invites tenders, procures the machinery and inspects it. In this case Messrs. Meik & Buchanan were appointed the engineers for the work, and it was suggested, and agreed, that as they were going to carry out the work it would be as well if, as far as the inspection and selection were concerned, they were to do the work which ordinarily would be done in the High Commissioner's office. They knew what they wanted. They asked for tenders. They received those tenders, and they forwarded them on to the High Commissioner or Director-General of Stores and said: " We recommend that such and such a tender be accepted."

Q.—Do you know of any case in which their recommendation was disallowed?

A.—I do not know.

Q.—So it comes to this, that the engineers were purchasing and that the Director-General of Stores was only a medium?

A.—It was a special case.

Q.—It was an accident that you were a permanent official previously, but the firm of engineers and their nominees on the spot, who formed a temporary staff, were entrusted with all this responsibility?

A.—I think they were quite rightly entrusted with the responsibility.

Q.—What hold had Government on them if things went wrong or if money was lost?

A.—They did not have to touch any money.

Q.—It is not a question of touching. I am not accusing you or anybody; I am talking about the system.

A.—I think the arrangement was a perfectly good business one. I think that if you entrust a firm of engineers to carry out a work, you can certainly trust them with buying the tools which are necessary for the carrying out of that work.

Q.—Is it not the practice for the engineers to invite tenders and then submit them to Government or the principal on the spot for scrutiny before a selection is made?

A.—Instead of having a professional adviser of Government, who was not particularly interested in this particular case we had the people who were most interested in the case. I think it was a very reasonable arrangement.

Q.—But somebody should approve of their proposals on behalf of Government, should they not?

A.—They did not order the stuff. They merely recommended that such and such a firm's offer should be accepted. The whole of the tenders and complete information were forwarded, and if the Director-General of Stores had seen that anything was greatly amiss, he had every right to raise the question, and would undoubtedly have done it. He had the control because he had the ordering of the stuff.

Q.—It was a Post Office affair?

A.—You are assuming that people are not doing their job.

Q.—I am not assuming anything.

A.—But that is what it comes to if you say it was merely a Post Office job, and that the Director-General of Stores was merely a machine for forwarding letters.

Q.—There was nothing left for him to do?

A.—Yes, there was. He could have objected and said: "Our experience is that that firm is not as good a firm as it might be," and he would probably have drawn Messrs. Meik & Buchanan's attention to it. That is one case.

Q.—If you were chief engineer or secretary to Government in Bombay, the final tenders would come to you for approval?

A.—No. You would ask the Secretary of State to purchase you such and such machinery, and he would purchase it and send it out, and give you information as to when it had been sent out.

Q.—But you send out the specifications and sometimes the tenders come to you?

A.—I have never seen tenders sent from the India Office out to India for selection by the officers out there. I never heard of a case of that sort.

Q.—Do you not ask for tenders through the Secretary of State?

A.—No. We ask the Secretary of State to send us out such and such articles, and he does it. The whole of the machinery for that is here in London, and we have nothing to do with it. We use what we get.

Q.—That is in ordinary cases?

A.—Yes, in ordinary cases. That is the usual rule, and there is no difference in this case, except the matter of size.

Q.—In this case you have got the engineers and the engineers are men employed for five or six years, and the selection of the tenders are left to them. It was especially left to them in this case?

A.—The power of recommendation was left to them, but it was always subject to the concurrence of the Director-General of Stores. The Director-General of Stores was the officer who bought the things. You will notice that the details of the information we got—the monthly statement of the progress of stores—were always headed "Contract so and so." That was the contract entered into by the Director-General of Stores on behalf of the Government of Bombay.

Q.—In this case the Government did not exact from the engineers the duties expected of them?

A.—When the engineers were told that their recommendation had been accepted, they then appointed inspectors to follow the manufacture of that material from beginning to end and to make the necessary tests. They worked in the same way as the Stores Department would have done.

Q.—The head of the Government, or his technical adviser usually scrutinises indents, does he not?

A.—I think as a matter of fact indents go up direct from the superintending engineer's office.

Q.—But there is a superintending engineer—a permanent official—to send up indents?

A.—Yes, but it does not matter whether a man is a permanent official or not.

Q.—But here you are dealing with millions of money and with a temporary staff. I am not insinuating anything; in fact I go further and say that I have no doubt at all as regards the honesty of the highest officers is concerned?

A.—It is a question of Meik and Buchanan—whether it was a good arrangement; whether the arrangement of letting Meik & Buchanan call for tenders for the machinery that was required, and inspecting it, after their selection having been approved by the High Commissioner, was a proper procedure or not? To my mind it was an eminently proper procedure. It saved probably a good deal of time.

Q.—But it would have been a very good procedure if the indents, and also the final tenders in important cases, had been examined by the Development Director and passed?

A.—The indents originated from me. I wrote to Meik & Buchanan saying: "We want such and such articles." I was the chief engineer. I was the originator of the demand. Meik & Buchanan criticised that demand.

Q.—You say you were the originator, but they might also be the originators?

A.—No. I do not think they ever originated demands themselves. I think the demands always originated from me or from my office. They criticised those demands, and then when they had satisfied themselves, by correspondence with me (there are plenty of cases in the correspondence) they called for tenders, made their selection and sent it up to the Director-General of Stores for concurrence. He satisfied himself that it was correct, that it was good business, and placed the contract for those stores. Messrs. Meik & Buchanan did the inspection.

Q.—The only link which is missing is the inspection by someone on behalf of Government either of the indent (since the price is attended to by the Director-General of Stores) or of the tenders. Either the indents or the tenders should pass through the Secretary to Government after scrutiny on behalf of Government by the Director?

A.—I suppose they thought the procedure which was adopted in this case was sufficient.

Chairman.—Thank you, Mr. Lewis.

(The Witness withdrew.)

The Committee assembled at 11 a.m. on the 28th October, 1926, all members being present.

55th Witness, Sir G. Buchanan, K.C.I.E.

WRITTEN STATEMENT.

BACK BAY RECLAMATION SCHEME: STATEMENT BY SIR GEORGE BUCHANAN, K.C.I.E., Kt.

The terms of reference to the Committee are as follows:—

(1) To enquire into the history of the inception and conduct of the Back Bay Reclamation Scheme.

(2) To make recommendations as regards future operations.

In the absence of any indication as to the matter upon which information is desired from me I propose in this statement to deal with the case under the following heads:—

(1) History of the inception of the scheme to May, 1919.

(2) My connection with the work from May, 1919, up to the date of its sanction by the Secretary of State for India.

(3) Conduct of the work.

(4) Summary and suggestions as to future operations.

History of the Scheme from its inception to May, 1919.

2. When I first examined the project in 1919 the various sources of information were made available to me and I took a number of notes which I showed to Sir George Lloyd, as exemplifying the great interest that had been taken in the matter for many years. The date of the first scheme was 1863, when a Company was formed to reclaim

1,500 acres of the foreshore, but owing to financial difficulties the Company was voluntarily wound up. In 1887 the Government of Lord Reay prepared a scheme on which no action was taken In 1897 a Committee was appointed by the Government of Lord Sandhurst to reconsider the matter and this Committee issued several reports and recommended that an accurate survey of the Colaba foreshore should be made. The Bombay Improvement Trust next prepared a project, and in 1904 a Committee entitled "The Military Lands Committee" contemplated the reclamation of very extensive areas in Back Bay for purely military purposes.

3. In 1905 the Bombay Public Works Department prepared four alternative projects for reclamation. On this occasion it was proposed for the first time to obtain filling by dredging from the harbour and pumping through pipe lines across the peninsula and tenders were received from various contractors. In 1906 the Bombay Public Works Department drew up a revised scheme for the reclamation of 973 acres in Back Bay and 121 acres on the harbour side of the Colaba Peninsula. In 1907 the Government of Lord Lamington appointed a Committee, presided over by Sir Walter Hughes, especially to consider this scheme and report upon its possibility and utility, probable financial results and best methods of carrying out the work. The Committee were not unanimous in their findings and no action followed.

4. Lord Lamington left Bombay in 1907 and was succeeded by Sir George Clark, now Lord Sydenham, and in February, 1908, the firm of Lowther & Company, Civil Engineers and Contractors (subsequently Lowther & Kidd), submitted the outline of a scheme for the reclamation of Back Bay and offered their services. In the first place they contemplated the reclamation of the whole of Back Bay, an area of 3,576 acres, or, alternatively, the reclamation of 2,945 acres. On the 16th July, 1909, they further addressed the Government of Bombay and said they had observed that the Government had issued a resolution on the subject of Bombay development, which, amongst other things, included a decision to prosecute an adequate scheme for reclamation in Back Bay, and they therefore placed their services at the disposal of Government to make the necessary surveys and investigations with a view to making definite proposals on a business basis. Apparently their offer was accepted, for, on the 27th October, 1910, they submitted a scheme for the reclamation of 1,272 acres at a cost of 358½ lakhs. They observed that they had been provided with all the data in possession of Government requisite for the consideration of the scheme, such as surveys of site, levels of ground, nature of sea bed and extent of material available for filling, and these they had supplemented by further surveys and an extended examination of the site, including a further series of borings in the harbour, so that, taken altogether, they considered they had ample data for the consideration of the project.

5. Messrs. Lowther & Kidd discussed at length the best method of carrying out the scheme, whether by Government itself or by means of a concession granted to a company or other similar agency, and finally recommended that Government should do the work at its own cost and risk through the agency of a firm of engineers and contractors. They accordingly tendered for the work on the basis of Government entrusting the execution to them as their fully empowered agents and paying a commission for their services of 5 per cent. on the cost, plus a bonus of one-fifth share in any savings effected on the sanctioned estimate. The report was accompanied by financial statistics in support of their proposals, general estimates for either the 973 or 1,272 acre scheme. and draft specification, conditions of contract, and form of tender.

6. On the 21st January, 1911, the Secretary to the Government of Bombay addressed the Secretary to the Government of India on the subject, giving the history of the various proposals up to date, and with reference to Messrs. Lowther & Kidd's offer for the 973 acre scheme he remarked that it was 36 lakhs less than the Government estimate for the same work, and he made the following recommendation:—

> "Detailed plans and estimates will be submitted when the general proposals are approved. For the preparation of designs of the plant and works, and for the execution of the work, Government propose to utilise the services of an engineer of wide experience of sea works, Mr. Kidd of the firm of Lowther & Kidd, who, as the Government of India are aware, carried out the Government Dockyard works in Bombay, and who has an intimate knowledge of the local conditions. The rates given above have been supplied by him, and he has expressed his willingness to prepare designs and working drawings, to place at the disposal of Government his extensive experience, to procure for Government the special prices at which manufacturers supply plant and materials to contractors, and to carry out the work at an inclusive charge of 5 per cent. on the outlay subject to a maximum of 5 per cent. on the estimate as finally accepted by Government after careful scrutiny. In order to give the firm an interest in carrying out the work as economically as possible Government propose a bonus of one-fifth of the saving that may be achieved. The reclamation will be effected

by means of suction dredgers working in the Harbour on the east of Colaba, where the presence of an ample deposit has been ascertained, and delivering the clay at the site of the reclamation—the most efficient and economical method of carrying out reclamation on a large scale. After the clay has settled, a layer of moorum, 1 foot thick, is to be spread over the whole area."

7. In the matter of Messrs. Lowther & Kidd's larger scheme for the reclamation of 1,272 acres the letter remarked that sections which had been taken indicated that the best and most profitable scheme would probably be one lying between the two schemes, and having a gross area of about 1,100 acres; that it was unnecessary at that time to prepare a detailed project, but immediately on receipt of the general approval of the Government of India and of the Secretary of State to the proposals submitted the Bombay Government would cause the necessary surveys to be undertaken and estimates to be prepared, when the whole question would be thoroughly re-examined from a financial point of view, and the most promising scheme submitted to the Government of India. Concluding, the letter went on to say that enough had been said to show that a scheme of reclamation would not only provide for an urgent need of the City of Bombay, but would also prove a sound financial undertaking of the nature of a productive public work which the Bombay Government regarded with great confidence. The Government of India was, therefore, requested to submit the proposals to the Secretary of State for his general approval, as the Governor in Council was anxious the actual work should be commenced with the least possible delay.

8. The Government of India's reply dated 14th October, 1911, stated that before any representations could be made to the Secretary of State it had to be made clear that the works would be reproductive, and for that purpose there was practically no data available. The Government of India did not wish to question the accuracy of the skilled engineers who had advised the Government of Bombay, but their figures had not been placed before the Government of India, and all that could be said on a general review of the case was that large estimates of that type were particularly liable to be exceeded, and that even in Bombay experience of reclamation on an open sea front of the type proposed was limited. On the proposal that the scheme, if undertaken, should be executed by Government in preference to private agency, the Government of India was not convinced, on the information before it, that the scheme, if undertaken, should be executed by Government in preference to private agency, and therefore asked that the matter should be further investigated. Finally, the Government of India asked what would be the cost of the detailed surveys and estimates, as these would be necessary before the scheme could be recommended to the Secretary of State.

9. The Government of Bombay again addressed the Government of India at length on the 6th December, 1911, and forwarded a letter from Messrs. Lowther, Kidd & Co., Civil Engineers and Contractors, offering to execute a detailed survey and investigation of the site for Rs. 1,57,500, i.e., estimated cost of survey, drawings, and estimate, Rs. 82,500, plus professional fee, Rs. 75,000. In making this offer Messrs. Lowther & Kidd stated that although they had no reason to doubt the substantial accuracy of the information on which preliminary schemes dealt with in their report on the 27th October had been based, they agreed that, having regard to the great extent and importance of the scheme it seemed desirable and necessary that the data upon which a definite and final scheme was to be formulated should be more extensive.

10. The following extracts from the Bombay Government letter are of interest :—

"In the first place I am to point out that no final scheme has been put forward at this stage for the acceptance by the Government of India or the Secretary of State. The two tentative schemes were explained with the object of proving that the reasons for believing that the work would be reproductive were sufficiently strong to justify expenditure on the more detailed investigation required for the preparation of a complete project.

"These reasons were fully set forth in Mr. Cameron's letter No. C.W. 133, dated the 21st January, 1911, but I am again to refer briefly to them here. The cost of the execution of a reclamation was first estimated by the officers of the Public Works Department, and the estimate thus obtained showed that the prospect of financial success was most promising. The Governor in Council felt, however, that complete reliance could not be placed on these figures, as no officer of the Department had practical experience of work of this highly special nature. Mr. Kidd, a partner in the firm of Messrs. Lowther Kidd, who possessed all the experience and knowledge required, and who was then in Bombay in connection with the extension of the Government Dockyard which was being carried out by his firm, was struck by the exceptional opportunity afforded by the stretch of rocky foreshore visible at low tide and offered to make a preliminary investigation of a project for reclamation, at his own expense. This offer was accepted by the Government of Bombay, as it afforded the best means of testing

the estimates of their own officers, whilst it involved no obligation to employ Mr. Kidd's firm for the execution of the work. The figures supplied by him confirmed those obtained by the officers of the Public Works Department. Provision was made in both estimates for all contingencies. In Mr. Porter's letter under reply, it is stated that experience of reclamation by suction dredging is 'limited' in Bombay. I am, therefore, to point out that the large reclamations being carried out by the Port Trust afford exceptionally complete data for estimating work of this kind.

"The Government of Bombay are satisfied that Mr. Kidd's figures may be accepted with safety as a sufficiently close approximation to the cost of the work to justify the further investigation of the scheme, and they clearly indicate that the scheme may be expected to be productive. Mr. Kidd's detailed estimates could not be supplied to the Government of India, as they are not officially in possession of the Government of Bombay, but an abstract estimate was so supplied. The Governor in Council has closely examined the figures and is convinced that they have been drawn up with due care and are sufficient for the immediate purpose in view, namely, to show that the reclamation scheme will be a reproductive public work and as such deserves detailed investigation.

"The Government of Bombay, being thus convinced that the scheme would be highly productive, laid before the Government of India their initial proposal that the scheme should now be examined in detail and that complete estimates of the cost of execution should be carefully prepared. Their second proposal at this stage dealt with this investigation and the preparation of the estimates.

"They proposed that this work should be entrusted to Mr. Kidd, and that his firm should eventually carry out the project for Government on the terms laid down in paragraph 14 of Mr. Cameron's letter. Mr. Kidd has special knowledge and experience of this class of work, and has, in addition, close acquaintance with local conditions owing to the work lately carried out by his firm in Bombay, the arrangements made for carrying out which work compared very favourably with those made on other large works in progress in Bombay. Further, the preliminary terms offered by him appeared to be very favourable to Government. If the investigation and the preparation of the estimates are to be entrusted to a firm of contractors, it appears necessary that they should carry out the work of reclamation in the event of its being approved; but it was not intended that their estimate should be accepted without careful scrutiny on the spot by an independent expert if such a person can be obtained.

"An alternative method of procedure is to employ an expert for the investigation and the preparation of the estimates, and to call for tenders for the execution. This alternative did not commend itself to Government, because it would not provide so satisfactorily for their control of the work. Further, Government are well aware that economy in this class of work can be attained only by securing that the suction dredgers and other plant required shall be of the best design. The difficulties which have arisen with the Port Trust dredgers serve as a warning on this point. It is also necessary that most careful consideration should be given to the arrangements for carrying out the work and to the order in which it must be undertaken, and this is more properly the work of the contractor than of a Consulting Engineer."

11. In due course the Government of India sanctioned the estimate for the detailed survey, remarking that it was presumed that the Government of Bombay would take such precautions as might be necessary to ensure the correctness of the Contractor's survey and report.

12. On the 3rd August, 1912, Messrs. Lowther, Kidd & Co., submitted their detailed project for the reclamation of 1,145 acres of land. The report was accompanied by 10 sheets of drawings, photographs, bill of quantities, schedules of rates and Actuary's report. Paragraphs 4 to 8, 22 and 23 of the report were devoted entirely to discussing the extent and character of the deposits in the harbour available for filling the area to be reclaimed and the suction dredger machinery proposed, and this is so important that I will quote these paragraphs *in extenso*.

"The survey operations fell naturally into three main divisions:—

(*a*) The extent and character of the deposits available for filling;

(*b*) The best attainable line for the sea wall; and

(*c*) Source of supply and character of moorum available for the subsidiary works.

Of these (*a*) was of chief importance, involving the feasibility of the scheme and being the chief factor in its cost.

(a) *Material for filling.*

The first point to receive attention was the nature of the sea bed to the westward of the proposed reclamation, as, obviously, if sufficient material of a suitable character could be obtained there, it possessed great advantages over any other possible source. This was quickly disposed of as the conditions are a very irregular rock bottom containing pockets or thin layers of loose sand in insufficient quantity within practicable distance and—for a great part of the year—a heavy ground-swell prevails which renders the work of dredgers dangerous, and frequently wholly impossible. The next source was clearly that part of the harbour bed adjacent to the western shore of the harbour and contiguous to the proposed reclamation. This, provided the material was suitable and available in sufficient quantity, presented conditions perfectly favourable in respect of sea exposure. Survey operations were consequently directed to ascertain the extent and character of the harbour bed over an area measuring 17,400 feet long by 9,000 feet wide. This was accomplished before the advent of the monsoon, and conclusively established the existence of an extensive convenient area of mud and clay, yielding within the area prospected more than three times the quantity of material required for the scheme now proposed.

Drawing No. 5 shows the results in detail of this part of our investigation. A system of boring by hydraulic tubes was devised which proved to be perfectly reliable as well as rapid in action. One thousand, three hundred and fourteen borings were sunk into the sea bed, of which the results of 1,159 are recorded in this drawing. These borings were in all cases sunk to the hard bottom—rock or moorum—or, where such a bottom was not found at a higher level, to the depth of 70 feet—and over—below low water level of ordinary spring tides.

(7) The character of the deposit was almost uniformly similar throughout—namely, silt overlying a deep bed of blue clay. The silt is of recent formation—speaking geologically—but the clay is an old deposit, and indubitable evidence of its having at some time been above sea level is afforded by the fact that it contains many trunks and branches of trees. For the purpose of filling and making up land the mud is sufficiently suitable, and the clay is eminently so. With good arrangements for draining out the water during construction the mud will make very good land after the lapse of a sufficient interval for drying. The clay, which is stiff and unctuous, hardens into perfectly solid ground in a very short time. As far as possible in course of execution of the works the clay would be preferred, not only because of its greater suitability for making land, but also because for dredging purposes its stiffer and more tangible character enables a higher percentage of solid material to be transported by the pumps.

(8) In brief it has been completely established that there is available more than three times the quantity of material required, all of it suitable for making up land and more than half of it eminently suitable both for this purpose and for economical transportation to the site.

Pump Filling.

(22) For making up land in the proposed reclamation the material has to be obtained from a greater depth and delivered to a greater distance than has hitherto been accomplished elsewhere. On the other hand great progress in the development of suction dredging machinery and methods has been made in recent years. This progress has been achieved mostly in the United States of America and the Dominion of Canada. In England, machinery and methods are backward and inefficient. We have consequently added to our own extensive experience in dredging a complete study of recent experience on the American Continent, and we have been in correspondence with the highest authorities on this subject there. As a result we have made provision for a very high class plant, and the working costs have been estimated accordingly. The machinery we would employ will be designed and guaranteed to effect the removal of 2,000 cubic yards of silt or blue clay per hour from a maximum depth of 70 feet below low water, and deliver it at any state of the tide to any part of the proposed reclamation. The question of the kind of power to be employed for operating this machinery is a most important one and we have made complete investigation of its cost by :—

(*a*) Steam,
(*b*) Electric Power, and
(*c*) Internal Combustion Engines on the Diesel System.

As regards (*b*) electric power. If generated by steam there would be a loss as compared with using direct steam. A rate quoted by the Hydro-electric

Company of 0·5 anna per Board of Trade unit does not compare favourably with results actually attained in Bombay by internal combustion engines. The advantages of electric power are confined to cases where the power is used at a number of points in small quantities, or intermittently, with a fairly regular load. These conditions do not obtain in this case. The pumping units are necessarily of very large power. The loss of energy in transmission, conversion, and in the motors would be heavy. But a controlling consideration is the extremely variable work of operating dredging machinery, where frequently it is running free one minute and encountering resistance to the point of " stalling " the next. This, with electric plant, would certainly result in increased losses by delays from breakdown.

(23) For the purposes of the present estimate we have as a result of our investigation based our cost estimates on steam power of the most modern and efficient type. But we think it very probable that we should decide to adopt for actual working (*c*)—the Diesel—or similar type of internal combustion engine. This would depend mainly on the cost of crude oil fuel at the time. For the present we have confined ourselves to arriving at a safe estimate of cost.

13. On the 7th August, 1912, the Bombay Government forwarded for the consideration of the Government of India Messrs. Lowther & Kidd's report and observed that the drawings might be considered as complete working drawings, which would give sufficient information for examination of the designs and for the immediate commencement of the work; the investigation had been most carefully made and might be accepted as exhaustive. The report was clear and complete, all doubtful points had been settled, and the revised estimate might be accepted as completely trustworthy and ample. It was further stated that in presenting this project to the Government of India the writer was to say that His Excellency had the fullest confidence in the ability and expert knowledge of Mr. Kidd, who had worked it out in detail; but in case it should be desired to obtain further expert opinion he was to suggest the names of Mr. A. W. Robinson, Montreal, who was probably the greatest living expert in the world on reclamation by suction dredging, and who was consulted as such by the Egyptian Government, and of Mr. C. S. Meik, the eminent consulting engineer of 16, Victoria Street, London, whose opinion on sea protection work might be accepted with confidence. The letter concluded that it was the earnest desire of His Excellency the Governor in Council that this project should receive the serious consideration of Government as highly productive work, an early prosecution of which was necessary for the growth and prosperity of the city of Bombay, and that it might be recommended for acceptance by the Secretary of State. The opinion was also expressed that the arrangement proposed by His Excellency for the execution of the work was the only arrangement which would ensure the efficiency and economy essential for the success of the scheme.

14. The decision of the Government of India on the letter from Bombay was to postpone consideration of the scheme, but to appoint a strong, fully representative committee to consider the general question of the future development of Bombay city. If, as a result of the deliberations of this committee, it should be decided that the reclamation of Back Bay was desirable, a beginning would be made by following the suggestion of Messrs. Lowther & Kidd, that is, to first take in hand the reclamation of an area of 84 acres, the cost of which was estimated at 37 lakhs, spread over four years.

15. It will be of use to quote here the considered opinion of the engineering adviser to the Government of India on the project submitted by Bombay. The late Mr. R. P. Russell, Secretary to the Government of India in the Public Works Department, recorded the following views in March, 1916.

" Whatever else may be said of it the Bombay Government seem to have examined this scheme exhaustively in the engineering aspect. Three estimates have been submitted :—

(*a*) For reclaiming an area of 973 acres, estimated cost Rs.284½ lakhs.
(*b*) 1,127 acres estimated cost 358½ lakhs.
(*c*) 1,145 acres estimated cost 325 lakhs.

The respective rates per square yard of every reclaimed gross area being 6·7, 5·8 and 5·86 rupees respectively.

Estimate (*c*) is the one on which the Government of Bombay pin their faith to. It provides for reclaiming 40 acres for future Government House, 205 acres for parks, 49 acres for gardens, 235 acres for roads and streets, 616 acres building area.

Messrs. Kidd & Co. have undertaken to carry out the work at their estimate of cost 325 lakhs. The estimate has been based upon rates sufficiently high

to cover any rise that may be expected to occur should the execution of the work be protracted for a considerable period; the actual rates obtaining between 1904 and 1908 for each class of labour as given in App. III, as also the corresponding rate used in the estimate. No details have been given as to how the actual rate for dredging has been arrived at. The estimate is upon a rate of 9 as ·3 pies per cubic yard which is equivalent to a rate of Rs. 2-5 per 100 cubic feet and Rs. 23 per 1,000 cubic feet. This rate includes the entire cost of the dredging plant, pipe line, pontoons, etc., etc. Excluding the cost of plant, a common rate for work of this kind varies from Rs. 5 to Rs. 10 per 1,000 cubic feet. This would include the cost of all establishment and working expenses in connection with the dredging work. In actual practice the cost of dredging may be as low as Rs. 2 to Rs. 3 per 1,000 cubic feet. Without a great deal more detailed information as to the number, cost, and capacity of the dredgers, length of pipe-line, necessity or otherwise of a shore delivery line, it is impossible to criticise the rate, but I should say that the rate of Rs. 23 should be ample. I may mention that the dredging of the Twante Canal in Burma, in many respects a much more difficult work, was estimated exclusive of depreciation of plant at Rs. 5 per 1,000 cubic feet of material dredged. The plant to be employed will be designed to dredge from a depth of 70 feet below low water to remove 2,000 cubic yards per hour. The length of the discharge pipe has not been stated. The detailed survey of harbour bottom adjacent to the western shore and continuous to proposed reclamation has been made over an area of six square miles, some 1,300 borings have been made down to hard bottom. The result shows that more than three times the total quantity of material exists, of which half is particularly suitable for the work. The estimate contemplates a reclamation level of nearly 3 feet above highest recorded tide level, the seal wall over about a mile of its length being carried out to a level of 6 feet. higher still this is nearly 8 feet higher than Cuffe parade and 6½ feet higher than Kennedy sea face. For the rest of the length the wall is carried to the same level as the reclamation, namely 3 feet above the highest known tide level. Presumably the greater height of the wall is limited to the length under greater attack, and has been determined by observations at site. Where the wall is carried to the lower level, it has been estimatd to cost at an average of about 220 rupees per lineal foot; elsewhere the rate has been taken at Rs. 456 per lineal foot. If the scheme is to be sanctioned it will probably be necessary to examine more carefully, and probably to call for further information in regard to this part of the work, which is estimated at about 65 lakhs. The type of wall proposed is suitable, but its cost is largely dependent upon the nature of the bed on which the mass of concrete or rubble blocks will rest, unless the bed is of rock, or of other hard formation, which seems to be the case on most of its length. The rate should contemplate a considerable mass of material to compensate for settlement. Generally, however, the estimate seems to have been prepared with great care, and probably contemplates this; altogether in its technical aspect the work appears to be quite feasible, and presents no insuperable difficulties with every likelihood, as far as can be judged, of being carried out at its estimated cost of Rs. 325 lakhs. Estimates (*a*) and (*b*), referred to in paragraph 1 above, were prepared by the Bombay P.W.D.; estimate (*c*) was prepared independently by Lowther & Kidd. The sufficiency of material has now been finally settled, and the closeness of the three estimates, namely, 6.7, 5.8 and 5.86 per square yard of gross area reclaimed coupled with the fact that a reliable firm of engineers is ready to execute the work at the last-mentioned rate may be taken as indicating that the estimate under consideration is probably as reliable as can be expected. The Bombay Government anticipate carrying out the work in eight years and the forecast is based upon that assumption, and the leasing out of an area of 60,000 square yards per annum commencing with the seventh year on the basis of 60,000 square yards of leasing per annum. The scheme cannot under the existing rules qualify as a productive public work. To qualify as a productive public work under the P.W.D. code, para. 1889, there must be good reason to believe that 10 years after completion the annual revenue will repay the annual interest including arrears of simple interest on capital invested. A statement has been prepared in this office, which shows that the scheme would qualify as a productive public work, if, commencing with the fourth year, an annual area of 130,000 square yards could be leased out until the eighth year, and 210,000 square yards per annum from the ninth year to the nineteenth year. It may be assumed at once that these conditions are impossible.

16. In November, 1912, the Government of Bombay appointed a Committee of prominent and representative citizens to investigate the financial features of the scheme, and to answer a series of questions dealing with the need for reclamation. the probable demand for building sites, the effect upon the value of existing landed property in Bombay, and other important matters. This Committee reported on the 22nd

January, 1913, and concluded their remarks by saying that they wished to lay stress on the fact that the scheme was not only financially sound, but that it would add to the beauty of the City, and after some years would add considerably to the resources at the disposal of the Improvement Trust in its efforts to reclaim insanitary areas.

17. On the 11th March, 1913, the Government of Bombay again addressed the Government of India on the subject, and after recapitulating briefly the steps which had been taken, and quoting the findings of the recent Committee, urged that sanction should be accorded to the work, and that either the Government of Bombay should be empowered to raise the successive annual loans required, acting as agents for the Government of India in the matter, but accepting the risk; or that the Government of India would provide the necessary sums as in the case of other productive works. The Government of India, however, was still unconvinced and expressed the opinion that a strong representative Committee should be invoked to consider the future development of Bombay City in all its bearings, and expressed the view that if the Committee were in favour of the Back Bay scheme, a beginning should be made with a strip of land measuring 84 acres, at an estimated cost of Rs. 37 lakhs, when the validity of the estimate and the demand for land would be tested by this experiment. The Bombay Development Committee was accordingly appointed by Government of Bombay Resolutions dated October and November, 1913, and their report was issued in April, 1914. This report contained no specific recommendation to undertake reclamation in Back Bay on a large scale, but suggested than a area of 100 acres should be reclaimed in order to provide accommodation for certain urgently required public buildings.

18. Several alternative schemes of reclamation were prepared in the following three years, and on the 15th September, 1916, the Government of Bombay asked the Government of India for permission to proceed with a scheme for reclaiming 220 acres, but the Government of India replied in February, 1917, that the 220-acre scheme was not in accordance with the decision arrived at in 1913, and it regretted it was unable to entertain the proposal. If, however, the Government of Bombay should submit a more modest scheme on the lines proposed by the Development Committee, and could satisfy the Government of India that it could be worked from provincial resources, it would be prepared to give such a scheme their careful consideration. The matter then dropped until the end of 1917, when there was a sudden revival of interest in the scheme, which came to a head during the temporary boom in land values and trade which took place at the end of the war. It will, I think, be interesting to describe the various groups who were anxious to see Back Bay reclaimed and their negotiations with the Government.

Sir Sassoon David Group.

On the 8th December, 1917, a group headed by Sir Sassoon David addressed the Government of Bombay on the subject of the Back Bay Reclamation Scheme, 1912, and asked for a concession, as they proposed to float a company with the necessary capital. On the 21st December they wrote that the whole of the capital required was assured, and as soon as Government granted permission the work would be proceeded with. On the 10th January, 1918, the syndicate wrote to the Government of Bombay, and said that they intended to carry out the work according to the intended programme of Messrs. Lowther, Kidd and Co. They would form a joint stock company, and raise the necessary capital, and would call up 6 lakhs of rupees to meet the first year's expenditure. On the same date a meeting was held in the Hon. Mr. Carmichael's room in the Secretariat, and the proposals of the syndicate were discussed in some detail.

Messrs. Tata Sons, Ltd.

On the 19th December, 1917, Messrs. Tata and Sons wrote a letter to the Secretary to the Government of Bombay, General Department, and, after reciting the history of the scheme since 1911, asked for an option on the reclamation of Back Bay for two months, and a statement of the general terms on which the Government would be prepared to entrust this work to a private corporation, as, if an option were granted, they would at once engage the requisite engineering staff to prepare a scheme. In that case they asked that their engineer should be allowed to study the papers relating to the project.

On the 3rd January, 1918, the Joint Secretary, P.W.D., Bombay, wrote to Sir Dorab Tata, saying he was given to understand that Messrs. Tata and Sons were still prepared to submit proposals for the reclamation scheme in Back Bay, and that on looking up the history of the project he found that the Tata firm first became interested in the year, 1911, when Mr. Padshaw addressed Mr. Cameron. On the 15th January, 1918, a meeting was held in Mr. Carmichael's room in the Secretariat, at which were present the Hon. Mr. Carmichael, now Sir George Carmichael; Mr.,

now Sir Stanley, Reed; Mr. A. J. Billimoria, a partner in the firm of Tata Sons, Ltd.; and Mr. Kent, Joint Secretary, Public Works Department. After discussion Sir Stanley Reed said that Government should state the conditions on which the Government were prepared to grant a concession, and Mr. Billimoria stated that Sir Sassoon David was prepared to join Messrs. Tata as members of the syndicate to be formed, and besides this powerful backing the scheme would have the resources of the Tata Industrial Bank at their disposal. The papers were then forwarded to the Governor in Council.

19. On the 5th February, 1918, Sir Sassoon David's syndicate wrote to the Secretary to the Bombay Government, and said that they understood that Tata Sons, Ltd., had also made an application to Government for an option on the scheme, and requested that their application should be considered as included in the application of Tata Sons, Ltd. On the 12th February, 1918, Messrs. Tata Sons, Ltd., addressed the Bombay Government, stating that the firm of Tata Sons, Ltd., with whom the Tata Industrial Bank was associated, had amalgamated with the Sassoon David syndicate, and requested that Government would please to reply to their application of 19th December as promptly as circumstances would allow, because the present was a particularly favourable opportunity of securing public subscription to the necessary funds.

20. On the 2nd April, 1918, Messrs. Tata again addressed the Bombay Government, and observed that they had not been favoured with a reply to their application for an option. They had already completed arrangements to appoint a local engineer, and were in negotiation for the engagement of the services of one of the best engineering firms in London to advise them generally on the engineering details of the scheme. On the 5th April Sir Dorab Tata wrote to Mr. Carmichael, forwarding particulars of the career of Sir Maurice Fitzmaurice, who was mentioned as the engineer proposed by the syndicate.

Messrs. Lowther and Kidd.

21. Messrs. Lowther and Kidd, whose offer to carry out what is known as the 1912 scheme was rejected by the Government of India, although strongly supported by Lord Sydenham's Government, still kept a watchful eye on the proceedings, and some time in the autumn of 1914 Mr. (now Sir) Claude Hill had an interview with Colonel Claude Lowther at the Marlborough Club, London, as a result of which Colonel Lowther wrote on the 1st October, 1914, to Sir Claude Hill, then a member of the Bombay Government asking (1) whether the work if undertaken would be carried out on the basis of their offer, and (2) whether the work would be entrusted to his firm. He said he did not want to hustle the authorities, but in view of further delay and possible changes in Government personnel a prompt decision on these two points would be of mutual advantage to all parties concerned, and as he understood Sir Claude Hill thought the proposal a fair one, he did not hesitate to put it forward in writing. The letter was noted on by the Secretary of Government, who observed that it was a natural request, and as Mr. Lowther said he had no intention to bind Government in any way to the construction of the work, he thought the answer should be in the affirmative. His note was dated 5th November, 1914, and was endorsed by the Governor in Council. A letter was then sent to Mr. Lowther by Sir Claude Hill in the following terms:—

> "In answer to your letter of the 1st October, 1914, I am glad to be able to assure you that should this Government decide upon carrying out the Back Bay Reclamation Scheme for Bombay, it is their present intention to undertake it, so far at least as concerns the lesser project, now under consideration at their cost and risk, and on the lines suggested by you in the report you submitted to Government, dated 3rd August, 1912.
>
> "The work may, of course, have to be deferred for a considerable time owing to the war, and will probably be carried out very gradually for reasons of finance and for convenience in various ways, but I am able to say that Government intend to employ your firm as their agents for the execution of the work, and they are prepared to agree in a general way with the terms you suggest for the services you propose to render as described in paragraphs 35 and 36 of your report of the 3rd August, 1912. I hope this assurance is sufficient for your requirements."

22. On the 26th March, 1915, a copy of the letter was sent to Mr. Kidd who, in the course of reply dated 20th April, 1915, observed: "I now thank you for having written giving us a definite assurance that Government will employ us as their agents for the execution of the Back Bay Reclamation works, and that they agree in a general way to the terms of Clauses 35 and 36 of our report of the 3rd August, 1912. Your assurance is quite satisfactory to us, and we shall hold ourselves at the disposal of the

Government when they are ready to proceed." Subsequently Colonel Lowther claimed that the letter from Sir Claude Hill constituted a definite promise to his firm for the execution of the work if and when sanctioned by Government, and in a letter dated 18th October, 1917, he emphasised this point of view in a private letter to the late Mr. Montagu, then Secretary of State for India. At a later date, of which there is no record, Colonel Lowther and Mr. Kidd appear to have dissolved their partnership, and on the 24th October, 1917, Colonel Lowther wrote to Sir Claude Hill saying that Parliamentary and other duties prevented his going to India for the moment, but that he had entrusted his old and valued friend, Colonel Grisewood, with the delicate mission of explaining personally the whole story of the dissolution and also he said that he had entered into partnership with Sir John Norton-Griffiths for the purpose of carrying out public works in India and that the merging of the two firms placed him in a strong position for executing marine and harbour work. In due course Colonel Grisewood arrived in India, and on the 9th March, 1918, he wrote to Mr. (now Sir) George Carmichael, sending particulars about the firm of Lowther & Griffiths and enclosing a copy of a letter he had written to the Tata Syndicate, asking that Lowther, Griffiths & Co. should be appointed their supervising constructing and consulting engineers.

23. On the 26th March, 1918, Colonel Grisewood addressed an official letter to Mr. Carmichael informing him that his negotiations with the Tata Syndicate had fallen through, and he had instructions from his principals, Messrs. Lowther, Griffiths & Co., to apply for a concession for the work on their behalf, and that he would be glad to know the requirements of the Government of Bombay so that the application for a concession could be framed so far as possible to meet their wishes and views. He also stated that in an interview with His Excellency the Governor towards the middle of December, 1916, His Excellency had informed him that Government had decided to entrust the Back Bay Reclamation Scheme to private enterprise.

24. Following on this correspondence, a deputation consisting of Sir Stanley Reed, Sir Sassoon David, Mr. D. Barocha and Mr. A. J. Billimoria, waited on the Governor of Bombay, and asked for an option on the concession (1) in order that they might secure promise of support, and (2) to warrant them in obtaining an expert engineer from England to report on the scheme. The Government of Bombay decided that a report should be obtained from an independent expert. Colonel Grisewood and the Tata Syndicate were informed accordingly.

Sir W. G. Armstrong Whitworth & Co., Ltd.

25. Mr. Kidd, after dissolving his partnership with Colonel Claude Lowther, joined the firm of Sir W. G. Armstrong Whitworth & Co., Ltd., as head of their Civil Engineering Department, and on the 24th January, 1919, Sir W. G. Armstrong Whitworth & Co., Ltd., Civil Engineers and Contractors for Public Works, addressed the Government of Bombay submitting a tender for the reclamation of 350 acres of land which they said conformed to the scheme of 1912 in the main line of sea frontage and would become absorbed as an integral part of that project should it ultimately be carried into effect. They observed that in connection with the scheme they desired to emphasise that by far the most important item governing the ultimate total cost was that of dredging, which arose from the fact that in no part of the world had any similar work been executed under anything like the same conditions as to depth from which material had to be obtained combined with distance to which it had to be delivered. In this connection it may be noted that Mr. Kidd had increased his price for mud filling to 4 Rs. per cubic yard.

26. At this time there were three parties asking for a concession to carry out the work (two of whom ultimately combined into one syndicate) and one firm of engineering contractors asking for a contract, and on the 9th December, 1918, the Joint Secretary to the Government of Bombay P.W.D. addressed the Government of India saying, that the Bombay Government had always recognised, that before the estimates prepared by Messrs. Lowther & Kidd in 1912 could be adopted, it would be necessary to have them scrutinised by an independent expert on the spot; for these reasons they desired to have the scheme examined by the best expert whose services could be secured. His report would enable them to calculate with greater approximation what the value of the concession was likely to be. The expert, said the letter, should be one who had experience in harbour and reclamation works, and the knowledge of recent developments of dredging and pumping appliances. As regards the fee Government was prepared to pay a reasonable sum, but preferred to leave the matter to the Secretary of State instead of fixing a limit which might exclude the one expert whose advice would be of most value in this particular case.

27. On the 25th January, 1919 (by which date Lord Willingdon had been succeeded at Bombay by Sir George Lloyd), the Secretary of State for India asked the Government of India by telegraph whether the latter agreed with the Government of Bombay that

the expert to be selected should be an independent person as he had received from the firm of Lowther & Griffiths an offer to send out two of the firm's engineers to revise the estimates, and urging that, as the scheme had been prepared by the firm, they should be given an opportunity to do the work. The Government of India, in a reply dated 5th March, 1919, gave a history of the scheme, and concluded its observations by stating that it was in agreement with the Government of Bombay that with a view to a settlement of this long outstanding question, the project should be examined by the best expert available, so that an authoritative opinion on the scheme might be obtained, and the closest possible estimate of cost be framed. The expert selected, the Government of India thought, should be one who had large experience on harbour and reclamation works, and knowledge of the most recent dredging and pumping appliances, and, as suggested by the Government of Bombay, should be entirely independent of any of the firms that had applied, or were likely to apply for the concession. For this reason it had excluded the firms of Lowther & Griffiths, Messrs. Tata & Co., and Sir W. G. Armstrong, Whitworth & Co., of which Mr. Kidd was a member.

28. Following on this despatch there was some discussion in Bombay between Sir Claude Hill, then a member of the Viceroy's Council, and the Governor of Bombay, and a telegram was sent, dated 8th April, 1919, from the Governor of Bombay to the Secretary of State as follows :—

> " Back Bay Reclamation Scheme : Government of India has asked you to send out best expert available to examine and make final report on above. Government of India has also asked us to send all plans to Delhi for transmission to you in order that expert may study them before departure. (1) I think this procedure involves unnecessary delay in view of the fact that expert must be here to see conditions just before monsoon breaks as well as after it. (2) I have consulted Government of India, and Sir Claude Hill concurs in proposing you should send expert out at once to arrive Bombay not later than the third week of May. (3) All plans and information essential to expert's study now here. (4) Lord Sydenham or W. L. Cameron, late Chief Engineer, Bombay, would advise regarding choice of expert. (5) Failing your ability to find expert in short time available, my Government would agree to using Sir George Buchanan, whose services would probably be available, and whom the Government of India recommend. (6) My telegram has been drafted in consultation with the Government of India, and is being communicated to them. (7) Please telegraph immediately whether expert can be found in time to arrive by middle of May, or whether we should proceed with Buchanan."

29. On the 7th May, 1919, I received the following telegram from Sir George Lloyd, as he then was :—

> " My Government are desirous of securing your services at once to examine and report upon the Back Bay Reclamation Scheme; all plans and data are here; it would involve your being in Bombay before the break of the monsoon and for as long afterwards as you found necessary for production of your report. Please telegraph informing me whether you will undertake the work, and in following letter suggest terms."

My connection with the work began from that date.

30. The foregoing brings the history of the case up to May, 1919, and I have gone into the matter in some detail in order to show that so far from the scheme having been prepared in secrecy and forced upon an unwilling people by an arbitrary Government, every possible opportunity for years had been given for free discussion, and that no less than 18 different projects had been discussed. The Government of India certainly showed no disposition to rush the matter, and in a letter from Mr. Montagu, then Secretary of State for India, to the Viceroy, dated 7th November, 1918, occurred the following paragraph :—

> " I still feel a little anxious about the Back Bay Reclamation Scheme in Bombay. My views are that it should be put forward as a valuable contribution to the housing difficulty in Bombay, but my views are very strongly on the evidence before me that if it is undertaken it should be undertaken as a Government enterprise and not given to any concessionaire."

This point of view was also emphasised by Mr. Montagu in an interview I had with him on the 17th July, 1919.

(2) *My connection with the work from May*, 1919, *up to the date of sanction by the Secretary of State.*

31. When I received the telegram already quoted from Lord Lloyd I was a member of the Government of India Munitions Board, but the War was over and I was on the point of terminating my duties with the Munitions Board, so I telegraphed

my acceptance of the offer and in a letter from Simla, dated 12th May, to Sir George Lloyd, I made the following remarks:—

"The work is of a kind with which I am familiar, as I designed and carried out the very large river training and land reclamation scheme on the Rangoon river, whilst I was also responsible for initiating all the reclamation works at Basra, which have transformed the river front on the Shatt-al-Arab.

"I have seen Sir Thomas Holland to-day, and I have arranged to leave Simla for Bombay on the 17th instant. I have at present only a superficial knowledge of the Back Bay scheme, but I assume that plans, cross-sections and borings are available (as there would certainly not be time to have these prepared before the monsoon), and that the reclamation is proposed to be effected by dredging outside a retaining wall marking the limit of reclamation and depositing inside the wall. In that case one of the principal problems would be to decide on the best type of dredger, and whether at the present greatly enhanced price of these machines the scheme would be practicable from the financial point of view? You suggest that I should view the locality before the break of the monsoon, and thereafter stay in Bombay until the completion of my report, but if the question of dredgers is the crucial one, and you wish for a reliable estimate, I am disposed to think that it would be preferable before committing myself to figures for me to go home with the papers, having obtained all local information, in order to discuss the dredger problem with the various builders who have done work for me in the past, as, although I can decide on the best type of dredger, I cannot, in the present state of the market, put prices upon them. These details can, however, be decided after I have gone over the available data."

32. I arrived in Bombay on the 19th May, 1919, and at once got in touch with the Honourable Member, Mr. Curtis, and other Government officials, whilst the Public Works Department placed at my disposal all Mr. Kidd's plans and papers. On the 21st May, 1919, I received a letter from Sir George Lloyd saying he was very glad I had consented to undertake the Back Bay Report, and he hoped to see me shortly in Bombay; also that he thought the whole scheme depended upon the mammoth dredger, its cost, and when it could be sent out, and that he believed this was the biggest dredging scheme ever contemplated and as such would, he was sure, interest me.

33. On the 23rd May, 1919, I wrote again to Sir George Lloyd saying that I had gone through all the plans and papers and had been able to form an idea of the work required; that so far as the sea wall was concerned there was no engineering difficulty, but that as I thought would be the case, the crux of the whole scheme lay in the provision and successful working of the dredger or dredgers, and that under these circumstances the sooner I got home to tackle the dredging problems with builders of dredging plant the sooner he would be able to decide on the best action to take. I therefore suggested that when I had received the terms of reference I should go home on the 31st May, and, having prepared a specification for the dredging plant and obtained full particulars and prices, I should return to Bombay with the whole scheme and estimates ready for consideration by the Bombay Government.

34. On the 28th May, 1919, I had an interview with Sir George Lloyd and handed him a note I had prepared, giving the history of the case since 1910. Sir George Lloyd discussed with me my terms of reference, asked me a number of questions, and said that the Back Bay scheme had for years past impeded progress in Bombay. He would give me his entire and absolutely confidence and if I said the scheme was impracticable he would turn it down at once and start on something fresh, but once my opinion was given he would refuse to allow any other expert to report, and he asked me not to let him down.

35. On the 29th May, I wrote to the Joint Secretary, Government of Bombay, Public Works Department, as follows:—

"With respect to the proposal to obtain my professional opinion and advice on what is known as the Back Bay Reclamation Scheme, I have read the terms of reference, and beg to reply as follows:—

"2. I have examined the site on several occasions, and have satisfied myself that the survey and borings made by Mr. Kidd are sufficient to enable me to write my report.

"I am already intimately acquainted with the monsoon conditions in India, and, therefore, do not require to study them afresh on the spot.

"3. The crux of the work consists in the provision of adequate dredging plant, and to enable me to deal satisfactorily with this matter it is necessary that I should go home and place before the leading builders a specification of the plant required and obtain estimates for the same."

36. On the 30th May, the Government of Bombay in acknowledging my letter stated they would be glad to avail themselves of my professional opinion and advice and desired me to undertake the preparation of the report referred to forthwith, in accordance with the following terms of reference :—

(1) To examine and report on the scheme prepared by Mr. Kidd, of Messrs. Lowther, Kidd & Co. for the reclamation of 1,145 acres in Back Bay, Bombay (known as the 1912 project), or any portion thereof, which Government may thereafter designate.

The scheme comprises

(*a*) the construction of a sea-wall;

(*b*) filling in within the area enclosed by the sea-wall by means of dredging in the harbour on the east side of the Colaba peninsula, and pumping the material across the narrow neck at various points in the Back Bay;

(*c*) covering with a layer of moorum the lands so reclaimed.

(2) A specific opinion is required on the following points :—

(i) the practicability of the scheme from the engineering point of view;

(ii) the suitability of the type of wall proposed, or alternate suggestions for better types;

(iii) the suitability of the proposed method of reclamation by means of dredging, or alternative proposals for same.

(3) Mr. Kidd in his project of 1912 gave a general estimate for the above, but unaccompanied by details of cost of dredgers and other plant. A revised estimate is required for the whole of the scheme giving details showing

(*a*) cost of dredging plant;

(*b*) cost of dredging;

(*c*) cost of sea-wall, along with the price of plant in connection with the same;

(*d*) cost of moorum filling and plant required.

(4) A programme of construction is required along with an opinion as to the order in which the work should be executed, and the time within which the various sections could be completed from the date of the order to begin the work.

The question whether the entire work should be given out as one complete contract or divided up into a number of small contracts may also be considered, and whether it might not be advisable to carry out some items of the project, or even the whole of it, departmentally.

(5) A separate report and estimate on above lines is required for the reclamation of the east of the peninsula from pilot pier to Sassoon Dock, known as the East Colaba project, and an opinion as to whether it could be carried out by dredging plant already in Bombay.

37. Having obtained all the information possible to enable me to make a report, I left Bombay for England on the 31st May, 1919, arriving in London on the 25th June, 1919. Shortly after my arrival I joined the firm of P. W. & C. S. Meik of Westminster in accordance with an arrangement of some years' standing. Mr. Meik, the senior member of this firm, was admittedly one of the most talented and experienced engineers in this country, and he was the gentleman, as already recorded by me in paragraph 13, who had been recommended by the Government of Bombay to the Government of India as the eminent consulting engineer whose opinion on sea protection works might be accepted with confidence. I had the advantage of Mr. Meik's co-operation and assistance in the preparation of my 1919 report, and subsequently he was closely associated with me in all that we did in connection with the Back Bay Reclamation work until his death on the 5th July, 1923. We recognised at once that the crux of the scheme lay in the efficiency of the dredging plant and success of the dredging operations, and on these matters we concentrated our attention. We had both had great practical experience with dredgers of all types and in dredging. It has been suggested in the course of the Enquiry that I had not the experience necessary to advise Government on the reclamation works at Bombay; I will therefore describe a few out of the many public works with which I have been connected in various parts of the world.

38. The Rangoon River Training Scheme, which was the largest of its kind in the world, had been completed by me in 1913 at a total cost of £921,783, in eighteen months less than the estimated time and for £78,000 less than the sanctioned cost. For this I had received the honour of knighthood. In this connection I quote from

some remarks made by Sir Harvey Adamson, K.C.S.I., late Governor of Burma on the 21st March, 1916, at a meeting of the Institution of Civil Engineers :—

> " When he (i.e., Sir Harvey Adamson) left Rangoon a few months ago, not only had the work been completed well within the sanctioned estimate of a million pounds, but its success had been assured. The deep-water channel had returned to its original position. The sandbanks on the Rangoon shore had almost entirely disappeared. Silt had been deposited behind the wall, raising the surface above low-water level and thus reclaiming a considerable area of very valuable land, and the wall itself stood absolutely firm. In fact, every object that had been expected from the scheme had been realised. It was a matter of gratification to him that the Author's services to the port of Rangoon had been rewarded with knighthood; he had proved himself to be a great engineer and a great administrator. The Author's success in Rangoon had led to his being selected for engineering war work, and he was at present engaged on river works in connection with the Mesopotamia Expedition. He was quite sure that the Author's work for the Empire would be as good, as useful, and as thorough as had been his work for the port of Rangoon."

39. In 1913, as a result of the work done by me at Rangoon, the Foreign Office approached the Government of India with a view to securing my services to represent British interests on an International Commission that was to be set up in connection with the conservancy of the Shatt-al-Arab and development of the port of Basra. The War intervened, and the proposal naturally dropped. In 1915 I was sent to Mesopotamia at the special request of the Secretary of State for India. I was responsible for the reorganisation of the port of Basra, for the vast dredging operations in connection with a channel 15 miles long across the Hamar Lake, the dredging in connection with the Shatt-Al-Arab Bar and the reclamation of considerable areas of land at Basra, suction cutter dredgers of large capacity being employed in each case. For these works I received the honour of the K.C.I.E. and a letter from the Government of India, from which the following is an extract :—

> " I am also to convey the appreciation of His Majesty's Secretary of State for India of the valuable services rendered by you in the appointment mentioned, and to say that the Government of India associate themselves with the Secretary of State's appreciation of your work. The success of our arms in Mesopotamia has been sensibly promoted by your valuable advice, great powers of organisation and experience of the conditions of Indian ports."

40. In discussing the question of dredging at Bombay between ourselves, i.e., the firm of Messrs. Meik & Buchanan and firms of dredger builders, we considered that we were reasonably safe on two points, viz.: the area over which dredging should take place and the precise nature of the material to be dredged. The scheme on which we were asked to report had already been definitely accepted by the Government of Bombay and had been sent to the Government of India for sanction. I cannot recall in my professional experience a single instance where more complete borings had been taken. The results had been accepted by the Bombay Government engineers and by the Secretary of the Government of India in the Public Works Department, who is the highest engineering authority in India, and this officer had commented on the fact that the detailed survey of the harbour bottom had been made over an area of 6 square miles, some 1,300 borings having been taken down to hard bottom, the result showing that more than three times the quantity of material existed, of which half was particularly suitable for the work, and that sufficiency of material had been finally settled. In the matter of the area available for dredging, Sir Lawless Hepper has, in his statement to the Committee of Enquiry, definitely held me responsible for selecting an area which afterwards was curtailed. The fact is that what was placed before me was a project approved by the Government of Bombay for dredging over a certain area. It was not for me to question whether this area actually was available, and for any consequences that have followed a curtailment at the instance of the Port Trust and Indian Marine I have no responsibility whatever.

41. During my stay in England I was largely occupied with discussing in detail the dredger, and I spent some time at the works of Messrs. Simons & Company going into matters with their technical staff. In August, Sir John Norton-Griffiths and Colonel Claude Lowther called on me and sent me copies of the correspondence that had passed between them and the Bombay Government.

42. I completed my report by the middle of October, 1919, and sailed again for Bombay on the 24th October, arriving on the 14th November. On arrival I presented my report to the Bombay Government, and I stayed with His Excellency the Governor for a week in order to discuss the scheme to the fullest possible extent. My report was dated September, 1919, and I wish again to emphasise the point that I was not initiating a new project: I was reporting on a scheme prepared by Mr. Kidd, of Messrs, Lowther,

Kidd & Company, Contractors, for the reclamation of 1,145 acres in Back Bay, Bombay, known as the 1912 project, and this scheme had already been accepted by the Government of Bombay in 1912, who had stated in a letter to the Government of India that the drawings might be considered as complete working drawings, which would give sufficient information for examination of the designs and for the immediate commencement of the work. The investigation had been most carefully made and might be accepted as exhaustive. The report was clear and complete, all doubtful points had been settled and the revised estimate might be accepted as completely trustworthy and ample. Such a letter from a responsible Government pre-supposes that all such questions as the right to dredge within the area selected by Mr. Kidd had been considered and disposed of. After going at some length into the history of the scheme I dealt with the various points in the terms of reference and said that the absence of details in Mr. Kidd's plans and estimates made it difficult for me to report on his scheme as fully as I should have liked to do, or to examine his figures of cost from a technical point of view; that it was usual, when preparing estimates for a project of this magnitude, for all details to be furnished, but that in this case details were left to the imagination, and that with reference to dredging no particulars were given as to the capacity of the dredger, size, length, and cost of pipe lines and the cost of working the dredger. In this connection, Sir Frederick Hopkinson has remarked that in matters of detail there was little to choose between my report and Mr. Kidd's, but I would observe that Mr. Kidd's report was accompanied by 10 sheets of drawings and was supposed to be a complete working project, whereas mine was the usual report prepared for a client prior to the preparation of working drawings and specifications.

42. I agreed that the scheme was practicable from an engineering point of view; that there was an abundance of material in the harbour for the filling, and that it could be deposited in the area to be reclaimed by means of modern suction dredgers much cheaper than in any other way. I noted that paragraphs 5 to 8 of Mr. Kidd's report were devoted to an analysis of the material in the harbour and the quantity available for dredging purposes and that, according to Mr. Kidd, it had been completely established that there was available more than three times the quantity required of suitable material. I said that on the assumption that Mr. Kidd's borings and surveys were correct (and I saw no reason to doubt their accuracy as a great many borings had been taken) I accepted his conclusion both in respect of quality and quantity of material. In this I consider I had full justification, as I do not believe any responsible engineer, in the face of such overwhelming evidence as to the nature of the material, would be so foolish as to say he wished to take up another year's time (to say nothing of the expenditure involved) in making fresh investigations. The borings were taken in 1912, and the structure of the earth does not usually change in seven years.

44. I did not agree with Mr. Kidd that better dredgers could be obtained in the United States or Canada than in this country; in fact I said my own experience was exactly the reverse, and I was unable to concur with Mr. Kidd's remarks on the subject of power to be employed for operating the machinery.

45. Finally, I submitted plans, specification and tenders for dredging plant by British firms, also an analysis I had prepared of the working cost of the dredgers. I modified and very considerably cheapened a section of the wall proposed by Mr. Kidd for reasons given in my report, and I disagreed with Mr. Kidd that there was any prospect of opening up a quarry on the site of the works. I prepared an estimate amounting to 367.61 lakhs, and remarked that I had gone into the matter very thoroughly and believed my figures to be reasonable and reliable. I noted that I never over-estimated an estimate because, although by so doing an engineer might get the credit for not exceeding his estimate, such a practice was not conducive to economical work, so that I preferred to make a fair estimate on the data available and try to keep within that amount.

46. In the matter of carrying out the work I expressed my disapproval of Messrs. Lowther and Kidd's proposal to carry out the work as agents to Government on the basis of 5 per cent. commission on the cost, and said the usual and best method of carrying out a large public work was to follow one of three courses:—

(1) Tenders to be invited for the execution of the whole work on working drawings, specifications, bills of quantities, and conditions of contract supplied by the engineers entrusted by Government with the project.

(2) The work to be divided into sections, and tenders to be invited for each section on the above lines.

(3) The work to be carried out departmentally on working drawings, specifications, and estimates prepared by the engineers entrusted by Government with the work.

Finally, I remarked that if I thought there were any contractors who possessed adequate dredging plant I should recommend tenders to be taken for the whole work, but that as

I knew there was no dredger yet built suitable for the work, and that new plant must be obtained, I recommended one of two courses :—

(1) (*a*) Tenders to be asked for the construction of the sea-wall and a contract placed if a satisfactory offer is received.

(*b*) Tenders to be also asked for the moorum filling and construction of roads, drains, etc., and either one contract or several smaller contracts to be arranged.

(*c*) The Government to purchase the dredging plant and carry out departmentally the work of filling the area to be reclaimed.

(2) The whole of the work to be carried out departmentally, making use of local contractors for small contracts.

I expressed my preference for the first course if a suitable tender were received for the construction of the wall, and in any case I recommended the preparation of working drawings, specifications, and bills of quantities, and a consideration of the tenders received, before thinking of doing the whole work departmentally. The programme of construction I suggested was as follows :—

(1) Order dredging plant,
(2) Order railway tip wagons,
(3) Open up quarries for stone and moorum,
(4) Begin building wall from Colaba end.

47. On the 24th November, 1919, under instructions from the Bombay Government, and accompanied by a Secretary to Government, I proceeded to Delhi to discuss the scheme with the Government of India, and had a series of conferences with the Member of Council concerned, the Finance Member, and the Secretary to the Government of India, Public Works Department. On the 29th November I left Delhi for Bombay, and was given to understand that so far as engineering details were concerned, the scheme would be approved by the Government of India. On the 1st December, 1919, I had another interview with Sir George Lloyd, who said nothing more could be done until the sanction of the Secretary of State had been received to the project, but he expressed a wish that if the work were carried out my firm should be the engineers, and he asked me to make proposals on those lines and indicate how the work should be proceeded with.

48. Sir George Lloyd said definitely and repeatedly that he did not wish the work to be carried out by the Bombay Public Works Department, and on the 3rd December, 1919, I submitted a note giving my views as to the execution of the work on the supposition that my firm would be the engineers. I also pointed out that it must be borne in mind that, although sufficient information had been obtained to prepare a project and a reliable estimate no working plans and specifications had yet been made, and one of the duties of the engineers in England would be the preparations of working drawings and specifications.

49. At the time this memorandum was prepared the Bombay Development Directorate had not been created, and I understood my firm would be in sole charge and control, and that our resident engineer would be free from the numerous restrictions on the economical execution of work which obtains in India on works carried out by Government; this was indeed a matter which Sir George Lloyd (as he then was) discussed with me on more than one occasion. I recommended that the dredging should be done departmentally, and the opening of quarries and construction of the wall entrusted to local contractors. In this I was influenced by Sir George Lloyd's anxiety to have the work started before the break of the next monsoon, and because at that time no responsible contractor would have undertaken the work on a schedule of rates. They might have done so on the basis of Messrs. Lowther and Kidd's offer, taking little risk, and being paid a percentage on the gross cost. I therefore considered that the work could be done as well by local contractors on piece-work terms, working under the direction of our resident engineer and staff.

50. I went on tour to the State of Baroda to advise His Highness the Gaekwar on harbour works, returning to Bombay on the 21st December. On the 24th December, 1919, I had an interview with Sir George Lloyd at Government House, and discussed the purchase of the dredger, and it was decided to despatch a cablegram to my London office asking that tenders for the construction of the dredger be obtained from the various dredger builders. On the 6th January, 1920, I went on tour to Gwalior, and thence to Burma to advise on various schemes. On the 14th January, 1920, the following telegram was despatched to me to Burma :—

"Bombay Government decided to appoint your firm consulting engineers Back Bay Scheme subject to requisite sanctions of superior authorities and settlement of terms. Your private note regarding terms being considered officially. Understand you will now return Bombay after completing work in Burma. Please telegraph possible date of arrival."

The decision on which this message was based was as follows:—

> "That this Government decides to appoint Messrs. Meik and Buchanan as consulting engineers to the scheme, subject to the scheme being sanctioned by the Government of India and the Secretary of State, and subject to terms being settled with Sir George Buchanan."

51. I returned to Bombay on the 18th February, and on the 21st February, 1920, I had an interview with Sir George Lloyd, and discussed with him how the work could best be pushed forward, as he was very anxious to see a start made. I think it was at this meeting that I said to His Excellency that Colonel Grisewood had asked if he could see me, and I replied that I could not do so without His Excellency's approval. Sir George Lloyd replied that although Colonel Lowther had no legal claim on the work there was possibly a moral claim, and that all things being equal he would like him to be given a chance of getting a portion of the work.

52. It was the same day or the following morning that I saw Colonel Grisewood, who told me he was forming a construction syndicate, the capital of which would be obtained in India, and that although neither Sir John Norton-Griffiths or Colonel Lowther would be actively associated in the carrying out of the work they would receive a percentage of the profits. On the same date there was a Council Meeting to discuss the terms of my firm's appointment as consulting engineers.

53. On the 22nd February, 1920, I had an interview with Sir George Lloyd who informed me the Council had approved of our appointment and the terms of our engagement. We again discussed the plan of operations and I said that in view of the urgency of the work I advised the acceptance of Colonel Grisewood's offer to carry out the first section of the wall at Colaba, because it seemed the only way of making an immediate start and local capital would be employed as well as local men interested. I think that it was at this meeting that Sir George Lloyd told me of his scheme for a Bombay Development Department. He also told me that he had decided to offer Sir Lawless Hepper the post of Director of the Department and he asked me for my opinion of this appointment. This I gave to him. On the 26th February, 1920, I wrote a demi-official letter to Mr. Monie, who was then Secretary to the Government of Bombay, and said that with reference to our conversation I enclosed copy of my note in which he would see I recommended that Colonel Grisewood's firm should be given the contract for the first section of the wall and that I had come to that conclusion because it was my conviction that in no other way would it be possible to get a good start made by the end of the monsoon. By an arrangement with Colonel Grisewood we guaranteed a start and obtained time to breathe and think, and at the same time we only bound ourselves to the first section. I also said in the letter referred to that I had discussed the matter with Sir Lawless Hepper, who approved.

54. On the 28th February, 1920, I left Bombay for London taking with me a letter of introduction from Sir George Lloyd to Mr. Montagu, Secretary of State for India. The letter was from the Private Secretary to His Excellency, the Governor of Bombay, to the Private Secretary to Mr. Montagu, Secretary of State, and said that my firm had been appointed consulting engineers to the Government of Bombay for the Back Bay Reclamation Scheme and that His Excellency was anxious that I should be given an opportunity of discussing any details of the scheme which appeared to require explanation with the Secretary of State or other official deputed by him. I arrived in London on the 17th March and on the following day I wrote as follows to the Private Secretary to Mr. Montagu:—

> I beg to enclose a letter from the Private Secretary to His Excellency the Governor of Bombay and in pursuance of His Excellency's wishes I place my services at the disposal of the Secretary of State to explain any details connected with the Back Bay Reclamation scheme.
>
> I have had the advantage of discussing the subject fully with the Governor in Council, Bombay, the Government of India and personally with Sir George Lloyd, and if the scheme is sanctioned by the Secretary of State, His Excellency wishes no time to be lost in placing the order for the dredger as it is necessary for everything to be ready to begin the reclamation as soon as the first section of the wall is finished.
>
> In this connection a tender for the dredging plant, in accordance with the general specifications drawn up by my firm, was received from Messrs. William Simons & Co., Ltd., and, acting on Sir George Lloyd's personal instructions, my firm took in tenders from other builders, the result of which was communicated to the Governor in Council, when I recommended Messrs. Simons' tender be accepted, subject to my firm's approval of the detailed plans and specifications and to certain important modifications which appeared necessary to me after further consideration on the spot of the best means of carrying out the works.

Messrs. Simons' time for the acceptance of their tender expired on the 12th March and I understand that the Government of Bombay, or the Government of India, telegraphed to the Secretary of State to see whether Messrs. Simons & Co. would extend the period for a few days so as to give time to the Secretary of State to receive and consider the complete reclamation and housing scheme.

I was also informed that the complete scheme was despatched by the same mail that I travelled by from Bombay and I was desired to lose no time in communicating with you, as if the work is to proceed and the Secretary of State accepts the proposals of the Government of Bombay in respect to the execution and supervision of the work, it is desirable that my firm should further discuss details of construction of the dredging plant with Messrs. Simons & Co. at the earliest possible date.

55. I received a letter from Mr. Brown, the Private Secretary to the Secretary of State on the 23rd March, 1920, saying that the Secretary of State was at present away from the office on account of ill-health but that Sir John Steevens, Acting Director General of Stores at the India Office, would be pleased to see me and discuss the Back Bay Reclamation scheme; that he had been anxious to have an opportunity of going through the matter with me on my arrival from India, and would be glad to make an appointment with me if I would suggest a time. Accordingly, I met Sir John Steevens on the 25th March, 1920 and the result of my interview is given in the following extracts from a letter I wrote to Sir George Lloyd on the same date :—

On Thursday, the 18th inst., I sent the Private Secretary to the Secretary of State the letter given to me by Mr. Cowie, accompanied by one from myself, a copy of which I enclose.

I received a reply from Mr. Brown stating that the Secretary of State was still away from office on account of ill-health, but that Sir John Steevens, Acting Director General of Stores at the India Office, was anxious to see me, and I have to-day had a long interview with him.

In the first place, I may say that the India Office asked Messrs. Simons & Co. to extend the time of their tender for the dredger and they agreed to do so provided there is another material increase in their prices, and I was not far out when I told you that if the order was not placed before the 12th March it would cost your Government another £100,000.

After discussing the dredger proposition generally, Sir John Steevens informed me that the India Office had passed orders to the effect that no order for the dredger was to be placed until the whole scheme had been sanctioned but that he along with his experts, was to go into the question of the dredger and decide if Messrs. Simons & Co.'s offer was desirable both from the practical and financial points of view.

Sir John then told me plainly that his expert was Sir John Biles, the Consulting Naval Architect to the India Office, who, if the scheme was sanctioned would prepare the detailed specifications and superintend the construction of the vessel. I said I had already discussed this aspect of the situation with yourself, and that I understood you would be adverse to dual control in connection with the scheme because if the dredger did not do its work, we should turn round and say that as we had had nothing to do with the dredger we could accept no responsibility. I also pointed out that obviously the Engineer to the scheme must have a voice in the construction of the dredger, although Sir John Biles, as Naval Architect to the India Office, might reasonably be expected to see that the dredger was a properly built sea-going vessel and that there was a great deal of work in connection with pipe lines and land stations which would be dealt with by my firm. Finally, I said that the last thing any of us wanted was friction and that, speaking for my firm, we were perfectly willing to work jointly and amicably with Sir John Biles; that I could give him a great deal of my local knowledge on points essential to the successful working of the dredger whilst he on his side would no doubt be useful in discussing details of construction of the dredger itself, Sir John Steevens thought this was a perfectly fair arrangement and I hope the work will proceed on those lines.

I also explained to Sir John Steevens that as we have been appointed the Engineers to the Back Bay scheme we wished to get on with the working drawings of the wall and generally proceed with the arrangements for carrying out the work as soon as possible; he made a note of this and promised to let me know when anything was settled. Meanwhile, time is passing and I am afraid you will be very disappointed at the continued delay in getting the Secretary of State's sanction to the entire scheme and at this rate it will be almost impossible to have the dredger ready for work by the end of the 1921 monsoon.

56. On the 29th March, 1920, I received a cablegram from the engineer of the Grisewood Syndicate saying the contract for the first section Back Bay had been concluded as recommended by me and that he would see me in London in the middle of May about the estimates.

57. On the 10th April, 1920, I received a letter from the Director-General of Stores saying that the approval of the Secretary of State in Council had been given to the taking of all steps necessary short of placing the contract. These steps involved the preparation of the necessary detailed plans and specifications, &c., for the provision of the dredger, pumping station, pipe lines, &c., in anticipation of full approval to the execution of the scheme being given at a later date. Further, I was informed that as a preliminary measure it would be desirable if I met Sir John Biles and Sir John Steevens, the Director-General of Stores, in order that a clear understanding might be arrived at, and any overlapping avoided. Accordingly, I met Sir John Steevens and Sir John Biles on the 16th April, and a discussion with these gentlemen led to the desired clear understanding.

58. On the 12th April, 1920, I met Colonel Claude Lowther, M.P., and Sir John Norton-Griffiths, M.P., who wished to discuss their position in relation to the Back Bay Scheme. On the 13th April, Sir John Norton-Griffiths wrote to me enclosing a copy of a cable sent by him on that date to Colonel Grisewood, also a copy of a letter his firm had addressed to the Secretary of State for India, in which they assumed that a contract for a portion of the Back Bay scheme had been given to them and asked that the contract should be signed in London between Norton-Griffiths & Co., Ltd., and the India Office. On the 15th April, 1920, Sir John Norton-Griffiths wrote to me and said that with a view to saving our staff unnecessary work he had had a draft made of the form of contract suggested, and he enclosed it for my information.

59. On the 20th April, 1920, at an interview at the India Office with Mr. Montagu, Secretary of State for India, I presented a memorandum of which the following are extracts, detailing the position of the Back Bay Scheme up-to-date :—

" The position when I left Bombay was as follows :—

> The scheme as prepared by myself had received the approval of both the Government of Bombay and the Government of India, and the Governor (Sir George Lloyd) had discussed with me the best methods of executing the work and had also explained his proposed organisation for carrying out not only the Back Bay Reclamation Scheme, but the whole of the Housing and Improvement Schemes. I was informed that a despatch had been issued by the Government of India to the Secretary of State asking sanction to the entire project, and that it was tolerably certain that sanction would have been received by the time I got to London.

" Sir George Lloyd was particularly insistent that the Back Bay Reclamation work must be started at the end of the monsoon, say about the month of October, 1920, and I left with the Governor a note explaining how this was to be done. I also recommended the appointment of a resident engineer, and time being an object, I proposed that a contract for the first section of the wall should be given to Colonel Grisewood's Syndicate, who were in a position to make a start with the preliminaries, and begin the permanent work directly after the monsoon.

" My instructions were to proceed home with all possible speed, and, on the assumption that the Secretary of State would have sanctioned the scheme by the time I got home, I was—

> (*a*) To make arrangements for the construction of the dredger and
> (*b*) To put in hand the necessary drawings and estimates for the construction of the wall

and I was given a letter to the Private Secretary to the Secretary of State saying that His Excellency was anxious that I should be given an opportunity of discussing any details of the scheme which appeared to require explanation, with the Secretary of State, or other official deputed by him. I forwarded this letter on my arrival in London on the 18th March, accompanied by a covering letter of my own explaining the urgency of the case, and I was informed by Mr. Brown that the Secretary of State was unfortunately ill, but that the Acting-Director-General of Stores (Sir John Steevens), was anxious to see me.

" I had a meeting with Sir John Stevens on the 25th March, and he informed me that orders had been passed that no contract for the dredger was to be placed until the whole scheme had been sanctioned, but that he, along with his expert, was to go into the question of the dredger, with special reference to the tender we had under consideration. I also discussed the relative responsibility of his expert and myself in regard to the work.

" On the 10th April, 1920, I received a letter from the Director-General of Stores observing that the approval of the Secretary of State in Council had been given that all steps, short of placing the contract, were to be taken in the preparation of the necessary detailed plans and specifications for the provision of the dredger, pumping station and pipe lines, in anticipation of full approval to the execution of the scheme being given at a later date, and, as a preliminary measure, it would be as well for Sir John Biles—Consulting Naval Architect—and myself, to meet Sir John Steevens.

" The same day I received a letter from Bombay from the Chief Engineer to Colonel Grisewood's Syndicate stating that a contract for the first section of the Back Bay Scheme had been given to his firm on the lines suggested by me, that he was leaving Bombay on the 14th April, and would, on arrival in England, come immediately to see me in order to discuss and settle the various details of the scheme. He also described a number of arrangements that had already been made in Bombay for the immediate execution of the work.

" On the 16th April I had a meeting at the India Office with Sir John Steevens and Sir John Biles, and came to a satisfactory understanding as to the relative responsibility of Sir John Biles and myself. I then informed Sir John Steevens of the letter I had received stating that a firm of Contractors had been given the contract for the first section of the wall, and I remarked that the most vital matter in connection with the whole scheme was to place the order for the dredger, as if this was not done promptly a whole year's time would be lost, all our plans being made on the assumption that the dredger (which would take a year to build) would arrive in Bombay in time to start operations at the end of the 1921 monsoon. The sanction to prepare detailed plans and estimates would be of very little use, as the builders would first and foremost have to order the steel, and this they could not do until the order for the dredger was placed. I also said that the position seemed a most curious one, as the construction of the wall, which would be of no use without the dredger, had apparently been arranged, while we were told the dredger could not be ordered. Sir John Steevens then said he would go and confer with some of the higher officials, and when he returned he informed me that the whole of the projects in connection with Bombay Improvements were now being discussed by the India Council from the financial point of view, and that he had been told it was not possible to detach the Back Bay Scheme from the complete project.

" The Government of Bombay in Council have appointed my firm the Engineers to the works in Bombay. As already stated, my instructions were to push ahead with the preparation of the detailed plans and estimate for the sea-wall so soon as the sanction of the Secretary of State had been received to the project.

" The Secretary of State has not yet sanctioned the project, but orders have been passed that detailed plans of the dredger may be prepared, even if an expenditure is incurred in connection therewith. On the other hand, the Bombay Government appear to have made all arrangements for constructing the wall, and possible of finding the money from their surplus balances, but as the project has not been sanctioned I have taken no action in the preparation of the detailed plans and estimates for the wall, although the Contractors' Engineer will, I understand, be home in a month to discuss the plans with me.

" It is perhaps a pity that the Back Bay Scheme is involved with so many other projects because taken by itself it must be exceedingly profitable to the Government."

60. The following is an extract from the memorandum of my interview, written on the 21st April, 1920 :—

" I called on Mr. Montagu by appointment at 3.20 p.m., and was received by him almost immediately.

" I said that I considered the subject on which I wished to see him was of sufficient importance to put down my views in writing, and that also I thought by so doing I should save his time. I asked him whether he would like me to read the paper or would he read it himself. Mr. Montagu said he would read my memorandum, which he did, asking me a few questions from time to time.

Mr. Montagu then took up the pen and red ink and wrote for some minutes at the back of my memorandum. He then said he would read me what he had written. To the best of my recollection the following was the substance of his remarks :—

" Sir George has given me a characteristically strongly worded memorandum which was for my private information, and to which under the circumstances I take no exception. Sir George Buchanan explained that

the project was being held up on account of the order not being placed for the dredger, and I direct that the papers be circulated and the case be brought up in Council for final decision on Tuesday next."

Mr. Montagu then talked to me rather freely. He said that he had discussed the Back Bay scheme with Sir George Lloyd, who was sitting in the chair I was then occupying, and he had impressed upon him the necessity of the work and the importance of its being done by Government.

Mr. Montagu said he was wholeheartedly in favour of the project, which had always been most attractive to him.

I then explained to him my position—namely, that after my scheme had been approved, Sir George Lloyd had asked me whether my firm would be the engineers as he did not wish the Bombay Public Works Department to have anything to do with the work. I had agreed on behalf of my firm and had promised to make the carrying out of the work my principal object, if necessary declining works elsewhere, and I had agreed to go out and spend several months every winter in Bombay.

I also said I should like to explain the position of Norton-Griffiths & Co., who I understood considered they had again been left out of the business. I said that Colonel Grisewood, who is at present in Bombay, was sent out by Colonel Claude Lowther as his representative with special reference to the Back Bay Scheme. Colonel Grisewood had asked if he could see me, and I had replied that I should first like to consult the Governor of Bombay. I saw Sir George Lloyd, who said he would like me to have a talk with Colonel Grisewood, as although Colonel Lowther, as the head of the defunct firm of Lowther & Kidd, had no legal claim on the work, yet there was possibly a moral claim on account of certain correspondence which had passed. I saw Colonel Grisewood, who informed me that he was forming a Construction Syndicate, the capital for which would be obtained in India, and that Sir John Norton-Griffiths and Colonel Claude Lowther would have nothing to do with the real operations, but would receive a certain percentage of the profits. He then gave me proposals for carrying out the first section of the work, and in view of the great urgency I recommended Sir George Lloyd to accept his offer as it seemed the only means of starting the work at once.

When I came home I met Sir John Norton-Griffiths and Colonel Lowther at dinner at the House of Commons. We discussed the Back Bay Scheme, and I told them what had happened; to my surprise they repudiated Colonel Grisewood.

I then said to Mr. Montagu that we really could not keep pace with these changes. We had turned down Mr. Kidd and given the work bona fide to Colonel Grisewood, and if there were now any differences between Norton-Griffiths & Co. and Colonel Grisewood they must settle them between themselves. Mr. Montagu agreed and said it was obviously nothing to do with us.

The meeting then terminated. Mr. Montagu informed me as I left that he hoped to give me news as soon as possible after Tuesday next."

61. I received a letter dated 5th May, 1920, from the Director-General of Stores saying that approval had been given by the Secretary of State for India in Council to proceed with the purchase of the dredger and accessories, and that action would now be taken accordingly.

62. On the 14th June, 1920, I had a meeting with Sir John Biles and Mr. West, from the India Office, and discussed with them the Back Bay dredger and plant. Together we went over the tender and specification for the dredger, discussed the question of the supply of electric current for the relay station, the manner in which the dredger was to be delivered at Bombay and the erection of the pontoons and pipe line at Bombay.

63. On the 18th June, 1920, I received a letter from the India Office forwarding copy of letter to Messrs. William Simons & Co. instructing them to proceed with the supply of the dredger for Back Bay. Work on the construction of the dredger and other plant then proceeded smoothly.

64. In concluding this summary of the history of the scheme from its inception I wish to record the opinion that there was no undue haste shown by anyone in proceeding with the work. For many years the project had been discussed and rediscussed and pending its disposal one way or the other it was blocking the development of Bombay. Once the scheme was sanctioned obviously the correct procedure was to get to work as soon as possible and Sir George Lloyd's (now Lord Lloyd) anxiety to see a beginning made at the end of the 1920 monsoon instead of losing

another whole year was reasonable. Although not being an engineer he did not realise the amount of preliminary work necessary in all large schemes before operations can actually be begun. Had the work been entrusted to the Bombay Public Works Department it would, I judge, have taken at least three years before anything was done, not on account of the unwillingness or inability of the engineers belonging to the Department but in order strictly to conform to procedure.

In the first place nothing would have been put in hand without the town planner's lay-out and then a complete working project estimate for every detail of the entire work would have been required by the Government of India before the expenditure of a rupee had been permitted on the work.

Our plan of operations was to prepare a general scheme and estimate and the detailed plans and estimates step by step as the work proceeded, a by no means unusual procedure. I said, and it has been proved correct, that the way prices of labour and materials were fluctuating in 1920 made the preparation of a complete project estimate a useless waste of time, unless indeed prices were included which could hardly under any circumstances be exceeded.

(3) *Execution of the Work.*

65. In the first place it will be convenient to discuss the duties and responsibilities of my firm under the agreement with the Secretary of State. I will then comment on the various estimates prepared for the project, and lastly discuss the execution of the work under sub-headings:—

Management and control.
Sea-wall.
Storm water drains.
Dredging.

Agreement between C. S. Meik & Buchanan and the Secretary of State for India.

66. There had been considerable discussion on the subject both in India and with the India Office in London and a draft agreement had been prepared. I had objected to a clause in this which provided that in the event of my death or incapacity the agreement might be determined; I said it was unusual inasmuch as my death or incapacity would not prevent my firm from carrying out and completing the work under the agreement in a satisfactory manner. I also said I was not aware of any other case where the execution of a work had been specially confined to the personal attention of one particular member of a firm. The clause referring to the determination of the agreement if I died or became incapacitated was deleted, but the one in respect to my personal attention to the work was retained. The agreement, as executed, appointed my firm as engineers to the Secretary of State, in carrying out the scheme described in my report dated September, 1919.

67. It was specified that the firm should at all times assist and advise the Government of Bombay in all matters relating to the execution of the work and perform all work and duties devolving upon engineers of large works. Work in England was specified, work in India and terms of payment. There was also a clause providing for arbitration in case any dispute arose between the Secretary of State or the Government of Bombay and the firm, as to the works and the duties of the firm. We have carried out the whole of the duties prescribed in the agreement so far as it was possible to do so, and certainly a great deal more than is usually performed by engineers in charge of large works. In this connection we desire to emphasise the fact that we were the Engineers, not the Contractors for the work, as we notice in the evidence a tendency to put us on the same footing as Messrs. Lowther & Kidd or Sir W. G. Armstrong Whitworth & Co., who are contractors. Sir Lawless Hepper, for instance, in his evidence stated that Meik & Buchanan carried out the work as agents for Government, which statement is untrue. Messrs. Lowther & Kidd and Armstrong & Co., offered to carry out the work as agents for Government but demanded a commission of 5 per cent. on the cost and an absolutely free hand as regards the execution.

68. It may be useful if I relate the usual recognised procedure in this country in regard to carrying out works at home or abroad and I do so in the light of over 50 years' professional experience by my firm, during which time they had carried out work of an aggregate value of many million pounds.

An engineer's duties to his clients consist, in the first place, in preparing plans, specifications and estimates of cost and if these are approved it is usual to invite tenders for the execution of the work. Apart from the work at Bombay, my firm has carried out to a successful completion two small projects on the departmental system, but we prefer working with a contractor. Under ordinary procedure, when the tender has been accepted, it is the duty of the contractor to make all arrangements for the execution of the

work, purchase plant, engage labour and design and make drawings for all temporary works and structures. The general arrangements are usually subject to the approval of the engineers who have to satisfy themselves that they are suitable for carrying out the work within a specified period, but otherwise the engineers are only concerned with the carrying out of the permanent work in accordance with their drawings and specifications.

69. To represent and assist the engineers there is appointed a resident engineer and staff of assistants, who are under the direct orders of the engineers. Their salaries are paid, in some cases, by the engineers and in others by their clients, depending upon the terms of the agreement; but there is no dual control and the duty of the resident engineer is to carry out the engineer's orders, to see that the work is executed in accordance with plans and specifications, and to measure up the work done from time to time in order that the engineers may issue certificates for payment of the Contractors. The resident engineer also sends the engineers progress reports, progress plans and sections and corresponds regularly with the engineers.

70. There are sometimes disputes between engineers and contractors and if the engineers think the contractors are not carrying out the works properly or with sufficient speed, there is generally a clause in the contract enabling them to take the work away from the contractors and to make other arrangements. There is also a clause in the contract giving the engineers power to order the removal from the works of an agent, engineer or other employee of the contractors who in their opinion shall be guilty of misconduct or be incompetent or indifferently qualified. In the case of work abroad a principal of the engineering firm usually makes a visit of inspection about once a year to satisfy himself that all is going on well and that the resident engineer is doing his duty, whilst in this country the engineers make more frequent visits. Remuneration almost inevitably takes the form of a percentage on the actual cost of the work, varying from 7 per cent. downwards, depending on the magnitude of the work and whether the resident engineer and staff is paid for by the engineers or their clients.

71. It must, however, be understood that the engineers although responsible to their clients for the proper execution of the works by the contractors in accordance with the terms of the contract, are not executive officers, and have nothing to do with the contractor's detailed arrangements for carrying out the work, the men he employs or the plant he uses, except that if the contractor is obviously using insufficient labour and plant to carry out the works within the time of the contract, or otherwise is not working according to specification, the engineers have powers to insist on the contractors taking measures to accelerate progress by putting on more men and machinery. In the case of the Back Bay Reclamation scheme, as I have already explained, the execution of the work was placed in the hands of the Development Department of the Government of Bombay, who, therefore, took the place of the contractors, the Director of Development represented the contractors' chief agent, and his engineers the contractors' staff. This is admitted by Sir Lawless Hepper in his evidence before the Committee. He agreed that Sir George Lloyd in his speech dated 3rd August, 1920, announced the intended formation of a body to be called the Development Directorate, and that their first duty was to carry out with the assistance of his engineering staff the Back Bay Reclamation scheme, and any other reclamation schemes which might be found necessary in or near Bombay City.

72. Sir Lawless Hepper stated that he was appointed Director on the 8th November, 1920, and on being asked whether he was assisted by two groups of gentlemen, secretaries and engineers, replied, " The Engineers were directly under me and I and the Engineers formed the Directorate, which is the executive part of the organisation to carry out the work." He was then asked to confirm the date of the appointment of the first Chief Engineer (Mr. Lewis) and his successors in office.

73. With regard to the position of my firm and myself I wish to make it clear that we never had any direct responsibility for the actual execution of the work. We were not executive officers, we had nothing to do with the employment of labour or rates of pay, the letting of the numerous contracts in Bombay, or the purchase of local stores and materials, nor were we consulted on those points. Detailed estimates for the execution of the work were submitted by the Chief Engineer direct to the Director of Development for sanction, and were not seen or dealt with at all by my firm. In the matter of the supply of machinery from this country, we were regarded as agents to carry out the orders of the Development Department, and although we did sometimes offer an opinion it was not incumbent on the Director to consult us.

74. In the matter of staff we nominated a resident engineer but in other cases we made enquiries at the request of the Development Department and as a rule advertisements were inserted in the papers by the High Commissioner who transmitted the applications to us and the selected candidates were interviewed by a Committee appointed by the High Commissioner and salaries, wages, and conditions of service were fixed by the Development Department. We had no power to remove any officers or workmen,

these powers being entirely in the hands of the Director of Development. This settles responsibility as nobody could be held to have executive powers, nor would any responsible person accept executive power unless he had control over all the staff and workmen engaged and it is absurd to suggest that this power was in our hands.

To summarise on the question of responsibility as between client, engineer and contractor.

When the client employs a contractor actually to execute the work:—

(*a*) The client approves the engineer's general proposals and is responsible for providing the necessary funds for the work.

(*b*) The engineer is responsible for the proper execution of the work by the contractor in accordance with the plans and specifications, but he has no responsibility or interest in the purchase of plant, employment of workmen or any other arrangements nor is he in any way concerned with cost accounting.

(*c*) The contractor is responsible for the cost of the work, making of the whole arrangements for the carrying out of the work, purchase of plant, employment of staff and workmen, etc., and in these details he does not consult the engineer. The keeping of cost accounts is of vital importance to the contractor.

When the client is his own contractor and at the same time the Government of a country, with definite rules of procedure the Government, who is the contractor, necessarily takes all responsibility for the carrying out of the work, employment of labour, purchase of plant, etc. The Government may delegate its powers to a Department, such as the Public Works Department or the Bombay Development Directorate, but final responsibility must rest with the Government. The engineer is responsible for the preparation of the detailed plans and estimates of the permanent work, and he must tender his advice to Government, but although the engineer may advise Government to keep proper accounts, to be economical in the use of plant and give his opinion on the execution of the work generally, he has no power to make Government take his advice, and, therefore, no responsibility.

75. The chief of the Executive is the Director of Development, and the responsibility for the execution and cost of the work rests entirely with him. We assisted and advised in every possible way but had no power to give orders, which would have been the case had the work been carried out by contract. At no stage were we informed in detail what the work was costing. We recommended Mr. Elgee for his appointment because he was a contractor's man, but when he had been at work for some time and I said to him, " What is the work costing, you are a contractor's man, where are your costing accounts? " he replied that under existing management it was quite impossible to get out costs and that the method of carrying out the work was far removed from anything in his experience, and the greater part of his time was occupied in the office writing up forms.

76. In the matter of my visits: I visited the work every year and once or twice in the year. After the usual procedure I inspected the works and expressed my opinion on the same. I announced my arrival to the Director of Development and the date of departure, and I was never asked to stay a day longer than I had contemplated, and Sir Lawless Hepper's statement to the contrary is untrue. Sir Lawless Hepper did, in January, 1923, suggest my firm should have an office and permanent representative in Bombay, and I pointed out that the resident engineer, whose official title had been changed to chief engineer, was supposed to be our representative, and that under our agreement the whole of the staff, both engineering and clerical employed in India in connection with the works, would be paid by the Government of Bombay. I said we welcomed the idea of having a resident engineer who would be our representative in fact, but his salary would be paid by the Government of Bombay and he would be senior to Mr. Lewis, who so far as the permanent works were concerned would have to obey his orders. He then said that in the matter of permanent works such as designs for the sewage mains and setting out of the development area it would be our duty to send out a man to make the surveys and to get together the information. This he had already mentioned to my firm in London when he was in England and we had at once agreed to the proposal.

77. The whole subject was then discussed at length by the Hon. Sir Chimanlal Setalvad, the member in charge of the Development Department, Sir Lawless Hepper and myself at a meeting at the Secretariat, Bombay, on the 4th January, 1923. The honourable member expressed the opinion that under our agreement we were to prepare working drawings, specifications, etc., for the whole of the work, and he asked why the Development Directorate were employing surveyors and draughtsmen for that purpose. I replied that our interpretation of the agreement was that we were to prepare drawings and specifications for the permanent works and for such plant and machinery as was ordered from England, but that the preparation of the drawings, etc., for all

temporary works were to be done by the Development Department as was usually the case when a contractor was employed, and that for these we took no responsibility. The honourable member dissented from my interpretation, and I then referred him to the clause in our agreement which stated that the whole of the staff, both engineering and clerical, employed in India in connection with the work would be paid by the Government of Bombay and pointed out the impossibility of our preparing in England drawings for temporary works. Finally an agreement was reached and the following is a copy of the official document approved by His Excellency the Governor in Council and my firm :—

" The Honourable Member, Sir Chimanlal H. Setalvad, Kt., with the Director of Development, Sir Lawless Hepper, Kt., met Sir George Buchanan at the Secretariat on the 4th January, 1923, when the following questions were discussed :

(*a*) Are Messrs. Meik & Buchanan to be appointed Engineers for the East Colaba scheme as well as for the Back Bay Reclamation Scheme?

(*b*) Are Messrs. Meik & Buchanan to be regarded as the Engineers for the Back Bay *Reclamation* only, or are they also to be the Engineers for the subsequent Development of the reclaimed area? and

(*c*) The relationship between Messrs. Meik & Buchanan on the one side and Government and the Chief Engineer, Reclamation Branch, on the other.

(2) After discussion the Honourable Member agreed to the following recommendations, which, it was understood, Sir George Buchanan was prepared to accept :

(*a*) Messrs. Meik & Buchanan should be appointed Engineers for the East Colaba Reclamation at a remuneration of one per cent. on the cost of the work, exclusive of the cost of land.

(*b*) Messrs. Meik & Buchanan are the engineers for the *Reclamation* and connected works only, and not for roads, drains, lighting and other things necessary for the development of the reclaimed area, but the cost of so much of the storm water drainage system as has to be constructed during the progress of the Reclamation is to be included in the amount on which the percentage for the purposes of the firm's remuneration is calculated. This recommendation applies also to the East Colaba Reclamation.

(*c*) The obligation which Clause 1 (*a*) of the agreement lays on the Engineers to carry out certain work in London may, with a view to securing a workable arrangement, be held to be confined to the *permanent* works only of the Reclamation, including storm water drains referred to in (*b*). And in order to ensure better co-ordination, all correspondence between the Engineers and the Chief Engineer, Reclamation Branch, should in future be addressed through the Director of Development, a copy of each document being forwarded at the same time for record in the Director's Office."

78. I will now summarise briefly the work performed by my firm and myself.

Work in England.

The dredger was a joint responsibility between Sir John Biles and my firm, otherwise we prepared the plans and specifications for the whole of the permanent works except in cases where the work was prepared by the Chief Engineer without our knowledge or consent. We also prepared a design for the gantry along the line of the sea wall. We prepared specifications (plans where necessary) and invited tenders which were sent to the India Stores Department, for necessary action, for plant and machinery aggregating in value approximately £350,000, exclusive of cost of dredger and practically the whole of these orders were placed in the United Kingdom.

79. In 1922 we received by a letter dated the 21st April, 1922, orders from the Director of Development that tenders for plant should be invited in countries other than the United Kingdom, and we cabled on the 11th May, 1922, as follows :—

" Referring to letter from Sir Lawless Hepper, dated 21st April, rolling stock orders already placed at most favourable prices and tenders under consideration for other plant. Serious delay inevitable if we are at this stage to commence making inquiries abroad. India Office have already discussed it with us and have approved our action. Do you confirm. Telegraph your wishes."

80. We employed and paid inspectors, and we furnished the India Stores Department with certificates on which the various contractors were paid. The Chief Engineer in a letter dated 5th October, 1921, said :—

> " Monie mentioned to me that he was going to propose that all the Development stores and machinery should be obtained through you. They evidently appreciate the way the stuff is watched and delivery kept in view."

We employed a permanent staff in our office whose time was chiefly devoted to the Back Bay Reclamation Scheme. The files of correspondence can be shown as evidence. The principals of the firm, and I in particular, devoted a great deal of our time to the work and other remunerative work was refused or curtailed because of my obligations to visit Bombay. For the purchase of machinery and stores in this country the usual charge in fees is 2½ per cent. on the cost. We agreed to perform the work for 2 per cent., and we have only been paid 1½ per cent., which in many cases has not paid our expenses. For the dredger we were to receive 1 per cent., and have only been paid ¾ per cent. I give these facts and figures because statements have been made as to remuneration to my firm on the supposition that it was all profit, and that we had no expenses.

Work in India.

81. I visited Bombay once each year, and twice in 1923, and if my visits were not as profitable to Government as they might have been, it was certainly not my fault as will be seen later on in this statement. On each occasion I wrote a long report to the Director of Development detailing the results of my inspection and gave it to him before I left Bombay, and it may be taken as tolerably certain that everything in the report had already been discussed verbally with Sir Lawless Hepper, and where possible, with the Chief Engineer. A partner (Mr. W. T. Halcrow, M.Inst.C.E.), who is specially qualified to criticise the execution of works, visited Bombay in 1922 and made a thorough inspection of the works, and in 1925 we sent our chief assistant, Mr. Settle, an enginner of great experience, to report on the dredging. These visits were outside the terms of our agreement and at the firm's expense.

82. I visited Bombay last on the 24th October, 1924, and I left Bombay on the 7th January, 1925, for Australia, with the full knowledge of His Excellency the Governor (who discussed Australia with me), Mr. Cowesjie Jehangir, the member of Council in charge of Development, and Sir Lawless Hepper. I intended returning to Bombay the following October, but was overtaken with an illness so severe that I was ordered by my Medical Adviser to go direct to England, as if I broke my journey at Colombo and went to Bombay he considered my life would be endangered. I arrived in London in a state of collapse, and sent a medical certificate to Bombay. The Bombay Government thereupon purported to cancel my agreement with the Secretary of State. My Medical Adviser is prepared to give evidence before the Committee on this point.

Estimates.

83. I will now give details of the various estimates prepared for the work, viz. :—my estimate of September, 1919, the Chief Engineer's revised estimate of 1921, my revised estimate of 1922, the Development Directorate's estimate dated October, 1922, and the estimate of the Advisory Committee, dated 1925.

Estimate of September, 1919.—This estimate was for 367·61 lakhs, increased by Government to 400 lakhs. It was at the time a fair and reliable estimate, and was accepted as such by the Government of India who examined the figures in the Public Works Department Secretariat and also by the Secretary of State who sanctioned the project. The estimate was not as stated by one of the members of the Committee " based entirely upon an engineer's report prepared in 1912 which was not checked in any way but taken over holus bolus." The estimate was most carefully prepared from data obtained from the Public Works Department, the Port Trust, the detailed information in my possession as to the cost of the Rangoon River Training works and the mass of information in the possession of the late Mr. C. S. Meik on cost of work carried out by his firm. In the matter of the dredging plant, estimates in detail were considered. The Government had in 1919 obtained a firm offer for the plant for £451,000 and the cost of dredging we worked out at 5·91 annas per cubic yard and we allowed 8 annas which gave a surplus for contingencies of over 32 lakhs of rupees. Sir Lawless Hepper's statement that insufficient provision had been made by Sir George Buchanan for the cost of the subsequent development of the reclaimed area in the way of roads, storm water drainage, sewerage, lighting, etc., is disingenuous—Sir Lawless Hepper was aware when he made that statement that in 1919 no reliable estimate was possible, as the Government had not even considered how the reclaimed land was to be utilised, and it was not until March, 1922, we received a copy of the preliminary lay-out prepared by the Town Planner, Mr. Davidge. Mr. Kidd on Public

Works Department's figures had allowed a lump sum of 59·45 lakhs which I raised to 75 lakhs. This included storm water drains, the continuation of the existing town roads across the reclaimed area: sewerage, it was understood, would be done by the municipality.

84. Prices were fluctuating, but no one in 1919 could foresee the vast rise in prices all over the world which would take place the following year, nor could he forecast that the Indian rupee would depreciate at the same time from 12 rupees to 15 rupees to the pound.

It is common knowledge that all engineers' estimates for works in various parts of the world had at that time to be increased by amounts varying from 50 per cent. to 100 per cent., and the Committee can by enquiry satisfy themselves on that point. To give one instance, when the dredger was ordered, the firm offer of £451,000 had been withdrawn by the lapse of time, and other circumstances combined to raise the contract price to over £650,000, payable at 15 rupees to the pound instead of 12. The Government were aware of this state of affairs, and could have called a halt, and asked for a re-examination of the estimate before the dredger was ordered had they wished to do so, but presumably the scheme was looked upon as so urgent and so profitable that a few hundred thousand pounds divided into 1,140 acres of land was a comparatively negligible factor, and I had not then nor have I now any doubt as to the scheme's practicability from an engineering point of view.

The Chief Engineer's Revised Estimate of 1921.

85. On the 18th July, 1921, I wrote to Sir Lawless Hepper, and said that on my arrival in India in November, 1921, I should like to go into the matter of revised estimates for the Back Bay scheme, as there was no doubt that since my estimate of September, 1919, prices had gone up by leaps and bounds in India, especially in labour rates, but that I thought there would be a reaction, the general opinion in England being that within a measurable time it would be possible to carry out all civil engineering works at 50 per cent. over pre-war prices. In August, 1921, we were astonished to receive from the chief engineer revised estimates for the Back Bay scheme amounting to 7 crores of rupees, and on the 9th August we sent him the following cablegram :—

> " Please inform director we deprecate acceptance of your estimates either of cost or time of completion, and are seriously concerned at the same. We consider any revised estimates at this stage quite impracticable. In six months partial and in two years complete revised estimates possible. Your figure moorum seems most excessive in view of latest proposals, and we see no reason seriously to depart from our figures for dredging. Cost of stone depends upon total quantity used on all works of department, and cannot be ascertained for number of years. Letters to director and yourself follow."

On the same date we wrote to the chief engineer, and said that whilst we realised his difficult position in being asked for revised estimates at 24 hours' notice we thought it manifestly wrong to treat those estimates as official, as it was little short of lunacy to try and prepare estimates at this stage. We received in reply to our cablegram a letter from the chief engineer, dated 19th August, 1921, saying that the estimates were required for political purposes, and were given by him on the understanding that they were not binding, and he had also stipulated that they should not be published. Further, it was necessary to have an estimate which erred on the high side.

86. On the 9th August, I wrote to Sir Lawless Hepper and said we were seriously concerned at the revised estimates received unofficially from the Chief Engineer, and we thought the whole scheme might be gravely prejudiced by the preparation of revised estimates at this stage. Sir Lawless Hepper replied, dated 31st August, that he did not think we need be seriously concerned about the rough revised estimates. There was so much criticism and such an insistent demand for information as to the probable cost of the reclamation that Government felt it was necessary to give a general idea without details.

My Revised Estimate of 1922.

87. Shortly after my arrival in Bombay in 1921, I wrote to the Chief Engineer dated 18th December, 1921, in the following terms :—

> " The original estimate prepared by me in 1919, amounted to 367.61 lakhs of rupees and in sanctioning the project the Government of India increased the amount to 4 crores of rupees.
>
> I recommended that the whole work of constructing the wall should be let by contract if a suitable tender were received, but the general conditions following the war were such that a contract on pre-war lines was found to be impracticable

and the work is now being carried out departmentally under your immediate charge and direction.

All prices of material and labour advanced rapidly between the date of my original estimate and the date the work was finally sanctioned and put in hand, a complete revision of my estimate is therefore required.

Mr. Meik and I have discussed the matter fully and we are of opinion that although at this stage of the proceedings a final estimate is impracticable, it is nevertheless possible and highly desirable to substitute a more up-to-date estimate for that prepared in 1919, more especially as a great deal of preliminary work has been completed and practically all the machinery and plant has arrived.

We do not propose to give any more detail in the revised estimate than in the original one, but in order to arrive at the total quantity of the various items and the prices to be placed against each it will be necessary to examine the detailed cost of the work completed and in hand, and we shall be very glad if you will assist us in obtaining the necessary information. I have in the accompanying notes indicated broadly what seems necessary. Perhaps you will kindly look through them preparatory to a discussion with me on the whole subject.

In connection with the report I am making to Government on the progress of the works, will you be good enough to furnish me with a complete schedule of establishments and salaries as on a work of this nature I hold strongly the opinion that supervision, and especially skilled engineering supervision, should be ample both as regards quantity and quality."

88. From information thus supplied I prepared a revised estimate amounting to 668,98 lakhs gross and 598,89 lakhs net after allowing for recoveries for value of machinery and plant. This estimaate accompanied my report dated 11th February, 1922, and Sir Lawless Hepper has in his evidence made statements in this connection which are so misleading as to amount to untruths.

Development Directorate's Estimate of 1922.

89. I was of course aware that the Chief Engineer was preparing his detailed project estimate in accordance with the ordinary Public Works Department procedure, but that was apart from our estimate as engineers for the works, and on the 4th July, 1922, the Director of Development forwarded us a printed copy of the complete project estimate prepared by his Chief Engineer and intimating that it was being submitted to Government for sanction but that Government would be glad to have any criticism we desired to make. We replied on the 26th July, 1922, and refused to accept the estimate which, we stated, was excessive, requiring careful examination and a great deal more information before it could be passed. We also remarked that in our opinion the estimate should not have been submitted to Government prior to our criticism. No action was taken by the Director of Development regarding our protest, and the project estimate was in due course formally sanctioned by Government and became the recognised working estimate, whilst the date for beginning dredging operations was postponed to 1924-25, and the completion of the whole scheme to 1931. It was not our estimate; we considered it extravagant and it has never had our approval. Incidentally I may point out that in the report accompanying the estimate and in the estimate itself, my firm were styled the "Consulting Engineers."

90. Sir Lawless Hepper in Appendix A of his statement has given a comparison between the cost of the works as provided in the sanctioned project prepared by his Chief Engineer and his new estimate, and in his evidence he points out that there is a saving on the estimates other than those connected with dredging amounting to some 35 lakhs of rupees. In point of fact, this absolutely proves our case that the estimate was an excessive one, because, notwithstanding the extravagance of the Development Directorate in the execution of the work, a saving has been shown, but that saving, it might be pointed out, is largely because of my action in cutting down expenditure on the permanent wall and cross walls.

In the above connection I would point out that nothing is easier than to over-estimate the cost of a work and thereafter take credit for savings, but the word savings is a misnomer.

Estimate of Advisory Committee, 1925.

91. Lastly, I come to the estimate accepted by the Special Committee appointed by the Government of Bombay in January, 1925, to inquire into the activities of the Development Department, the chairman of the Committee being Sir Lawless Hepper, the Director of the Development Department. The Special Committee appointed a sub-committee, also under the chairmanship of Sir Lawless Hepper, to examine in detail the financial prospects of the Back Bay Reclamation Scheme. This Sub-Committee

took as a basis the figures for dredging in 1923-24, 1924-25, and observed in their report, " On this basis the Chief Engineer now estimates the cost of the whole scheme at 11 crores and the date of completion 1944-45." In effect the filling *will take* four times as long and cost about four times as much as it would have done if Sir George Buchanan's estimate of output had been attained. The Special Committee accepted these figures, and when their report, dated 1st January, 1926, was published to the world, my name was coupled with it as an example of engineering inefficiency, and in a letter to the Secretary of State for India dated 12th February, 1926, my firm expressed surprise at the publication of the report, and said, " We most emphatically decline to accept the reported conclusion of the Committee as to cost and time of the completion of the work."

92. I will now quote from the evidence given by Sir Lawless Hepper, the Director of Development, and Mr. Elgee, the Chief Engineer, as it appears in the report of the proceedings of your Committee.

Sir Lawless Hepper, 4th August, 1926.

Q.—A sub-committee's report mentioned another estimate for 11 crores. Where does that come in?

A.—That is an estimate prepared for the sub-committee. It is an approximate estimate only, prepared by the chief engineer in July, 1925, to show what the probable cost of completing the reclamation would be, assuming that the results of dredging would be no better than they were in the season 1924-25.

Mr. Elgee.

Q.—In the Director of Development's notes, he gives a total estimate of 9,27 lakhs in his advance statement. I cannot reconcile these figures. Can you explain to me the difference between that and your estimate of 11,00 lakhs?

A.—The 11 crores estimate was based on the season's dredging of 1924-25, as they were the only figures we had to go upon. We were ordered to prepare an estimate on that basis. The whole of the work must be carried under that 11 crores estimate.

Q.—Is this 927 lakhs a revision of the 11 crores estimate?

A.—Yes, that would be a revision.

Q.—What is this based on? Why is it so much less?

A.—The difference is 2 crores, i.e., 1½ millions sterling.

Q.—One gets nauseate with these figures. You are putting Government in an awkward position. One month you are giving the cost as 9,27 lakhs; shortly afterwards you are giving the cost as 11 crores?

A.—It was all based on certain figures.

Q.—Then it is not the Engineers' estimate?

A.—It is not. It was on a very pessimistic view, it was based on the season's dredging which we knew could be improved. I do not call that an estimate (the 11 crores) although we had to put up that figure.

Q.—Who wanted it to be put up?

A.—That was prepared by the Advisory Committee.

Comment on this evidence is unnecessary.

Management and Control.

93. The work is being carried out by the Bombay Development Department and Sir Lawless Hepper, the Director of Development, is the executive head of the department. He is assisted by a staff of engineers and my firm had the nomination of the resident engineer, who would supply such information as was required and supervise the permanent work.

The position is aptly described in a pamphlet on the Development of Bombay written on behalf of the Development Department by Mr. St. Nihal Singh and to whom it is stated every facility was given by the Department.

" So that the work would be pushed through at the maximum speed, the Government created an independent department, known as the Development Directorate, to take in hand new projects. An engineer with long experience of railway administration (Sir Lawless Hepper) was placed at its head, and with him was associated a civilian of remarkable financial ability (Mr. P. W. Monie). Men who had made their mark in various branches of engineering were appointed to the various posts. A well-known British firm of engineers (Messrs. Meik & Buchanan) was retained to offer advice in regard to the reclamation work. A

distinguished British town planner (Mr. W. R. Davidge) was engaged to advise the Directorate on the remodelling of the old areas and the laying out of the new settlements. Government thus provided an efficient executive agency, in the Development Directorate, to carry out the work; whilst the control of Government over its operations was secured by attaching the Directorate to a regular Department of Government, known as the Development Department, under the Honourable Sir Chimanlal Setalvad, Member of the Executive Council; the Deputy Director of Development being also Secretary of Government in the Development Department."

94. Sir Lawless Hepper was officially appointed on November 8th, 1920, but previous to that date he had taken an interest in the work and assumed responsibility. In February, 1920, he was consulted and agreed to the proposal that Colonel Grisewood's syndicate should be given a contract for the first section of the wall. In August, 1920, he had attended conferences in our London office and agreed to the proposed programme of operations. When the works were begun nothing was done without his knowledge and consent. He sanctioned estimates prepared by his engineers and arranged contracts for the supply of cement and other materials. He scrutinised schedules of establishment and accepted tenders for works which were not within the powers of his own chief engineer. The Director was assisted by a Secretary to Government and a financial adviser, but so far as we were concerned, we regarded the Director of Development as the head of the department and we corresponded with him as such. There was an Advisory Committee of representative public men in Bombay, appointed by Government from whom the Director could obtain advice if necessary, but I was never asked to attend a meeting of the Advisory Committee and I think I only saw them on one occasion, the 16th February, 1922, and then I was not introduced to the members. I am not sufficiently acquainted with the working of the Director's office to say to what extent he was hampered by having to refer to the Member of Council in charge of the Development Directorate, but, from my general knowledge of Indian procedure, I should say that his difficulties must have been considerable. Certainly my own interviews with the hon. members in charge of the Department did not inspire me with confidence.

95. The Director had also to keep an eye on the political barometer as the work was being carried out under the shadow of an intense general and political hostility. Both the Director and the Chief Engineer frequently commented to me both verbally and in writing on the persistent hostile criticism that the scheme had received from its inception. This hostility extended to my firm. When I was staying with Sir George Lloyd at Ganeshkind on the 31st August, 1923, he told me that there were, I think, four different resolutions tabled in the Legislative Council giving alternative proposals to abolish us or reduce our fees. On the 1st August, 1923, Sir Lawless Hepper discussed the same subject with me.

96. An important matter we had to consider if the work was to start at an early date was to find a competent engineer, and good men at that time were exceedingly scarce. I had recommended in my memorandum dated 3rd December, 1919, the appointment of an officer who had served under me as my executive engineer on the Rangoon River training works, who had accepted a tentative offer in January, 1920. At the last moment, however, he decided to remain in Rangoon. In view of the urgent demand that the work should at once be put in hand this considerably upset my plans, but I finally decided to offer the appointment to Mr. L. W. Lewis, a chief engineer in the Indian Public Works Department, at that time stationed in Burma, and who had served under me both in Rangoon and Mesopotamia. I considered I was very fortunate in obtaining Mr. Lewis' services, and I wish to testify to the most excellent work performed by him up to the time his health broke down. He had the entire organisation and control of a very large quarry in connection with the Rangoon River training work and therefore knew exactly what plant to order for the quarry at Bombay and all contingent arrangements for housing workmen, &c. Mr. Lewis was appointed in June, 1920, and it was decided that after inspecting the works, and particularly after deciding on a site for the quarry, he should come home and prepare schedules of the plant he required to be purchased and despatched to India. Mr. Lewis arrived in London towards the end of July, 1920, and Sir Lawless Hepper, Mr. Lewis and ourselves had a long conference in the month of August on general matters connected with the scheme. Accommodation was given to Mr. Lewis in our office. We helped him with our advice but he was free to make his own detailed programme.

97. On the 25th August, 1920, I left for Bombay via East Africa and Mr. Lewis remained in our office getting the direct assistance of the late Mr. C. S. Meik in everything connected with the ordering of plant. On the 16th November, 1920, Mr. Meik wrote to me in Bombay as follows:—

"As no doubt Lewis has told you, he has now got the orders placed for practically the whole of the machinery, including the cranes.

"In the matter of the cranes, I have been into the whole question with Lewis and we have come to the conclusion that it would be better to defer ordering the cranes to deal with the concrete blocks until it is ascertained whether or not we are going to get really sufficiently large stone from the quarry to protect the sea face. I enclose you a memorandum that Lewis has handed me in this connection and with which I cordially agree. There is no doubt that if we can get stone of large enough size from the quarry it will mean the saving of a great deal of money."

98. In December, 1920, Sir Lawless Hepper, Mr. Lewis and I met in Bombay. In the same month the Development Directorate came into being. I do not know at what particular date the resident engineer became chief engineer for all schemes of reclamation, including those for which we were not the engineers, but we were not satisfied with the change, nor did I think the headquarters of the Development Directorate in the old Customs House should have been the office of the Chief Engineer, Back Bay Reclamation Scheme, and a number of his staff. I expressed my views to Sir Lawless Hepper on this point. I considered that Mr. Lewis was thereby detached from the work and I held that his office should have been in a central position on the site of the works. Presumably he was placed in the head office so as to be near his chief, the Director of Development.

Accounts.

99. I was very disturbed to find on my visit to Bombay at the end of 1921 that no cost accounts were being kept and that no one knew in any detail what the work was costing. Accordingly, I addressed the Chief Engineer on the subject, and on the 21st January, 1922, received the following reply :—

"*Ref. your letter dated the 7th instant.*

"I forward herewith in original the Audit Officers' letter No. $\frac{\text{W-40}}{336}$ dated the 17th instant, together with the statement referred to for information.

"May this statement be returned to this office when finished with."

"No. $\frac{\text{W-40}}{336}$

"With reference to your No. 4946 dated the 12th instant, I have the honour to forward herewith a statement showing the total expenditure to the end of October, 1921, on works, establishment, &c., on several sections of the Back Bay Reclamation Scheme :—

"Expenditure incurred on—

(1) Machinery obtained from home,
(2) Materials, and
(3) Labour charges,

is not available."

100. On the 22nd February, in my report to the Director of Development, I raised the whole question in the following terms :—

"*Engineering Accounts.*

In addition to an efficient engineering staff, the success from the point of view of economical execution of a work carried out departmentally depends upon the proper keeping of accounts.

As previously stated, the practice in India is to have a project estimate prepared by the engineers and sanctioned by competent authority before the work is put in hand, and this project estimate and subsequent works estimates are placed in the hands of the Government Accounts Department who, through their auditors, scrutinise all statements of expenditure submitted by the engineers and check each item against the sanctioned head of account, at the same time furnishing the engineers with debits of various kinds which may not have reached them at first hand.

An engineer is not thereby absolved from the responsibility for his accounts, but the check acts as a safeguard because any irregularity or excess on a head or sub-head of the estimate should be brought promptly to his notice by the receipt of an objection statement.

The engineer's accountant although under his orders is appointed by the Accounts Department and much depends upon his qualifications.

A good accountant should be more than a mere recorder of figures. He should be able to assist the engineer by the analysis of costs under many sub-heads which do not necessarily appear in the project estimate.

34. The practice in England differs from that which obtains in India. Works are sanctioned on estimates to which in India only administrative sanction would be given but whether the works are executed by contract or departmentally the engineer has to be in close touch with costs from day to day from beginning to completion of the works and by means of a competent accounts staff and a reliable system of cost keeping as differentiated from account keeping the engineer knows exactly where there has been excess on the smallest sub-head of his estimate or where money has been saved.

Both Indian and English systems have their good points and that in India is the result of many years' experience. I have worked with both and venture to suggest that a weak point in the Indian method is that works accountants are frequently not more than figure-recording clerks and when as a member of the Indian Munitions Board I was in control of the Indian Ordnance Factories, we entirely reorganised the accounts system, with the co-operation of the Accounts Department and in each factory accountants receiving perhaps Rs. 100 to Rs. 150 per month were replaced by Indian accountants of much more experience and receiving three and four times the pay who were capable of assisting superintendents in practical cost analysis.

35. My excuse for writing at length on this subject, apart from its general importance, is that the accounts of the Back Bay Scheme do not appear to be kept on either one or the other of the systems, described above. Although works estimates have been made, there is as yet no sanctioned project estimate. The chief engineer keeps no accounts nor has he been furnished with up-to-date statements of expenditure by the accounts branch in order that he may see how matters stand. In this connection I wrote to the chief engineer on the 7th January, asking to be supplied for the purpose of this report with a statement in some detail giving the total expenditure on the project up-to-date or reasonably so, the chief engineer asked the Accounts Department for the information and on the 21st January I received a statement of expenditure up to the end of October which can hardly be called up-to-date nor did it contain sufficient detail to be of any practical use.

36. The accounts are kept on what is known as the pre-audit system which means, as the name conveys, that no payments are made until the accounts have been audited and one of the chief recommendations for the system is that the audited accounts are supposed to be always written up-to-date.

Under such a system there is no object in the chief engineer keeping account books but it is of the first importance that he should be furnished at least once a month with an up-to-date statement of expenditure on all heads of account whilst each deputy chief engineer should be able to rely upon a current audit and the prompt supply of all debits against his estimates."

101. This was followed up by a letter from my firm dated 13th April, 1922, to the Director of Development, in which they said they desired to endorse and emphasise my remarks as it was impossible to exercise economy without a proper system of cost accounting. In a letter dated the 15th March, 1922, the Director of Development acknowledged receipt of my report dated 11th February, and said the various questions would be taken up with the chief engineer and in a letter dated 12th May, 1922, Sir Lawless Hepper observed :—

" The remarks about accounts, and also about additional engineering staff, in your report, were referred to Lewis immediately, and he was asked to consider them and to submit any recommendations he had to make. So far he has produced nothing, but he promises to let me hear before he leaves."

Subsequently the chief engineer reported in terms as under :—

" (7) With reference to paras. 33-36. I agree that the Audit as at present worked does not give us the information necessary for an economical control of the work from day to day. I had arranged with Mr. Bailey that I should be supplied with a statement monthly showing expenditure under the various accounts heads up to the end of the previous month.

For a long time the last account rendered remained that of the 31st October. Lately I pointed this out to Mr. Bean personally and I have since received statement for November and December, 1921. I am, therefore, without information as to expenditure during four months of this year.

(8) The deputy chief engineers find similar difficulties and it is not easy for them to know how they stand. I am informed that the audit department frequently ask the deputy chief engineers how accounts stand, which should be unnecessary. The system is apparently good enough for the audit but it does not give the deputy chief engineers information as to how costs are working out."

No action was taken by the Development Department until the 30th August, 1922, when a letter was addressed to the Government of India in the Financial Department suggesting that when I next arrived in India a senior officer of the Accounts and Audit Department should be deputed to investigate the matter on the spot in consultation with the Development Directorate, myself, and the Audit Officer, Bombay Development scheme.

102. On the 3rd October, 1922, the Government of India in the Finance Department replied sanctioning the proposal and in January, 1923, exactly a year after I had first raised the question, an officer arrived in Bombay for the investigation. In due course this officer wrote a report. He said that he had interviewed Sir Lawless Hepper, Sir George Buchanan, the Secretary to Government in the Development Department and the Chief Engineer, Mr. Lewis. He had been requested to look into the system of accounts and to report whether, without introducing an entirely new system, any modifications could be made showing analysis in greater detail, and so evolve a system of costing of the various processes. He pointed out that the present system of accounting was that in use in the Public Works Department. The sections sent in their bills properly allocated and the Audit Office watched the expenditure against the grant and estimate. A costing system would only be of use to the Executive and of no use to the Audit Office and he suggested that the present audit system remain unaltered but that a system be introduced which would be of the greatest use to the Deputy Chief Engineers in charge as it would be of a technical nature and would enable the Deputy Chief Engineers to watch expenditure over each process and to effect economy. I do not know precisely what happened as a result of this report. I think that accounts officers were sanctioned and afterwards removed, but the net result so far as I am aware has been that at no time has there ever been a reliable system of cost accounting such as any contractor or business man would insist upon as a matter of course unless he wanted to go bankrupt.

103. The incident has more than local interest. I have always entertained the idea that a weak point in the execution of Public Works all over India is the absence of a cost accounting system. At present, as was pointed out by the Public Works accountant, all that the Audit Office requires is correct allocation of bills and expenditure on every head within the sanctioned estimate. That the estimate may be far too high and that great savings could be effected by an attention to cost accounting does not concern the Audit Department and does not under the system concern the Engineer. The Chief Engineer for all reclamation schemes was under the direct orders of the Director of Development but so far as the Back Bay Reclamation Scheme was concerned he also had duties to my firm. As the man on the spot carrying out the work under the Director of Development he had a free hand, subject to the control of the Director, in all matters connected with the actual execution of the work. We had no authority to interfere with his discretion but in the words of our agreement we were at all times to assist and advise the Government of Bombay in all matters relating to the execution of the work, and the Director was at liberty to accept or reject our advice. On the other hand as regards the permanent work we desired full information as to progress and cost and we desired also progress plans, surveys and reports, which the chief engineer in his capacity of resident engineer was to supply.

104. Some time in 1921 the health of Mr. Lewis showed signs of giving way. He was laid up for three weeks in June, 1921, and on the 11th August, 1921, Sir Lawless Hepper wrote that he had been away for ten days as he was not very fit. As time went on we began to get very anxious indeed about the work. We were getting no information of any kind from Bombay and it appeared to us that the job was going to pieces and we felt we were being pushed out of our position as engineers to the work, and were regarded as people whose opinion would be asked if and when the Director and his engineers thought fit to do so. On the 11th April, 1922, I wrote to Sir Lawless Hepper and said, " I am much distressed to receive a letter from Lewis by this mail written from St. George's Hospital and I wonder if you are taking any action on the lines I suggested to His Excellency and to yourself. Possibly as his leave is nearly due you are letting him carry on to that date especially as it would be difficult for him to get a steamer passage by an earlier boat. On the other hand if you had Lewis examined by a Medical Board before he leaves India and they reported unfavourably he would not be able to return to India from leave without a clean bill of health. We feel very strongly that in the interests of the work there should be no chance of a repetition of this disastrous year of sickness."

105. Early in April, 1922, in a letter to the chief engineer we challenged an indent for a quantity of machinery and rolling stock aggregating in value over £90,000. We said we fully understood that as the work was being done without a contractor great weight must be attached to the wishes of the engineer on the spot in the matter of plant and plans for execution, and we had no desire in any way to hamper him. On the other hand it should be remembered that in addition to the actual capital cost of

the plant, interest for many years had to be paid, and it was desirable to economise, wherever it was possible to do so, without interfering with efficiency or with speedy execution. On the 11th April, 1922, I wrote to Sir Lawless Hepper on the same subject and concluded my letter by remarking we had pointed out that we had no wish to interfere with the discretion of the men on the spot or in any way to delay the work, but that in the interests of economy we thought his estimate might be cut down. In a letter dated 12th May, 1922, Sir Lawless Hepper replied, "I went through the question about rolling stock, etc., with Lewis and the result was the cablegram he sent you. With the exception of the portal crane for Colaba it seemed to me to be advisable to order the plant."

106. The plant was then ordered, the responsibility resting with the Director of Development. In this connection I think that there is no doubt "Higher Control" in the Development Directorate were imbued with the idea that the Back Bay Reclamation Scheme was a potential gold mine as in July, 1923, Sir Lawless Hepper showed me a financial statement of the Back Bay Scheme which estimated that by the year 1938 all charges against the works would have been paid off and there would be a cash surplus of 370 lakhs of rupees. I wrote to my partner on the 26th July, 1923, and remarked that I could now understand why Sir Lawless Hepper was not worrying very much about plant, economy, etc.

107. On another occasion I pointed out that the wagons were not being fully loaded at the quarry, thus delaying the work and increasing the cost. I gave examples and pointed out that one 20 ton wagon contained one stone weighing one ton, i.e., the cost of transport of that one stone was 20 times in excess of the estimate.

108. On the 27th April, 1922, I wrote again to Sir Lawless Hepper and said, "We have had no news from Bombay since the 24th March, when Lewis wrote me a demi-official letter from St. George's Hospital and for all that I know he may still be there." On the 12th May, 1922, Sir Lawless Hepper wrote as follows:—"Your letters of 11th and 27th April, Lewis was in hospital for several weeks and has not been at all fit since he came out. In his present condition, he is not up to the job. He will go before a Medical Board before leaving and will, of course, have to be passed fit by the Medical Board at the India Office before he returns." In a letter dated 3rd June, 1922, I wrote to Sir Lawless Hepper as follows:—"There can be little doubt that Lewis' health has broken down seriously and in the opinion of Mr. Meik and myself you would do well to have him examined at home by a Medical Board for an expression of opinion as to his fitness to continue hard work in the East." I went on to say that we had observed that there appeared to be a tendency on the part of the Chief Engineer to keep us in the dark and use us merely as agents for the purchase of plant. On the same date we wrote an official letter to the Chief Engineer (enclosing a copy to Sir Lawless Hepper) and said, "a veil appears to have dropped between us, and since Sir George Buchanan left Bombay on the 25th February, we have practically had no news of any kind as to the progress of the works. We concluded our letter with the following remarks:—

> "Finally we would say that we fully appreciate the difficulties you are encountering in carrying out departmentally a work of such magnitude and we should be the last people to contemplate adding to those difficulties.
>
> We know that in the matter of details in connection with the execution of the works you are taking the place of the contractor, and as far as possible the man on the spot must be allowed to use his unfettered discretion. That need not, however, prevent your keeping us fully informed as to the progress and cost of the works and asking us to advise on all matters where you think you would be benefited thereby, because it is impossible to ignore the fact that under our agreement with the Secretary of State we are appointed the engineers in carrying out the scheme and in the construction and execution of all works connected therewith until their final completion, and we are specifically instructed to assist and advise the Government of Bombay in all matters relating to the execution of the works and to perform all works and duties devolving upon engineers of large works."

109. In a letter dated 8th June, 1922, to Sir Lawless Hepper in reply to the one received from him dated 12th May, I said, "Your letter amply confirms the fears I have already expressed in my letter of the 3rd June, and there is not the slightest doubt that a drastic change is necessary in the administration and execution of the works, and if Lewis either through illness or other causes is unwilling to carry out our instructions it will be better for everyone if he does not return." Under date 4th July, 1922, the Director of Development replied to my letter of 3rd June. The following are extracts from his letter.

> "I was under the impression that you were being kept fully in touch with the work, and that all plans and designs were being referred to you for approval.

Instructions are being issued to the Chief Engineer which will, I think, obviate any cause for complaint in the future.

In particular the Chief Engineer is being informed that all designs for important parts of the work require your approval, and this should be held to extend not only to the design of the sea wall itself, but to all connected works such as the numerous culverts which have to be constructed in it for storm water, drainage, etc.

Again the questions of storm water drainage, sewage, lighting and roads in the reclaimed area itself are likely to be more important, and to involve much more expenditure than was anticipated, and the proposal and plans connected with these services will be submitted to you.

The Chief Engineer is also being asked to send you a weekly demi-official letter on the progress of work, and to maintain a proper photographic record."

I may observe here that the weekly demi-official letters promised by Sir Lawless Hepper were never sent to me.

110. Mr. Lewis went on leave some time in June, 1922, and returned to duty in October, 1922, and during my visit to Bombay at the end of 1922 the question of the relation between the chief engineer and ourselves was discussed at a conference on the 4th January, 1923, with the Member of Council in charge of the Department, Sir Lawless Hepper and myself, when it was decided that in order to ensure better co-ordination all correspondence between the Engineers and the Chief Engineer, Reclamation Branch, should in future be addressed through the Director of Development. This was to ensure that Mr. Lewis carried out his duties towards my firm, which under the circumstances were by no means onerous and could have been carried out without friction given the willingness to do so.

111. I next visited Bombay on the 13th July, 1923, and left on the 11th August, 1923. In a note descriptive of my visit I recorded the extraordinary difficulties I had experienced in the performance of my duties, and I had already pointed these out several times to Sir Lawless Hepper and shown him my notes. On the 30th August, 1923, I wrote to Sir Lawless Hepper from London and said we had come to the conclusion that in the interest of the work arrangements should be made for the retirement of the Chief Engineer at the earliest possible date, and on the 6th September, 1923, my firm wrote officially to the Director of Development and pointed out that Mr. Lewis's health had given way and that he was not fit to remain in charge of the works. The following is a paragraph from our letter :—

" Mr. Lewis no longer possesses our confidence. We believe he has done good work in his time but it is quite evident that there is now something wrong with him, possibly he is still suffering from bad health or he is too old for the job ; he appears to have no grip of the works ; there is no co-ordination or planning out ahead, and we are convinced that in the interest of the work an immediate change is necessary."

112. Sir Lawless Hepper replied to us under date 30th November, 1923, and confirmed the following cable, which had been sent to us on the 19th November :—

" Your letter of the 6th September regarding Lewis's services. Lewis has intimated that he proposes to take eight months' leave due to him next July preparatory to retirement. After careful consideration Government consider it desirable to accept his proposal as settlement of question ; telegraph if you concur."

113. Mr. Lewis relinquished his appointment on the 12th July, 1924. In my judgment, and in the judgment of my firm, it was a mistake to have allowed him to return to duty after his leave of May, 1922. I am in no sense blaming Mr. Lewis. I found him in Burma and in Mesopotamia to be an engineer of ability, but his health had completely broken down, and he was clearly unfit for the responsibilities attaching to his appointment.

114. That Sir Lawless Hepper was aware of the way in which work was suffering is clear from the correspondence. For instance, in a letter dated 12th May, 1922, he said :—

" After endless delays the railway to Colaba has been begun and I hope that under a different *régime* it may be possible to get it finished by October."

And on the 8th of June, 1922, I replied :—

" I am very disappointed to hear from you that the railway to Colaba is just begun, because so far as I am aware there was nothing to prevent it being by this time very nearly finished."

The degree of disorganisation reached was discussed between us whenever we met, and latterly, as has been shown, all correspondence with the Chief Engineer passed through Sir Lawless Hepper's hands. As a consequence of Mr. Lewis's illness, the

lack of a business-like system in the Bombay office, and an atmosphere of hostility more easily felt than describable by a visitor from London, the work was an unhappy one for all concerned. There was a series of watertight compartments; the Chief Engineer's deputies never conferred with each other, and were in complete ignorance of what was going on in any section except their own. The essence of this work, if it was to be the success planned for, was despatch. The construction of the wall was hurried on; the delivery of the dredger was hastened. These were measures of despatch, undertaken by Sir George Lloyd (now Lord Lloyd) without the help of the directorate. Other measures to expedite work were possible, but none were undertaken. The revised estimate of 1922 contemplated a prolongation of the work, apparently without dismay, to the year 1931.

I naturally take a great interest in and enjoy visiting works with which I am concerned, but I have no hesitation in saying that I always felt in Bombay that I was up against a colossal apathy unique in my experience. The best staff in the world would have been ruined in like circumstances.

115. In my report dated 10th January, 1923, I commented upon the lack of staff co-ordination as follows :—

> " Speaking generally, I am of opinion that the works have made fair progress considering the difficulties experienced, and the shortness of staff, but I doubt if there is sufficient planning ahead and co-operation between the Chief Engineer and the Deputy Chief Engineers. If the latter are not kept fully informed as to the general programme of the work it makes it very difficult for them to look ahead in their plans and arrangements. Conferences held at frequent intervals are of great benefit to works under construction, and promote mutual confidence among the members of the senior staff.
>
> " The Engineer in charge must of necessity look many months ahead of the works and cannot spare the time for daily details. The Deputy Chief Engineers in their turn must also spend part of their time preparing the work a few weeks ahead, and the assistants confine themselves to the daily routine duties.
>
> " In particular, the annual programme of work should be worked out in the greatest detail in close conference with the officers concerned, otherwise smooth working is impossible. At the same time I discussed the matter personally with Sir Lawless Hepper and the Chief Engineer, and tried to impress upon both of them the necessity for engineering conferences."

In a letter dated 9th August, 1923, to Sir Lawless Hepper, I said :—

> " In conclusion, I would invite a reference to paragraph 11 in my report to you dated 10th January, as I am still of opinion that more co-operation between the Chief Engineer and his deputies and more joint conferences would tend to facilitate the work."

Sea Wall.

116. There was an idea prevalent in Bombay that an exceptionally strong wall would be required in Back Bay to withstand the force of the monsoon sea and Mr. Kidd had proposed a solid upright concrete wall for the length exposed to sea attack (9,300 feet) and rubble stone embankment protected with 20-ton concrete blocks for the remaining 12,924 feet. Mr. Meik and I disagreed with Mr. Kidd as to the force exerted by the sea and designed a stone rubble embankment protected on the sea side by 20-ton concrete blocks. As soon as the project was sanctioned Sir George Lloyd was as already explained anxious that the work should be put in hand with the least possible delay and the month of October, or at latest, November, 1920 (by which time the monsoon would be over) was fixed upon as the date to be aimed at. It was possible to do so and in a letter to Sir Lawless Hepper dated 27th February, I repeated what I had already said in a letter to Mr. Monie, viz. : that after due and prolonged consideration it was my conviction that if the work was to be started by November there was no other way to do it than by giving a contract to Colonel Grisewood's syndicate (the Indian Construction Company) for the first section, as they were on the spot and had a staff ready to hand. After I left Bombay in 1920 a contract was arranged with the Company but on further consideration it was withdrawn and the Governor in Council decided that the work should be carried out departmentally. It had also been decided by the Government of Bombay to begin the work at both ends and I had received instructions from the India Office to that effect. It was now apparent that the work could not be begun during the fine weather of 1920-21 and in August, 1920, Mr. Meik and I had a long conference in London with Sir Lawless Hepper and Mr. L. W. Lewis as to the best methods of procedure.

117. A memorandum dated 12th August, 1920, by my firm was considered by the conference. We said that having regard to the fact that the work was to be carried

out in two places simultaneously the most suitable and speedy manner would be to let a contract for the 8,000 feet of wall from Colaba Point (known hereafter as the Colaba contract) and to carry out the remainder of the work departmentally making use of contractors for small contracts and piecework. We proposed to construct the 8,000 feet of wall from Colaba Point entirely of concrete blocks, not on account of the strength of the sea but because the foundations for the whole wall would be on the solid reef which was exposed at low water rendering construction easy. We considered the work lent itself to execution by contract and we proposed that tenders be invited publicly by advertisement in the Indian press. Our proposals were agreed to and my firm prepared complete specifications, forms of tender, schedules of rates and contract drawings for the work. Tenders were in due course received from Messrs. Pauling & Co., Ltd., Messrs S. Pearson & Son, Ltd. (Sir Frederick Hopkinson's firm), the Indian Construction Syndicate (Colonel Grisewood's firm), and I believe several other firms, but I have not beside me any particulars of the tenders.

118. There was a special meeting on the 8th February with Sir Lawless Hepper, Mr. Lewis and myself to consider tenders received. I have not the proceedings of the meeting but so far as my recollection goes we unanimously considered that for various reasons the work could better be done departmentally. Meanwhile I had been giving the subject serious consideration from other points of view and I came to the conclusion that in the interests of economy it would be better to dispense altogether with the block wall and to revert to the scheme for a rubble wall throughout. I discussed the matter with the Chief Engineer, Mr. Lewis, who was greatly taken with the idea.

119. The present state of affairs is that 8,000 feet of wall from Marine Lines has been completed, the method of construction being to tip whole trains of stone from a timber gantry and when the rubble mound has reached the required height to build thereon a concrete superstructure. The work was carried out so far as we are in a position to know in accordance with the specification furnished by my firm, and we stipulated that if stones of sufficient size could be obtained from the quarry the 20-ton concrete blocks could be dispensed with. At the Colaba end 11,778 feet of wall have been practically completed. As the depth of rubble was small the rubble mound was built by means of end tip wagons. I had frequently to criticise the construction and to draw attention to our specification for work and material. There is now only a gap of 1,800 feet to complete the whole length of the wall.

120. When I went to Bombay in 1924, I took with me detailed drawings for the completion of the parapet, &c., and in a letter dated 8th January, 1924, I sent them to the Director of Development for his consideration. On my next visit to Bombay in December, 1924, I drew the attention of the Director of Development to the time that had elapsed and again asked which alternative the Government approved. A reply was sent to us on the 17th December, 1924.

121. I consider the wall a success although I do not believe it was carried out strictly in accordance with our specification and it has cost more than was necessary. In this connection the particulars of cost given by Sir Lawless Hepper in his evidence are absurdly inaccurate, and the statement of Mr. Elgee that he had no specification to work to can only have one meaning, viz., that he, the Engineer responsible for this most important work, was not placed in possession of the specification, and that therefore he was proceeding blindly where an expenditure of many lakhs was involved.

Storm Water Drains.

122. It is assumed in the evidence, why, I do not know, that we forgot or neglected the question of storm water drains.

In my estimate dated September, 1919, I put down 79 lakhs for roads, drains and lights, Mr. Kidd having allowed 59.45 lakhs, and in my memorandum dated 15th February, 1921, I observed " a work which is not urgent but must be arranged for is the prolonging of the storm water drains from the present sea front to outside the new wall," and in a letter at the beginning of February, 1922, to the Chief Engineer I observed as follows :—

> " I enclose herewith copy of the revised estimate of the Back Bay Reclamation Scheme. Roads, lights and drains was originally estimated at 59.45 lakhs and increased by me to 75 lakhs. I have retained the latter figure as the general lay-out has not been settled, and although prices are still uncertain, if anyone can judge by what is going on elsewhere, they should have dropped considerably by the time the scheme is sufficiently advanced to build roads on the reclaimed area."

123. It should be borne in mind that it was not possible to design the drains, Cross bunds or locate main roads until more was known about the lay-out of the reclaimed

area, and the preliminary scheme of Mr. Davidge, the expert town planner, was not received by me until March, 1922. After the lay-out had been received and approved by the Development Directorate we wrote to the Chief Engineer and asked for certain sections and levels in order that we could take up the question of the storm water drains, and on the 14th September, 1922, the Acting Chief Engineer wrote that he hoped to send us the plans and sections of the storm water drainage area in about a fortnight's time, but in a subsequent letter said that he had been instructed by the Director of Development not to send the plans, as the work was not within the scope of our duties. This seemed to us rather extraordinary as on the 4th July, 1922, Sir Lawless Hepper had written to me as follows :—

> " Questions of storm water drainage, sewage, lighting and roads in the reclaimed area itself are likely to be more important and to involve much more expenditure than was anticipated, and the proposals and plans connected with these services will be submitted to you."

124. Meanwhile the Chief Engineer took in hand the designs on his own account, but on the 5th January, 1923, I wrote the following letter to Sir Lawless Hepper :—

> " On the assumption that the arrangements discussed with Sir Chimanlal Setalvad are approved I should if you agree like Mr. Halcrow to look into at once the proposals for storm water drains and the East Colaba Reclamation Scheme in order that he may get together the data necessary to enable us to prepare the working plans, &c. I also propose to discuss the methods of execution proposed by Mr. Lewis."

125. I also wrote to the Chief Engineer and said I should be glad if he would place at my disposal all the information he had on the subject. On the 8th January, 1923, the Chief Engineer wrote :—

> " An inspection of Mr. Davidge's plan indicates the position of the storm water drains for the area of the reclamation. The drains have obviously to discharge under the sea wall and will naturally be placed on the axes of the main avenues running east and west across the area."

And on the 26th January, 1923, he wrote saying that he had prepared a design of the drains after having been told by Sir Lawless Hepper that they would not be included in the work carried out by our firm. On receipt of the plans we went very fully into the subject and wrote a reported dated 18th April, 1923.

126. We criticised the Chief Engineer's method of construction and said with regard to the request in your letter No. 649 of 5th February, 1923, for two 10-ton steam cranes of the gantry type we are of opinion that you should be able to carry out the work on the drains with the plant now on the site, and we suggested that all the points raised by us should be fully considered in consultation with the Director of Development.

127. We estimated a minimum saving under our scheme of 1 lakh 32,000. It was finally decided by the Director of Development to let the Chief Engineer have his own way, and on the 28th June, 1923, we wrote the following letter to the Chief Engineer :—

> " We have received your letter No. 8573 dated 6th June, 1923, replying to ours of 18th April, 1923.
>
> " From this we observe that the construction of the forms for the concrete blocks and other preparations have now proceeded so far that you have decided with the Director's approval to make no change in your original plans.
>
> " At the same time we may say that having carefully compared the alternative schemes and the estimate of comparative cost in your letter, we are of opinion that a considerable saving would have been effected had the drains been constructed according to the method we proposed."

Dredging.

128. In previous paragraphs I have stated that I accepted the data compiled by Mr. Kidd as to the nature of the material to be dredged and the area in the harbour available for dredging and I have given my reasons for so doing. It is assumed in the evidence that I did not avail myself of the experience obtained in the large reclamation works at Sewri carried out by the Bombay Port Trust. The assumption is incorrect. In fact a great deal of the evidence heard by the Committee in respect to dredging and dredging plant is, so far as I am concerned, incorrect.

129. My original plan of operations was, I maintain, practicable when proposed by me and is still practicable, but quite obviously a work of such magnitude, however well planned, requires constant consideration and revision to meet new problems that arise. In March, 1921, the Bombay Port Trust raised the question as to dredging in the

harbour, and the following extracts from the correspondence between the Chief Engineer, Mr. Lewis and myself are of interest :—

Mr. Lewis to Sir G. C. Buchanan. 4th March, 1921.

" One point has been brought forward, not officially as yet, which is interesting—it appears that the only authority which can sanction any alteration of the port of Bombay such as removal of the bed of the harbour is the Port Trust. Well, although the Back Bay scheme has been based on the pumping of the bed of the harbour since 1905, the Port Trust have never been approached on the subject. I was told by one of the Port Trust engineers that should we start dredging his duty would be to inform the Port officer and have the work stopped. I mentioned this to Hepper who remarked that that was not going to stop the Back Bay Reclamation."

Mr. Lewis to Sir G. C. Buchanan. 11th March, 1921.

" We have received a letter from the Port Trust asking that the trustees should be informed of the details of the scheme of dredging in the harbour in order that they may express their views, in so far as they are concerned, as Conservators of the Port under the powers reserved to them under the Indian Ports Act, 1908.

" They go on to say that it will be necessary for them to consider the possible effect on the channels and currents of the harbour of the removal of large quantities of material. The control of the position of the dredgers and pipe lines with reference to the navigation of the Port is another matter with which the Trustees will require to be consulted.

" All the information that I have is that the sheet of soundings from which I am going to take out the quantity of material available and finding out what will be the outside figure required. I will give them an area over which we dredge which possibly may be considerably less than Mr. Kidd's original area which he said contained three times the amount of material necessary for the work. It is a pity that this view of the question was not gone into earlier. Apparently, since 1905, it has always been the idea that the dredging should be done in the harbour and pumped across to the Back Bay, but the Port Trust have never been officially told that such was the intention. They only discovered this a short time ago and this is the result."

Sir George Buchanan to Mr. L. W. Lewis. 7th April, 1921.

" I am very busy going into the question of the quantity of material to be dredged from the various areas, and the position and number of pipe lines required, and will send you a report as soon as possible.

" I need hardly say there is nothing in the questions raised by the Port Trust and the people in Salsette, indeed the opinion of the latter can only be described as fantastic.

" That questions should be raised after the work has actually begun is very annoying, and is one of the results of the system of carrying out large public works in India. In this country, as you know, the consent of the Legislature to a Private Bill would be necessary, and every one concerned would be given the opportunity of formulating their objections to the scheme."

Mr. Lewis to Sir George Buchanan. 9th April, 1921.

" I hope that your meeting with McMurray will have had the effect of the abandonment of the Ormiston Street pipe line. The more I think of that job the less I like it. By the way, I see that in your report you took Kidd's figures as to the amount of material available for filling of the reclaimed area. I have just had the cross sections plotted and the area taken out and I find that the amount of mud and blue clay is together only 38 million cubic yards. There is a certain amount of hard and soft moorum according to the sections which the dredgers could easily remove with the help of the cutters, this will mean that if it can all be utilised we shall probably have sufficient material up to cross section No. 44 or 46. If these sections prove correct then we should certainly be able to put in the first pipe line across the peninsula considerably lower down than Ormiston Road. McMurray had the idea of putting the intermediate pumping station somewhere near the Arthur Basin."

Sir G. C. Buchanan to Mr. Lewis. 13th April, 1921.

" I have not yet finished my report on the pipe lines, as we are going into the matter in considerable detail, but one point is certain, and that is we must have a line down the Ormiston Road or in that vicinity.

" I enclose tracings showing alternative location south of the Ormiston Road at the Arthur Basin. Will you kindly look into the practicability of that line. Meik thinks there should be no difficulty in tunnelling under the railway sidings and under the railway below Wodehouse Bridge. Whilst at Arthur Basin you could if preferred lay the pipes on piles inside the Basin, or you could go along the Arthur bunder road.

" If on investigation the proposed new location is practicable, will you please send me a cablegram to that effect."

Mr. Lewis to Sir G. C. Buchanan. 22nd April, 1922.

" I shall be very glad to hear the decision that you will have come to as regards the Ormiston Road pipe line. Mitchell was in seeing me about the Mumbra sand which he finds is considerably better than he expected. He has been doing some work for the Port Trust about the mud and silt which is obtainable from dredgings, also the blue clay. He is of opinion that the material is very poor for reclamation works, the Port Trust's experience shows that it is none too good, but Mitchell has been examining samples for some time now and his opinion is that the material will never get a proper chance of drying out. It might get somewhat harder during the hot weather, but the advent of the rains would immediately turn it to slush again. Whether the layer of moorum will be of much use, with a soft material under it is another doubtful matter."

130. On the 25th April, 1921, we sent to Mr. Lewis our programme of dredging operations on the assumption that the dredger would begin work about December, 1922, or January, 1923, and also a report on the objections of the Port Trust.

Mr. Lewis to Meik and Buchanan. Cablegram dated 6th May, 1921.

" Referring to your letter of the 13th ultimo proposed location practicable, sending by this mail latest map of locality."

Mr. Lewis to Sir G. C. Buchanan. 6th May, 1921.

" I have to-day sent you a cable informing you that the proposed location of the pipe line at Arthur Basin is practicable. I am sending herewith a copy of the latest map of this part of Bombay. You will notice that our pipe line crosses a very large number of railway lines. In all probability the railway will want to do the work under their own lines and probably within their own boundary."

Sir G. C. Buchanan to Mr. Lewis. 12th May, 1921.

" Mitchell's poor opinion of the material for reclamation is certainly disconcerting but it cannot be any worse than the material used at Sewri."

Mr. Lewis to Sir G. C. Buchanan. 14th May, 1921.

" The problem is, will the moorum be necessary and if so will it be possible to get the amount of material and transport it in the requisite time? I mentioned the matter to Hepper, who asked me to write to you about it. His idea is that it will be a good excuse for an underground railway through Bombay, commencing somewhere near Sewri, as an underground line, tube, but coming originally from Trombay, where the moorum might be obtained. The line would go from Sewri approximately to Marine Lines or to within a mile or so thereof and we should have a rising branch coming up into somewhere near our yard. After the railway had served to bring down all our material it would be handed over to the Bombay people as an extra convenience. Talking about this we put the cost down at about two crores and a half."

131. *Mr. Lewis to Meik and Buchanan. 20th May*, 1921.—Criticises programme of dredging operations and wall construction and says he does not think that the dredger will pump an ounce of material into the reclamation before the cold weather of 1923-24.

Mr. Lewis to Sir G. C. Buchanan. 20th May, 1921.

" I think I mentioned the matter of the moorum topping in my last week's letter, well that has been giving me a lot of thought, it made Hepper scratch his head when I put the figures before him. Well it has occurred to me that there must be some material available in Back Bay, and as we know the foreshore is of sand, I have found some borings which were made along a line which is for a certain length just about the line of our wall. That shows considerable depths of sand and moorum as well as clay and it seems to me advisable that the bottom of Back Bay should be investigated. Do you know why the filling has always been proposed to be taken from the Harbour and not from the Back Bay itself. We know that the foreshore is all sand, from the Cuffe Parade to Chowpatty and we know that all up the coast there are stretches of sand where the bare rocks

do not crop out. Is it that the reefs and rocks in Back Bay have frightened the people off the idea of obtaining all or some of the filling from the Bay instead of the Harbour? I have been talking to Mitchell, who has been investigating the mud and clay in the harbour for the Port Trust. He tells me that he does not think that the mud, and equally so the clay, will ever get rid of their water. During the dry season they will do so to a certain extent, but the return of the monsoon will put things back where they were. The filling of the reclamation with this rather unsuitable material will make things much more difficult for the builders on the reclaimed lands and will also put off the time of utilisation. These points do not concern us as the engineers whose task is to reclaim, but they will have a very definite effect on the success of the job as a whole. Hepper is quite keen on the investigation of the bottom of Back Bay. What do you think of it? It would mean the filling from the sea side instead of from the land side, but that would make it easier to get the slope, from the wall to the original shore line as designed. Quite how it was to be done, pumping from the land side, has been a problem I have been content to leave to the future, just under present circumstances."

Mr. Lewis to Sir George Buchanan. 28th May, 1921.

" Have you ever seen any results of borings or other evidence on which Kidd based his opinion as to the unsuitability of Back Bay as supply of dredged material for the Reclamation? That would be an immense saving."

Sir G. C. Buchanan to Mr. Lewis. 22nd June, 1921.

" *Possibilities of dredging material for reclamation from Back Bay.*

" We have always held the view that there is so much rock in Back Bay and in many cases near the surface, that it would be quite impracticable to use a suction cutter dredger on a large scale. You might get a considerable quantity of material in pockets, by means of a grab dredger loading into barges, but it is probable that the cost would be heavy. Alternatively it is possible that a certain amount of material in the locality marked with an x on enclosed plan No. 3257 might be made available by dredging with the " Kalu " or even the big dredger, for reclamation of the northern area, and we certainly think it will be worth while taking borings to ascertain the position of the rock as if you could reclaim a portion of the northern section by this means it would be much cheaper than by taking it from the harbour.

" One point, however, must not be overlooked, namely, that dredging in Back Bay to any great extent will materially increase sea and wave action during the monsoon.

" I may say that we do not accept without more information Mr. Mitchell's very pessimistic view of the nature of the material we shall get from the harbour, as we hope there will be a great deal of hard clay that will require very little moorum topping.

" McMurray tells me that he discussed the matter with Mitchell in another connection, namely, the possibility of the Port Trust using what amounted to surface dredgings, for their own reclamation works."

From Meik & Buchanan to Mr. Lewis. 7th July, 1921.

" In several of your D.O. letters to Sir George Buchanan you have remarked that the following subjects have attracted your attention :—

" (*a*) The material to be dredged from the harbour for the use as filling in the Back Bay reclamation.

" (*b*) The quantity of moorum to be used for topping within the reclaimed area and the best method of obtaining same.

" We have given these matters serious consideration and beg to observe as follows :—

" 2. *Suitability of dredging material for reclamation purposes.*—We understand that Mr. Mitchell has reported unfavourably of the material from an examination of samples supplied by the Port Trust.

" We have no personal knowledge of the quality of the material, and Sir George Buchanan, *vide* para. 34 of his report on the whole scheme, dated September, 1919, relied on the following specific statement made by Mr. Kidd in his report dated 3rd August, 1912. (*Not reproduced.*)

" 3. As already stated by Sir George Buchanan, there is no reason to doubt the accuracy of Mr. Kidd's observations, accompanied as they were by no less than 1,314 borings, and, although it is impossible to come to a definite conclusion until the dredger has actually been at work on the site, we believe that with proper drainage the material will be found suitable for reclamation purposes.

"4. *Moorum topping.*—Sir George Buchanan in his estimate dated September, 1919, allowed for 1,919,000 cubic yards of moorum, that being the amount necessary to cover the whole area of the reclamation one foot thick, and also provide for some additional moorum on cross banks and behind the mass concrete wall at Colaba.

"Sir George Buchanan estimated for what he considered the maximum quantity of moorum, but it is obvious that in the absence of any lay-out his figures could only be regarded as approximate.

"5. We have now obtained from Mr. Davidge a copy of the lay-out prepared by him, and our considered opinion is as follows:—

"(*a*) Until the nature of the dredged material is ascertained by actual experience it is useless to attempt to estimate the total quantity of moorum required.

"(*b*) Under any circumstances it would be folly to cover with moorum ground which it is intended shortly to build over, as the expensive moorum would be largely dissipated during the course of excavation for the foundations of the buildings.

"(*c*) We are, therefore, of the opinion that all the moorum that need be estimated for at present is the quantity to cover roads and cross-roads and possibly the recreation grounds, and assuming that one foot is sufficient thickness, the total quantity is approximately 750,000 cubic yards, or say, 1,000 trains of 50 trucks, each truck containing 400 cubic feet.

"We are also strongly of opinion that the foundations of public buildings should, wherever practicable, be constructed before the filling is pumped into the area to be reclaimed.

"We may say that Mr. Davidge concurs in the foregoing conclusions.

"6. We hope that it will be possible to obtain all the moorum required for the Back Bay scheme in the vicinity of the Kandivli quarries and bring it down from time to time as each section of the reclamation is completed, and we would emphasise the fact that as the deliveries will be spread over five years, or probably more, it should be possible by judicious arrangement to transport the moorum without undue interference with the transport of the stone."

Mr. Lewis to Sir George Buchanan. 22nd July, 1921.

"As far as the moorum is concerned, I think that the total quantities will be much less than we have allowed for. In the first place, it would not be any use putting moorum over the areas to be devoted to gardens, parks, &c., for nothing but the very hardiest things will grow on moorum, which always contains a good proportion of stones. Then on spaces to be devoted to house building, it seems rather unnecessary to place moorum over the spaces actually covered by the houses. All foundations will have to be taken down to bed rock and the floors will probably have to be suspended on girders, so that the utility of having two foot of moorum over the areas, other than those on which the roads will be laid, seems very doubtful."

Mr. Lewis to Meik & Buchanan. 28th July, 1921.

"I have to acknowledge receipt of your letter of the 7th July, 1921, referring to the material to be dredged from the harbour and the quantity to be used for moorum topping.

"I have noted your remarks and do not propose to go further into the subjects until we find by experience what is the character of the material we have to deal with.

"As regards the moorum, I had come to a very similar conclusion as to the extent to which it would be required, as you will see from various letters that I have written to Sir George Buchanan."

Letter from Sir George Buchanan to Sir Lawless Hepper. 8th June, 1922.

"In the matter of dredging it seems to me that for some reason of his own Lewis has made up his mind to delay operations as long as possible and to begin reclamation at Marine Lines instead of at Colaba."

Letter from Sir G. C. Buchanan to Mr. O'Rorke. 5th July, 1922.

"Mr. Meik and I have been discussing the dredging problem and although if good material is found in Back Bay it will be very useful for the Marine Lines end of the reclamation we cannot see that it will be practicable to dredge from Back Bay for use at Colaba or indeed for the bulk of the work.

" The samples sent by you are not particularly good and you do not mention if there is any sand overlying the hard moorum bed."

Sir G. C. Buchanan to Mr. O'Rorke. 13*th June*, 1922.

" In the matter of dredging, you observe that a detailed survey of Back Bay is required to determine the possibility of dredging there instead of in the harbour as this year's preliminary operations showed there was a large area of dredgable deposit of better quality than that available in the harbour. We certainly never understood that there was any suggestion that all the material for reclamation could be got from Back Bay."

Sir George Buchanan to the Chief Engineer. 11*th December*, 1922.

" With reference to the informal conference on the 8th instant on the subject of dredging at which were present yourself and Messrs. McMurray and Halcrow, I think it may be as well to record briefly what occurred.

" (1) To begin with I pointed out that the successful reclamation of the enclosed area by pumping material dredged from the sea bed was the crux of the whole scheme. I said that the general plan of operations proposed by Mr. Kidd, viz., dredging from the harbour side of the Colaba Peninsula and pumping through pipe lines across the peninsula had been accepted and arrangements made accordingly. Further that we were aware that you had been investigating the prospects of obtaining materials from Back Bay itself and we agreed that a portion of the area near Marine Lines might most usefully be so reclaimed, but that your idea of reclaiming the whole area by dredging from Back Bay was a deviation from the original and sanctioned project which required very grave consideration, the responsibility resting with my firm.

" (2) It is understood that you have fears as to the suitability of the material in the harbour although Mr. Kidd took a great number of borings and expressed himself as entirely satisfied with the result and Mr. McMurray observed that too much credence should not be given to borings as from his experience at Sewri borings were found to be unreliable.

" I remarked that in my judgment the first thing to do was to ascertain the precise nature of the material in the harbour by a practical test and we discussed the various methods short of beginning the reclamation, viz., by grab dredger, the " Kalu " or by a bucket dredger borrowed from the Port Trust, and finally, Mr. McMurray suggested that the new large grab dredger being built for the Port Trust and expected out in a few months and which had to be tested somewhere might be requisitioned for the work. It was then agreed to negotiate with the Port Trust for her use.

" (3) With reference to Back Bay it is understood that you are continuing your investigations and it was suggested you might obtain from home a heavy Priestman grab using it with your own crane and barge.

" (4) Your programme of work contemplates beginning dredging operations in the season 1924-25 and I emphasised the tremendous importance of starting before that date and said it had certainly been our intention to lay the first pipe line across the peninsula at the earliest possible date and get the dredger to work. It was then agreed that the dredger must begin work not later than the end of 1923 monsoon."

132. From the correspondence it would appear that in the first instance the Bombay Port Trust were only concerned with the possible effect on the channels and currents of the harbour of the removal of large quantities of material and the first intimation we had that there was to be any curtailment of the area selected by Mr. Kidd was conveyed to us in a letter from the Chief Engineer, dated 7th September, 1921, forwarding the correspondence with the Bombay Port Trust and the Royal Indian Marine on the subject. The Port Trustees in addition to curtailing the area observed that they had been advised they should be compensated for the removal of the soil, &c., from the bed of the harbour. The action of the Port Trust came to us as a great surprise. Mr. Kidd in his report, dated 3rd August, 1912, stated, " It has been assumed that no royalty will be payable for the removal of the mud and clay from the harbour," and as the Government of Bombay had accepted Mr. Kidd's scheme and forwarded it to the Government of India with the remark that all doubtful points had been settled, one might be excused for thinking that the Government of Bombay had long ago investigated any rights or supposed rights of the Port Trust or Indian Marine.

133. In a note to the Director of Development, a copy of which accompanied the chief engineer's letter to us dated 7th September, 1921, he pointed out that the reduction

of material due to the restrictions demanded by the Port Trust and the Royal Indian Marine amounted to 15,572,896 cubic yards, and he suggested that this quantity should be obtained by extending the dredging area out into the harbour which would, however, entail the purchase of additional pipe line.

134. The extracts from the correspondence also show that our anxiety as to the quality of the material was largely connected with the depth of moorum it would be necessary to lay on the pumped filling for the purpose of making the reclaimed area fit for use. Otherwise we had and we still have no doubt that the material is available in the harbour in abundance for the working of the dredger. The Chief Engineer was obsessed with the idea that possibly all the material could be found in Back Bay, and in his report, dated October, 1922, accompanying his project estimate he remarked :—

> "There is a possibility which is being investigated of material being obtainable from Back Bay, but this point is not yet decided, and it is considered desirable to make provision for the trenches and the shore pipe line should it be necessary owing to the investigation giving negative results."

135. The Chief Engineer's programme of operations did not contemplate beginning dredging until 1924-25. We strenuously combated that idea, with the result that dredging began in 1923-24, but in our opinion there was no reason why dredging should not have been started in 1922-23. With regard to dredging in Back Bay we did not initiate that proposal, but welcomed the idea that as the dredger "Kalu" happened to be available she should be employed to augment the work to be done by the "Sir George Lloyd."

136. We relied on the statement made by the chief engineer as to the quality and quantity of the material in Back Bay, but as events have turned out the borings taken by Mr. Thomas under the supervision of the chief engineer have proved wholly unreliable.

137. As regards the dredger "Sir George Lloyd," we hold the opinion that whatever the class of material (short of hard rock and moorum) no better dredger could be procured for the purpose of the scheme, and criticisms on the mechanical efficiency of the dredger are beside the point, because up to the present the dredger has had no opportunity of showing what she can do.

138. I do not propose in this statement to discuss in detail the working of the dredgers during the two seasons when I was in Bombay. A great deal has been said about soft clay, unctuous clay and hard clay, but the fact remains that there is, I firmly believe, an ample supply of suitable material to feed the dredger if she is properly handled—Mr. Brims, the dredging superintendent, has said that the dredger could do her specified output for possibly a month on end, and if for a month, why not for six months. He also said he accepted Mr. Kidd's soundings, &c.

139. Mr. Girdwood had no fault to find with the dredger and said the cutter would remove any material in the harbour, down to a certain depth, presumably until the hard was reached.

140. The human factor is, however, all important and until proper team work is instituted along with a 24 hour day and a bonus on output the results are bound to be unsatisfactory.

Summary.

141. My considered opinions on the scheme and on the events that have taken place since the work began are as follows :—

(1) There was no undue haste shown by anybody in proceeding with a work which was begun in 1865, had been discussed and rediscussed for years, and for which no fewer than 18 different sets of plans and estimates had been prepared since 1887.

(2) Certain sections of the community in Bombay have always exhibited violent hostility to the scheme, and this was intensified with the slump in land values which has occurred during the last year or two.

(3) The Governor of Bombay (now Lord Lloyd) was justified in his attempt to break through the traditions of the Public Works Department and get the work put in hand as soon as possible after it had received the sanction of the Secretary of State, and the procedure adopted was a very usual one. All great schemes, however well planned, require perpetual reconsideration and revision to meet new problems, and this work was no exception to the rule.

(4) In the matter of the estimates, I insist that my original estimate of 367 lakhs was reasonable and reliable and that Mr. Kidd's estimate of 1912 was excessive. I resent the suggestion made by a member of the Committee that my estimate was made low in order to obtain administrative sanction or to show a

profit on dealings in land, and in this connection it must be borne in mind that even on the 702 lakh estimate the Government of Bombay prepared a statement in which an ultimate profit was shown amounting to 369 lakhs of rupees. Estimates for engineering works in the East advanced between 1912 and 1919, but the great advance was between 1919 and 1922, largely on account of the sudden rise in the price of labour as well as in all materials.

The estimate of the chief engineer in 1922 for 702 lakhs should have 136 lakhs deducted to make it comparable with my estimate for 367 lakhs, and I believe a contractor freed from Government restrictions would have completed the work and made a profit on the chief engineer's estimate. Moreover, I still think that the work can be completed within a reasonable margin of that estimate.

The estimate of 1,100 lakhs prepared by the Special Advisory Committee under the chairmanship of Sir Lawless Hepper was admittedly " prepared to order " and was not an engineer's estimate. It would be interesting to know precisely the reason for its preparation and publication.

(5) Regarding my responsibility, I have no desire to evade any responsibility or unduly to blame anyone else. During the course of this enquiry I have been subjected to attack not only by witnesses but by members of the Committee. I quote below the statements made by members of the Committee along with my explanation.

4.8.26. *Sir F. Hopkinson.* Witness: *Sir Lawless Hepper.*

Q.—Sir George Buchanan says that for years he has been struggling against Government extravagance and inefficiency. Is not he responsible for extravagance and inefficiency?

A.—Exactly.

13.8.26. *Sir F. Hopkinson.* Witness: *Mr. H. S. Elgee.*

Q.—Is it not a fact that if anything has gone wrong with the provision of plants, the control and conduct of the works out here, it is to be attributed in the end entirely to Sir George Buchanan. Was not he the chief engineer in direct control of the whole scheme?

A.—Yes.

Q.—In fact, he is just in the position of a contractor and the chief engineer is in the position of a contractor's agent?

A.—Quite so.

Q.—If a contractor tells you to do a work, as his agent, you are responsible for carrying on the work only as he has ordered you?

A.—Yes.

16.8.26. *Sir F. Hopkinson.* Witness: *Mr. C. K. Chitale, R.B.*

Q.—I used the wrong term just now, namely, consulting engineers, Messrs. Meik and Buchanan were not consulting engineers—they were the engineers controlling the whole work. So far as the control of the work was concerned, *they were in an almost identical position to contractors?*

17.8.26. *Sir Frederick Hopkinson.* Witness: *Mr. H. S. Elgee.*

Q.—On the 18th May, 1922, he (Sir George Buchanan) wrote another letter on the same terms saying that " We are still unconvinced that you require three of these machines at once, estimated to cost over £12,000, nor do we understand why you want 20 tons lifting power when the very heaviest of the protection blocks shown on our last drawing, No. 3259, is only 15 tons." It was for Sir George Buchanan to say, " I do not think these are necessary, and therefore I shall not supply them?"

A.—He could have done so.

Q.—If he had been in close touch with the work, surely he could say that without putting the responsibility on somebody here?

A.—I think so.

5.8.26. *Sir M. Visvesvaraya.* Witness: *Sir Lawless Hepper.*

Q.—As regards expenditure for a huge work of this magnitude responsibility must be that of the Director of Back Bay Reclamation works.

A.—I am prepared to go as far as this. In connection with the work, it was necessary, from time to time, to let out contracts for the supply of material or for loading or for unloading stones. They were not large contracts, they were petty contracts and strictly speaking, in the terms of that agreement, I think, all the tenders on every occasion were sent to the engineers as an ordinary matter of working and having regard to the fact that Sir George Buchanan was sometimes in Australia and sometimes in Africa and at other various places, it was not practicable to send all cases of tenders for contracts that used to arise. But it may be said that in those cases I was responsible for that expenditure on them, but having tacitly accepted the situation, I think, it might be said that he was responsible.

With reference to the statements that I was in the position of a contractor and the chief engineer that of contractor's agent, or that I was responsible for extravagance and inefficiency, I would in the first place point out that I am not a contractor and I would then ask Sir Frederick Hopkinson whether he or any other contractor would undertake the smallest responsibility on the relations that actually existed between Sir Lawless Hepper and the Development Directorate on the one hand and myself and my firm on the other, viz. :—

(1) We had no power to appoint or dismiss staff or workmen. When the chief engineer whom we had nominated completely broke down through ill-health we protested, and again protested, but found it absolutely impossible to secure his removal or transfer. Would any contractor take on a work if he was told that under no circumstances whatever could he get rid of his chief engineer?

(2) We had nothing whatever to do with the employment of labour, rates of pay or the letting out of the numerous sub-contracts of all descriptions; nor were we consulted about the purchase of materials and stores in Bombay. Sir Lawless Hepper himself fixed the contract for the cement and he had a special supply department which provided stores and materials for all the work being carried out by the Development Directorate including the Back Bay scheme.

Sir Lawless Hepper erred when he said that tenders were sent to the engineers as an ordinary matter of working. I can only recall to my mind two occasions on which we were advised, and for our information only, that contracts had been placed; one was in the case of the cement and the other was in the case of some pipes for the dredger which were manufactured in Bombay.

Sir Lawless Hepper has made the remark that Sir George Buchanan was sometimes in Australia and sometimes in Africa and it was not practicable to send all cases of tenders for contracts that used to arise. What an extraordinary statement! I was not carrying out our duties single-handed. I was not even the engineer. My firm were the engineers and we had an office and staff in London actively engaged in carrying out the whole of our business.

(3) With reference to plant ordered in England, we received indents and carried out instructions. On one occasion we advised against the purchase of three steam shovels and Sir Frederick Hopkinson remarks that it was only necessary for Sir George Buchanan to say, "I do not think these are necessary and therefore I shall not supply them." That statement is absolutely incorrect. The matter was placed before Sir Lawless Hepper as the head of the Development Directorate and he passed an order that the cranes were to be purchased and there the matter ended.

(4) When I visited Bombay it was as an adviser. I had no power to say to any man on the works, "Do this or do that," as I was in no sense an executive officer. Sir Lawless Hepper was the supreme executive head of the Development Directorate. Sometimes he took my advice and sometimes he preferred the advice of his own Chief Engineer. Moreover, I had never any intention of being anything but an adviser and our fees were based on that arrangement. Had I taken charge, in the sense that Mr. Kidd proposed to take charge, I should have required corresponding fees.

(5) The provision of adequate and efficient staff was always difficult. The first year that dredging started I arrived in Bombay and found one man alone in charge of the large dredger, and on my asking what would happen if that man got an attack of fever, or any other complaint, I was

told that the dredger would have to stop work until he got well again, and it was only on my urgent representation of the case that sanction was accorded to sending a cablegram to London to get out an assistant dredging master.

(6) We were never supplied with the usual engineering details of cost, in fact I doubt if anyone ever knew what the work was costing.

(6) The creation of the Development Department and Directorate I consider, in the light of events, to have been a mistake. The Governor of Bombay (now Lord Lloyd) hoped that he would institute a new department with fresh blood, freed from the restrictions and red tape of other departments, but when he disappeared from the scene, and with him the only driving force in Bombay, the Development Directorate degenerated to an ordinary Government Department, slavishly following other departments and hide-bound by rules, regulations and restrictions.

It was a public works department being carried out on exactly similar lines to the recognised Public Works Department, and subjected to precisely the same rules and regulations, but without its experience. One branch only of the Development Directorate's activities have been examined, and I suggest valuable information would be obtained by inquiring into the expenditure and results obtained in the other departments.

(7) Regarding the Back Bay scheme, the position at present is that the constructional works as designed have proved an unqualified success. Grave doubts were expressed in Bombay as to the possibility of building at reasonable cost a wall strong enough to resist the force of the sea, and I was brought out to Bombay one year especially to observe the force of the waves, but the sea wall, as built, has resisted successive monsoon storms, and will, when the works are completed, provide a handsome sea promenade.

The filling in of the reclaimed area by the dredgers has certainly not come up to expectations. A great deal has been said about the quality and quantity of material in the harbour and the efficiency of the dredger, but very little consideration has been given to the human element in the working of the dredgers. My view is that there is an ample supply of suitable material in the harbour, and that the dredger can perform all that it was required to do under its contract and specification, but that the human element has failed completely, and under existing conditions I do not see how it can possibly do otherwise. My advice is to free the work from the incubus of Government control, get rid of the whole staff before next working season, and invite tenders from contractors for the completion of the entire work. Mr. Merrett, the Assistant Dredging Master of the dredger " Sir George Lloyd," in the course of his evidence, summed up the situation admirably. When asked in what respects the dredging in Bombay differed from work done elsewhere, he replied : " One is run by a private company and they want their pound of flesh. If you do not turn over the percentage, you have to make room for someone else."

(8) Lastly, there has been a disposition in Bombay to treat this large work (probably as large a dredging proposition as the world has seen) on a par with the building of a house or other cut-and-dried operation, and the moment anything went wrong there was condemnation of all concerned and an outcry to stop work.

This, if I may say so, is a most narrow and parochial view. The work might be regarded for India as a national undertaking and should be completed. In this particular case there have been overwhelming reasons connecting with the state of the world for the original estimate being increased. All estimates for works were similarly increased, and it would be of interest to know what increase has taken place in the estimates for the building of New Delhi, but to take one example out of many of works carried out long before the War. The original estimate for the Manchester Ship Canal was in the neighbourhood of £5,000,000, whereas the actual cost was nearer £15,000,000. Now that the work is completed you hear no complaints from the City of Manchester—which is every day reaping the benefit of this great undertaking.

I emphatically assert that the Back Bay Reclamation Scheme inaugurated by Lord Lloyd is not a failure, and there is no reason why it should not be brought to a triumphant conclusion.

The slump in land values which at present obtains is not going to last for ever, and the day will yet come when Lord Lloyd's foresight and energy in the enterest of Bombay will be recognised and gratefully appreciated.

GEO. C. BUCHANAN.

ORAL EVIDENCE.

Sir H. Courthope-Munroe, K.C.—I understand that, by the courtesy of the Committee, I am allowed to appear here to a limited extent to represent Sir George Buchanan. I appear with my friend, Mr. Melville. I understand that after you have examined Sir George, if there is any matter which he desires to go into a little more fully, or if there are any matters which have been dealt with by the Committee which he thinks want clearing up, the Committee will allow me to put further questions. I understand that to that extent only I am allowed to take part in the evidence.

Chairman.—That is exactly right, Sir Harry.

Sir George Buchanan; called and examined.

Chairman.—The statement you have been good enough to prepare for the Committee will be printed in its entirety as a preface to your evidence, Sir George. Before I commence examining you there are one or two small matters in relation to your statement which I would just like to clear up. On Page 1, the first line, you say "When I first examined the project in 1918." Does that mean "1919"? It was on the 7th May, 1919, that you got a telegram?

A.—Yes, that is so; it is 1919.

Q.—Then may "1918" be corrected to 1919? Then will you read on? You say "The date of the first scheme was 1865." We have got it from official documents that in fact the date was 1863.

A.—I accept that.

Q.—Will you therefore correct "1865" to 1863, just to get the record right. Then on Page 19 you say "A meeting was held in Mr. Carmichael's room in the Secretariat at which were present the Hon. Mr. Carmichael, now Sir George Carmichael, Sir Stanley Reed, Mr. Billimoria, representing Tata Sons, Ltd." As there is a Mr. Billimoria, on this Committee, it might be clearer if you would put "Mr. A. J. Billimoria, partner in the firm of Tata Sons, Ltd."

A.—Yes, I quite understand.

Q.—Do you consent to that correction?

A.—I do.

Q.—There is another matter on Page 112. I will hand you this document and ask you to look at the underlining in green. If you turn over the page you will see the question which you set out in your statement.

A.—Yes.

Q.—Now will you substitute "Sir F. Hopkinson" for "Chairman" on Page 112 of your statement?

A.—Certainly.

Q.—Just satisfy yourself first?

A.—Yes. I will do that.

Q.—With those four corrections the statement might be released. I think it will be more convenient to take you through your statement almost page by page. Will you turn to the first page? When you first examined the project in 1919 did you first of all make yourself acquainted with the history of previous reclamations in Back Bay?

A.—I did.

Q.—We have been told that Bombay is built upon seven islands, and Lord Lloyd in his evidence has referred to reclamation going back to the early part of the 18th century?

A.—Yes.

Q.—Did you read the evidence of Sir Stanley Reed?

A.—I have seen his evidence.

Q.—Did you notice whether or not he indicated that Bombay owes it distinguished position to successive reclamations?

A.—Yes.

Q.—The joining up of various islands and making solid ground, and the driving back of the sea along the actual sea front?

A.—Yes.

Q.—Is Sir Stanley Reed a gentleman of large experience in Bombay matters?

A.—I have always understood so.

Q.—He was the Editor of "The Times of India" for very many years, was he not?

A.—Yes.

Q.—And associated with many public affairs in Bombay?

A.—Yes.

Q.—He was a man who might be presumed to be reasonably likely to form a good judgment?

A.—Yes.

Q.—The first scheme which you deal with is what we now know as the 1863 one. That was a scheme to reclaim 1500 acres of the foreshore?

A.—Yes.

Q.—Therefore not dissimilar in extent to the reclamation scheme which we are now investigating?

A.—A little larger.

Q.—Larger as 1145 acres is to 1500 acres?

A.—Yes.

Q.—You say that owing to financial difficulties that company was voluntarily wound up. I think we have got it from Sir Stanley Reed that the company in fact did make some reclamation between 1863 and 1866?

A.—Yes, I have always understood so.

Q.—Which he said was of immense advantage to Bombay?

A.—Yes.

Q.—And the company failed, not by reason of any inherent weakness in the feasibility of the scheme, but because of the North and South War acting on the industries of India and bringing down the Asiatic Banking Corporation?

A.—That is so.

Q.—The company had got on deposit 90 lakhs in the Asiatic Banking Corporation, and its failure caused the Development Company to go into liquidation. Then you deal with 1887. The Government of Lord Reay proposed a scheme. Then again in 1897 the matter comes up under Lord Sandhurst. Then the Bombay Improvement Trust became interested in reclamation, and in addition to that there was in 1904 the Military Lands Committee. It is all set out in your statement, Sir George, and is set out correctly.

A.—Yes.

Q.—In 1905 did the Bombay Public Works Department propose four alternative projects?

A.—Yes.

Q.—And was it in 1905 that it was first suggested that reclamation should be effected by pumping across the peninsula from the harbour into the area to be reclaimed?

A.—Yes, I understand that was the first occasion.

Q.—And a year later, in 1906, there was, I think, a revised scheme dealing with 973 acres in Back Bay and 121 acres in Colaba?

A.—Yes.

Q.—So far we have got: 1887, Lord Reay; 1897, Lord Sandhurst; the Bombay Improvement Trust; the Military Lands Committee; 1905, the Bombay Public Works Department; and then in 1907 Lord Lamington appointed a Commission. So that up to that time from 1863 to 1907, had the matter been under discussion by a large number of bodies, looked at from a good many angles?

A.—Yes.

Q.—Now I come to February, 1908. In that month did Messrs. Lowther & Co. submit a scheme of a very ambitious nature to reclaim 3576 acres or 2945—one or the other?

A.—Yes.

Q.—And they offered their services to make surveys and investigations?

A.—Yes.

Q.—On the 27th October, 1910, did they put forward a proposal to reclaim 1272 acres at a cost of 358 lakhs?

A.—Yes.

Q.—When putting forward that estimate, did they state that they had been given all data in possession of Government?

A.—Yes including a series of borings in the harbour.

Q.—Was it also their recommendation that Government should do the work through the agency of a contractor on certain terms of remuneration?

A.—Yes.

Q.—On the 21st January, 1911, there comes an important letter from the Secretary of the Government of Bombay to the Secretary of the Government of India?

A.—Yes.

Q.—Is the substance of that letter to this effect—that Messrs. Lowther & Kidd had previously carried out the execution of the work in relation to the Government Dockyard in Bombay; they had intimate knowledge of local conditions; and, on Page 4,

" The reclamation will be effected by means of suction dredgers working in the harbour on the east of Colaba where the presence of an ample deposit has been ascertained, and delivering the clay at the site of the reclamation—the most efficient and economical method of carrying out reclamation on a large scale "?

A.—Yes.

Q.—Did the letter further remark that if general approval were given about 1,000 acres would be attempted to be reclaimed, and that they would require to have the necessary surveys made and estimates prepared?

A.—Yes. There is this point: " expressed his willingness to prepare designs and working drawings." Up to then they had not been prepared.

Q.—True. Then the letter says : " Immediately on receipt of the general approval of the Government of India and of the Secretary of State to the proposals submitted "—that is, the Bombay Government were urging that this reclamation should go through on the lines proposed by Mr. Kidd?

A.—Yes.

Q.—It is on page 4 of your statement. I will read it : " Immediately on receipt of the general approval of the Government of India and of the Secretary of State to The proposals submitted, the Bombay Government would cause the necessary surveys to be undertaken and estimates to be prepared, when the whole question would be thoroughly re-examined from a financial point of view, and the most promising scheme submitted to the Government of India. Concluding, the letter went on to say that enough had been said to show that a scheme of reclamation would not only provide for an urgent need of the city of Bombay, but would also prove a sound financial undertaking of the nature of a productive public work which the Bombay Government regarded with great confidence. The Government of India was, therefore, requested to submit the proposals to the Secretary of State for his general approval, as the Governor in Council was anxious the actual work should be commenced with the lest possible delay."

A.—Yes.

Q.—Then a period of nine months elapsed before the Government of India replied. On page 5 of your statement the Government of India are quoted as saying :—" Before any representations could be made to the Secretary of State it had to be made clear that the works would be reproductive, and for that purpose there was practically no data available. The Government of India did not wish to question the accuracy of the skilled engineers who had advised the Government of Bombay, but their figures had not been placed before the Government of India, and all that could be said on a general review of the case was that large estimates of that type were particularly liable to be exceeded, and that even in Bombay experience of reclamation on an open sea front of the type proposed was limited. On the proposal that the scheme, if undertaken, should be executed by Government in preference to private agency, the Government of India was not convinced, on the information before it, that the scheme, if undertaken, should be executed by Government in preference to private agency, and therefore asked that the matter should be further investigated. Finally, the Government of India asked what would be the cost of the detailed surveys and estimates, as these would be necessary before the scheme could be recommended to the Secretary of State "?

A.—Yes.

Q.—Then that is followed by a letter from the Government of Bombay to the Government of India on the 6th December. In that letter it was set out that the firm of Lowther and Kidd had offered to execute a detailed survey and investigation of the site for 1 lakh 57,500 rupees—a little over £11,000?

A.—Yes.

Q.—That is, an estimated cost of survey plans and drawings so much plus professional fees so much?

A.—Yes.

Q.—Then the Government of Bombay pressed upon the Government of India the desirability that that should be done, and at the middle of page 6 you set out an extract as being one of interest, and I will read it : " The cost of the execution of a reclamation was first estimated by the officers of the Public Works Department, and the estimate thus obtained showed that the prospect of financial success was most promising. The Governor in Council felt, however, that complete reliance could not be placed on these figures, as no officer of the Department had practical experience of work of this highly special nature. Mr. Kidd, a partner in the firm of Messrs. Lowther Kidd, who possessed all the experience and knowledge required, and who was then in Bombay in connection with the extension of the Government Dockyard which was being carried out by his firm, was struck by the exceptional opportunity afforded by the stretch of rocky foreshore visible at low tide, and offered to make a preliminary investigation of a project for reclamation,

at his own expense." Then on page 7, at about the tenth line, there comes a very important passage which we shall have to discuss later: "In Mr. Porter's letter under reply "—that shows that Mr. Porter was the writer of the letter of the Government of India, does it not?

A.—Yes.

Q.—" It is stated that experience of reclamation by suction dredging is " limited " in Bombay. I am, therefore, to point out that the large reclamations being carried out by the Port Trust afford exceptionally complete data for estimating work of this kind." Then they refer to the fact that Mr. Kidd's figures were a sufficiently close approximation to the cost of the work to justify a further investigation of the scheme, and they clearly indicate that the scheme may be expected to be productive. " Mr. Kidd's figures may be accepted with safety as a sufficiently close approximation to the cost of the work to justify the further investigation of the scheme, and they clearly indicate that the scheme may be expected to be productive. Mr. Kidd's detailed estimates could not be supplied to the Government of India, as they are not officially in possession of the Government of Bombay, but an abstract estimate was so supplied. The Governor in Council has closely examined the figures and is convinced that they have been drawn up with due care and are sufficient for the immediate purpose in view, namely, to show that the reclamation scheme will be a reproductive public work and as such deserves detailed investigation." Then this letter, which is a very long one, continues. " An alternative method of procedure is to employ an expert for the investigation and the preparation of the estimates, and to call for tenders for the execution. This alternative did not commend itself to Government, because it would not provide so satisfactorily for their control of the work. Further, Government are well aware that economy in this class of work can be attained only by securing that the suction dredgers and other plant required shall be of the best design. The difficulties which have arisen with the Port Trust dredgers serve as a warning on this point. It is also necessary that most careful consideration should be given to the arrangements for carrying out the work and to the order in which it must be undertaken, and this is more properly the work of the contractor than of a consulting engineer." At page 9, on the 3rd August, 1912, Messrs. Lowther Kidd submitted their detailed report, did they not?

A.—Yes.

Q.—That was for the reclamation of 1,145 acres?

A.—Yes.

Q.—The report was accompanied by ten sheets of drawings, photographs, bills of quantity, schedules and actuary's report. A very large portion of the report (to which, of course, we will have to refer in detail later) was devoted to discussing the extent and character of the deposit in the harbour and the suction dredger machinery; and the first matter to which Mr. Kidd appears to have devoted his attention is Back Bay. He says: " Material for Filling. The first point to receive attention was the nature of the sea bed to the westward of the proposed reclamation." That is Back Bay, is it?

A.—Yes, that is Back Bay.

Q.—" As, obviously, if sufficient material of a suitable character could be obtained there, it possessed great advantages over any other possible source. This was quickly disposed of as the conditions are a very irregular rock bottom containing pockets or thin layers of loose sand in insufficient quantity within practicable distance and—for a great part of the year—a heavy ground-swell prevails which renders the work of dredgers dangerous, and frequently wholly impossible." Therefore, we have Mr. Kidd unequivocally condemning Back Bay as an area for dredging?

A.—Yes.

Q.—Then he deals with the question of the harbour: " The next source was clearly that part of the harbour bed adjacent to the western shore of the harbour and contiguous to the proposed reclamation. This, provided the material was suitable and available in sufficient quantity, presented conditions perfectly favourable in respect of sea exposure. Survey operations were consequently directed to ascertain the extent and character of the harbour bed over an area measuring 17,400 feet long by 9,000 feet wide. This was accomplished before the advent of the monsoon and conclusively established the existence of an extensive convenient area of mud and clay, yielding within the area prospected more than three times the quantity of material required for the scheme now proposed." Then he submitted drawing No. 5 and said " A system of boring by hydraulic tubes was devised which proved to be perfectly reliable as well as rapid in action "?

A.—Yes.

Q.—Then he refers to the character of the deposit, silt overlying a deep bed of blue clay. " For the purpose of filling and making up land the mud is sufficiently suitable." That is, the mud superimposed on the clay?

A.—Yes.

Q.—" And the clay eminently so." " The clay, which is stiff and unctuous, hardens into perfectly solid ground in a very short time. As far as possible in course of execution of the works the clay would be preferred, not only because of its greater suitability for making land, but also because for dredging purposes its stiffer and more tangible character enables a higher percentage of solid material to be transported by the pumps." " For making up land in the proposed reclamation the material has to be obtained from a greater depth and delivered to a greater distance than has hitherto been accomplished elsewhere." " As a result we have made provision for a very high class plant, and the working costs have been estimated accordingly. The machinery we would employ will be designed and guaranteed to effect the removal of 2,000 cubic yards of silt or blue clay per hour from a maximum depth of 70 feet below low water." I am only making passing references to this, but might I ask you this? Is there anything in Mr. Kidd's report which throws the least doubt on the feasibility of the scheme?

A.—No, I do not think there is anything in Mr. Kidd's report which throws any doubt whatever on it.

Q.—And whilst asserting the existence in sufficient quantity of dredgable material, he adds a phrase which may have attracted your attention—that is, the phrase on Page 10 which you set out " A system of boring by hydraulic tubes was devised which proved to be perfectly reliable as well as rapid in action." Did it strike you there that he was talking about something which at first at all events had been in the nature of an experiment?

A.—All he wanted to know was where the hard material came to.

Q.—That is not an answer to my question. My question was this. When you saw that passage " A system of boring by hydraulic tubes was devised, &c.," did not that rather suggest that Mr. Kidd was embarking on something in the nature of an experiment?

A.—If you take it in that way, yes.

Q.—I am asking you how it struck you. Did that passage strike you at all that Mr. Kidd was possibly embarking on an experiment?

A.—Knowing how it was done, I should not have called it an experiment.

Q.—Did it occur to you that it might be prudent to take a few check borings to see whether Mr. Kidd was right in his views?

A.—No. I considered that Mr. Kidd's borings were ample; in fact, I had never seen a scheme with greater detailed information in respect of the material. I was quite satisfied with it, and I am still quite satisfied with it.

Q.—Was your own report, dated September, 1919, brought over to India by you or sent through the post?

A.—I took it with me to India.

Q.—You took it with you to India and presented it to the Government. In your report you do undoubtedly assert your confidence in Mr. Kidd's borings?

A.—Yes.

Q.—But you yourself of course had no personal knowledge of the character of the sea bed in the harbour?

A.—I would not say that, because I had a very general knowledge of the sea bed.

Q.—I will come to it a little later, but I think you have said that you had no personal knowledge of the character of the sea bed. You had never taken any borings?

A.—I had never taken any borings.

Q.—Beyond what Mr. Kidd put in his report, had you any information at all?

A.—Yes. I had studied the Sewri reclamation.

Q.—How had you studied that—what documents or what people?

A.—I discussed it frequently with the late Chief Engineer to the Port Trust.

Q.—Is that Mr. Messent?

A.—Yes.

Q.—Did Mr. Messent ever give you any figure of the performances of the " Kalu " and " Jinga "?

A.—No, I do not think he did. I do not remember any detailed figures.

Q.—The " Kalu " and " Jinga " had been working, had they not, from 1908 to 1913 in the Sewri reclamation?

A.—Yes.

Q.—Did you consider that the nature of the sea bed in the Sewri area was the same as that in the harbour?

A.—I always understood it was the same, yes.

Q.—From whom did you understand it?

A.—I discussed it frequently with Mr. Messent. I went over the Sewri reclamation works. I was constantly down there.

Q.—When did you go over the Sewri reclamation works?

A.—I must have gone over them several times. I was several times in Bombay between 1901 and 1924. I always knew what was going on. Mr. Messent was a very old friend of mine.

Q.—I am asking about Sewri for the moment, because, you see, the evidence up to now has really all been one way. It may be wrong, but it has been all one way, namely, that the character of the deposit in the Sewri Mazagon reclamation is all mud, very little clay and no rock, and that the material in the harbour is of quite a different character altogether?

A.—I do not agree.

Q.—So be it. In fact, if it had occurred to you advisable that check borings should be taken, they could have been taken when you handed in your report in November, and for three or four months after that, could they not?

A.—Yes.

Q.—From November you get for some months a complete certainty of calm weather?

A.—Yes.

Q.—And within a week or ten days check borings could have been made?

A.—They could. I did not think it was necessary.

Q.—I see your point, but I am asking you whether they could have been made? You were there from November, 1919, when you handed in your report, for how long—two or three months?

A.—I arrived in Bombay on the 19th May and I left Bombay on the 31st May.

Q.—I have jumped for the moment to November 1919. You will probably be able to tell me from your recollection. It was in November 1919 that you handed in your report?

A.—Yes.

Q.—How long did you stay there after handing in your report?

A.—I should think three months.

Q.—I am not pinning you down?

A.—Something like two or three months.

Q.—In that two or three months you could have arrived with certainty at the nature of the sea bed, could you not?

A.—I considered I knew it absolutely.

Q.—I follow that.

A.—I could have done it, yes.

Q.—I see your point, but still you could in fact have arrived at it with certainty by December of 1919?

A.—Yes.

Q.—Now I go back to your statement on page 12: "On the 7th August, 1912, the Bombay Government forwarded for the consideration of the Government of India Messrs. Lowther & Kidd's report and observed that the drawings might be considered as complete working drawings, which would give sufficient information for examination of the designs and for the immediate commencement of the work; the investigation had been most carefully made and might be accepted as exhaustive. The report was clear and complete all doubtful points had been settled, and the revised estimate might be accepted as completely trustworthy and ample. It was further stated that in presenting this project to the Government of India the writer was to say that his Excellency had the fullest confidence in the ability and expert knowledge of Mr. Kidd who had worked it out in detail; but in case it should be desired to obtain further expert opinion he was to suggest the names of Mr. A. W. Robinson, Montreal, who was prabably the greatest living expert in the world on reclamation by suction dredging, and who was consulted as such by the Egyptian Government, and of Mr. C. S. Meik, the eminent consulting engineer of 16, Victoria Street London, whose opinion on sea protection work might be accepted with confidence."

So Mr. Robinson is being put forward as the greatest living authority on suction dredging?

A.—Yes.

Q.—And Mr. Meik, who at a very early date after this became partner with you, is put forward as a great authority on sea protection work?

A.—Yes.

Q.—"The letter concluded that it was the earnest desire of His Excellency the Governor in Council that this project should receive the serious consideration of Government as highly productive work, an early prosecution of which was necessary for the growth and prosperity of the City of Bombay, and that it might be recommended for acceptance by the Secretary of State."

A.—I would like to emphasize that the letter from the Bombay Government says " The investigation had been most carefully made and might be accepted as exhaustive. The report was clear and complete, all doubtful points had been settled, and the revised estimate might be accepted as completely trustworthy and ample " I think that is worthy of emphasis.

Q.—I did read it, but you are quite at liberty to emphasize it, and I am glad you have done so. It is a matter we have to consider. That revised estimate was 325·61 lakhs, was it not?

A.—Yes.

Q.—And the Government of Bombay was pinning its faith and pledging itself as decisively as a Government could to the propriety of that estimate?

A.—Yes.

Q.—Then you say " The decision of the Government of India on the letter from Bombay was to postpone consideration of the scheme," which is a habit which Governments have, is it not?

A.—Yes.

Q.—" But to appoint a strong, fully representative committee to consider the general question of the future development of Bombay city."

A.—Yes.

Q.—That is rather an important moment. You see, up till now right from 1863 onwards, nothing had been discussed except the reclamation of Back Bay and just the 127 acres in Colaba. Now we get the Government of India coupling with that the general question of the future development of Bombay City?

A.—Yes.

Q.—If, as a result of the deliberations of this committee, it should be decided that the reclamation of Back Bay was desirable, a beginning would be made by following the suggestion of Messrs. Lowther and Kidd; that is, to first take in hand the reclamation of an area of 84 acres, the cost of which was estimated at 37 lakhs." Messrs. Lowther and Kidd had suggested, had they not, that there could be an alternative reclamation of a small strip of 84 acres?

A.—Yes.

Q.—And they put the cost of that at 37 lakhs. It was on that that the Government of India fastened, and said: " Well, if the committee recommend, begin on that small area." Up to this point, is it putting it correctly, in your opinion, to say that the attitude of the Government of Bombay throughout was that of a Government very desirous of having the reclamation?

A.—Undoubtedly

Q.—And the attitude of the Government of India very cautious?

A.—Yes.

Q.—In 1916, that is five years later than Mr. Kidd's report, the late Mr. Russell was then Secretary to the Government of India in the P.W.D., and he recorded these views in March, 1916. You set them out, but the point I wish to emphasise is on page 16 : " Generally, however, the estimate seems to have been prepared with great care, and probably contemplates this." That is that certain material would settle. "Altogether in its technical aspect the work appears to be quite feasible, and presents no insuperable difficulties with every likelihood, as far as can be judged, of being carried out at its estimated cost of Rs. 325 lakhs."

A.—Yes.

Q.—That, therefore, is the considered opinion of Mr. Russell, the Secretary to the Government of India in the P.W.D., approving Mr. Kidd's plans as regards feasibility and approving the estimate? That is right, is it not?

A.—Yes.

Q.—" The sufficiency of material has now been finally settled." You would like that point emphasized?

A.—Yes.

Q.—" And the closeness of the three estimates, namely 6·7, 5·8, and 5·86 per square yard of gross area reclaimed, coupled with the fact that a reliable firm of engineers is ready to execute work at the last-mentioned rate may be taken as indicating that the estimate under consideration is probably as reliable as can be expected." So that, in its broad details, Mr. Kidd's scheme had also the approval of the Secretary of the P.W.D. of the Government of India?

A.—Yes.

Q.—Down to the bottom of page 16 is there any other matter in Mr. Russell's memorandum that you would like me to mention or to discuss with you?

A.—I take it that I shall have an opportunity later on of going into greater detail?

Q.—We must do so, of course. I should like you to understand that I am now trying to get all the introductory matter quite clear. After that, of course, we shall have to go straight through the various facts. I am now just prefacing this, so that people may understand exactly what was, according to your statement, the position of the Government of Bombay in relation to the scheme, the position of the Government of India, the position of Messrs. Lowther and Kidd, and all the people who took a prominent part in it.

A.—Quite so. I do not think there is anything which I particularly want to emphasize in this. I might say, with reference to page 15, that Mr. Kidd's project was supposed to be a complete working project.

Q.—Undoubtedly. I read that at the bottom of the page.

A.—I would also like to draw attention to the fact that Mr. Russell's remarks, at the top of page 15, " Without a great deal more detailed information as to the number, cost, and capacity of the dredgers, length of pipe-line, necessity or otherwise of a short delivery line, it is impossiblle to criticise the rate."

Q.—Yes, but it goes on to say, " but I should say that the rate of Rs. 23 should be ample ".

A.—Yes.

Q.—I had better read the whole of your paragraph 16, I think. " In November, 1912, the Government of Bombay appointed a Committee of prominent and representative citizens to investigate the financial features of the scheme, and to answer a series of questions dealing with the need for reclamation, the probable demand for building sites, the effect upon the value of existing landed property in Bombay, and other important matters. This Committee reported on the 22nd January, 1913, and concluded their remarks by saying that they wished to lay stress on the fact that the scheme was not only financially sound, but that it would add to the beauty of the City, and after some years would add considerably to the resources at the disposal of the Improvement Trust in its efforts to reclaim insanitary areas." So there, again, we find the reclamation of Back Bay linked up with the housing problem?

A.—Yes.

Q.—Then the Government of Bombay, on the 11th March, 1913, returned to the attack, and wrote to the Government of India pressing that sanction should be given to the work, and you say, " The Government of India, however, was still unconvinced and expressed the opinion that a strong representative Committee should be invoked to consider the future development of Bombay City in all its bearings, and expressed the view that if the Committee were in favour of the Back Bay scheme, a beginning should be made with a strip of land measuring 84 acres." Do you mind turning back. Is that the same Committee about which we were talking a few minutes ago at the bottom of page 13? Is this a repetition of the bottom of page 13?

A.—No, I think that is a new Committee.

Q.—That Committee, again, had their attention called to the 84 acre scheme of Mr. Kidd?

A.—There had been very many committees.

Q.—Then you say " The Bombay Development Committee was accordingly appointed by Government of Bombay resolutions dated October and November, 1913, and their report was issued in April, 1914. This report contained no specific recommendation to undertake reclamation in Back Bay on a large scale but suggested that an area of 100 acres should be reclaimed in order to provide accommodation for certain urgently required public buildings." Then, in the next two or three years, there were several schemes. The matter was not allowed to rest at all, and on the 15th September, 1916 the Government of Bombay pressed the Government of India to allow them to reclaim 220 acres, did they not?

A.—Yes.

Q.—Then the Government of India said " No, that is not in accordance with the decision arrived at in 1913 "; and they said they could only consider a much more modest scheme and only entertain it if the Government of Bombay could show that it could be financed out of provincial resources. Is that how it stood?

A.—Yes, that is how it stood.

Q.—That is the history up to the end of 1916. Then we come to the very important date of December 1917. In December 1917, did a group of Bombay gentlemen interest themselves in this question of the reclamation?

A.—Yes.

Q.—Were they Sir Sassoon David, Sir Shapurji Broacha, Sir Fazalbhoy Currimbhoy, Sir Vithaldas Thakersey and Sir Lallubhai Samaldas? That was the first syndicate?

A.—Yes.

Q.—I do not know, Sir George, whether you are in a position to tell us whether those gentlemen were very influential and prominent citizens of Bombay?

A.—I am not in a position to say so as a matter of fact, but it was generally understood that they were.

Q.—It rather sounds like it, does it not?

A.—Yes.

Q.—And not only prominent citizens, but very enterprising and very hard-headed citizens?

A.—Yes.

Q.—And they proposed to carry out the Kidd scheme for the reclamation of the 1,145 acres, did they not?

A.—Yes.

Q.—What they wanted was a concession, and they assured Government that all the necessary capital could be provided?

A.—Yes.

Q.—In the same month did Messrs. Tata Sons, Limited, also come to the front?

A.—Yes.

Q.—Did they want to have an option to consider whether they would undertake the development also?

A.—Yes.

Q.—Neither the first group nor Messrs. Tata Sons, Limited, were, I suppose, doing this for philanthropy, were they?

A.—No. I do not think it was ever suggested they were philanthropists.

Q.—There may have been a certain sentiment about the improvement of Bombay, but it is obvious from what you put in your statement, and from the evidence which we have had, that they were of opinion that there was money in it?

A —Undoubtedly.

Q.—And that the reclamation could be done according to Mr. Kidd's estimate, and that the result would be a profit to whoever undertook it? That is right, is it not?

A.—I do not think they ever gave any guarantee that they thought it could be done according to Mr. Kidd's estimate. They were not carrying out Mr. Kidd's scheme. They said that if the option were granted to them they would at once engage the requisite engineering staff to prepare a scheme of their own. I do not think they were contemplating following Mr. Kidd.

Q.—Will you look at page 18 of your own statement—" and they said that they intended to carry out the work according to the intended programme of Messrs. Lowther, Kidd & Co."

A.—Yes, the intended programme. I did not mean that they were going to pick Mr Kidd's scheme.

Q.—They were not going to be slavishly bound, but they were going to reclaim an area of 1,145 acres by suction dredging, presumably, and they believed that they could make it pay?

A.—Yes.

Q.—That they would not only reclaim the land, but would make it pay?

A.—Yes, and that if they were given the option they would at once engage the requisite engineering staff to prepare a scheme.

Q.—Then the opposing groups combined into one, did they not?

A.—Yes.

Q.—And the matter was discussed with Sir George Carmichael. At this time Lord Willingdon was the Governor, was he not?

A.—Yes.

Q.—He had, in January, 1918, about 11 months to remain in office before the arrival of the new Governor?

A.—Yes.

Q.—Was the effect of the discussions with Sir George Carmichael, with the Sassoon David and the Tata group that Government resolved to have a report by an independent engineer?

A.—Yes.

Q.—Before they had come to that decision, were Messrs. Lowther and Kidd themselves anxious to do the work as agents for Government?

A.—They were.

Q.—We need not take this in great detail, but they had been pressing from 1914 for Government to entrust the work to them?

A.—They had.

Q.—It is only business?

A.—Yes.

Q.—Mr. Kidd, I think, had left the firm of Lowther & Kidd and had joined the firm of Messrs Armstrong, Whitworth & Co.?

A.—Yes.

Q.—And later Messrs. Armstrong, Whitworth & Co. were not indisposed to do certain reclamation work?

A.—They sent in a definite proposal.

Q.—On page 24 you set out a letter of the 9th December, 1918, signed by the Secretary to the Government of Bombay Public Works Department, addressed to the Government of India, saying " that the Bombay Government had always recognised that before the estimates prepared by Messrs. Lowther & Kidd in 1912 could be adopted, it would be necessary to have them scrutinised by an independent expert on the spot; for these reasons they desired to have the scheme examined by the best expert whose services could be secured. His report would enable them to calculate with greater approximation what the value of the concession was likely to be. The expert, said the letter, should be one who had experience in harbour and reclamation, and the knowledge of recent developments of dredging and pumping appliances." Then it deals with the fee.

A.—I would just like to point out to you, Mr. Chairman, that I say in paragraph 26, on page 24, that the Joint Secretary to the Government of Bombay addressed a letter to the Government of India——

Q.—I will ask you to wait for a moment. I have read you the letter of the 9th December, 1918. I prefer to get the story in chronological order. I will come back to that letter. For the moment let us consider the letter of the 9th December, 1918, in which the Government of Bombay were asking for the services of the best expert who could be secured. Then, on the 24th January, 1919, some six weeks later, Sir W. G. Armstrong, Whitworth & Company, Limited, were offering to do some work, as " they observed that in connection with the scheme they desired to emphasise " —this is the point you want, is it not?—" that by far the most important item governing the ultimate total cost was that of dredging, which arose from the fact that in no part of the world had any similar work been executed under anything like the same conditions as to depth from which material had to be obtained combined with distance to which it had to be delivered."

A.—Yes. What I wanted to point out was that the Government of Bombay were hardly consistent in their letter of the 9th December, 1918, in saying that before the estimates prepared by Messrs. Lowther & Kidd could be adopted it would be necessary to have them scrutinised by an independent expert, because in their letter of the 7th August, 1912, they said " that the drawings might be considered as complete working drawings, which would give sufficient information for examination of the designs and for the immediate commencement of the work; the investigation had been most carefully made and might be accepted as exhaustive. The report was clear and complete, all doubtful points had been settled." I say that that letter is inconsistent with the letter dated 9th December, 1918.

Q.—In December, 1918, the gentleman who was Joint Secretary (and it is the Joint Secretary who is writing) would not be Joint Secretary in 1912?

A.—No, they were different personalities.

Q.—You do not object to the letter of the 9th December, 1918, do you, asking for the best expert whose services could be secured; because it was by that means that you came to do the work.

A.—No, I do not object.

Q.—Now we come to an important date The letter which I have just read of the 9th December, 1918, was written at the time when Lord Willingdon was on the eve of leaving Bombay?

A.—Yes.

Q.—And on the 25th January, 1919, which is the next date you mention, Lord Lloyd had arrived as Governor?

A.—Yes.

Q.—At the bottom of page 24 you say " On the 25th January, 1919 (by which date Lord Willingdon had been succeeded at Bombay by Sir George Lloyd) the Secretary of State for India asked the Government of India by telegraph whether the latter agreed with the Government of Bombay that the expert to be selected should be an independent person," and then he dealt with those matters which had been under discussion with Messrs. Lowther & Kidd. Then on the 5th March, 1919, the Government of India gave a history of the scheme, and stated that it was in agreement with the Government of Bombay that, with a view to a settlement of this long outstanding question, the project

should be examined by the best expert available so that an authoritative opinion on the scheme might be obtained, and the closest possible estimate of cost be framed. Then you quote, " The expert selected, the Government of India thought, should be one who had large experience on harbour and reclamation works, and knowledge of the most recent dredging and pumping appliances, and, as suggested by the Government of Bombay, should be entirely independent of any of the firms that had applied, or were likely to apply for the concession." Then we come to the telegram of the 8th April, 1919. The Governor of Bombay sent this telegram to the Secretary of State. It has been read more than once, but I must just give a summary of it to make the story intelligible. The Government of Bombay say, " Back Bay Reclamation Scheme: Government of India has asked you to send out best expert available to examine and make final report on above. Government of India has also asked us to send all plans to Delhi for transmission to you in order that expert may study them before departure. (1) I think this procedure involves unnecessary delay," that is, the sending of plans. This appears to be a personal telegram from Lord Lloyd, does it not? It says " I " think. " I have consulted the Government of India and Sir Claude Hill concurs in proposing you should send expert out at once to arrive Bombay not later than the third week of May." Then it is suggested that certain persons could advise regarding choice of experts, and now comes the mention of your name for the first time: " Failing your ability to find expert in short time available my Government would agree to using Sir George Buchanan, whose services would probably be available and whom the Government of India recommend. (6) My telegram has been drafted in consultation with the Government of India and is being communicated to them. (7) Please telegraph immediately whether expert can be found in time to arrive by middle of May, or whether we should proceed with Buchanan." Lord Lloyd's attention was called to that telegram, but he was not able to tell us who it was made the recommendation or in what manner the recommendation had been made. Do you happen to know at all?

A.—No; I do not think I can enlighten you on that point.

Q.—It does not matter; it is immaterial. On the 7th May, 1919, you got a telegram. You are then at Simla?

A.—I was then a member of the Government of India Munitions Board.

Q.—But you were at Simla?

A.—Yes.

Q.—" My Government are desirous of securing your services at once to examine and report upon the Back Bay reclamation scheme. All plans and data are here, but it would involve your being in Bombay before the break of the monsoon, and for as long afterwards as you found necessary for the preparation of your report. Please telegraph informing me whether you will undertake the work, and in a following letter suggest terms." That is a telegram from Sir George Lloyd to yourself?

A.—Yes.

Q.—Then you say: " The foregoing brings the history of the case up to May, 1919. I have gone into the matter in some detail in order to show that so far from the scheme being prepared in secrecy and forced upon an unwilling people by an arbitrary Government every possible opportunity for years had been given for free discussion, and that no less than 18 different projects had been discussed."

A.—Yes.

Q.—" The Government of India certainly showed no disposition to rush the matter, and in a letter from Mr. Montagu, then Secretary of State for India, to the Viceroy, dated 7th November, 1918, occurred the following paragraph: ' I still feel a little anxious about the Back Bay reclamation scheme in Bombay. My views are that it should be put forward as a valuable contribution to the housing difficulty in Bombay, but my views are very strongly, on the evidence before me, that if it is undertaken it should be undertaken as a Government enterprise and not given to any concessionaires.' "

A.—Yes.

Q.—To try and locate that letter, that letter was just 12 months after the Sassoon-David syndicate and the Tata syndicate had revived the matter by asking for a concession?

A.—Yes.

Q.—That must obviously have been known to Mr. Montagu, and must have been in his mind?

A.—Yes.

Q.—As to whether, amongst other things, the matter should be undertaken as a Government enterprise or be handed over to some concessionaire?

A.—Yes.

Q.—Then on page 27, paragraph 31, you say: " When I received the telegram already quoted from Lord Lloyd I was a member of the Government of India Munitions

Board; but the War was over and I was on the point of terminating my duties with the Munitions Board, so I telegraphed my acceptance of the offer." You telegraphed your acceptance, and then you say: " In a letter from Simla dated the 12th May to Sir George Lloyd I made the following remarks: ' The work is of a kind with which I am familiar, as I designed and carried out the very large river training and land reclamation scheme on the Rangoon River, while I was also responsible for initiating all the reclamation works at Basra which have transformed the river front on the Shatt-al-Arab.' " Had you up to this time any previous personal experience of reclamation on an open sea front?

A.—I do not quite understand you.

Q.—What do you not understand? Had you up to this date, 1919, any previous practical experience of reclamation upon an open sea front?

A.—If you put it in that way I say, No; but I should like to say something about that later.

Q.—In the letter you say you carried out a very large river training scheme. " River training " means, does it not, directing the river into some desired channel?

A.—Yes.

Q.—That was at Rangoon. I think the result of that work, taking it shortly, was that it was completed by you in 1913, and in 1916, three years later, Sir Harvey Adamson spoke in terms of the highest appreciation of your work in Rangoon?

A.—Yes.

Q.—And you received the honour of knighthood for that work. Then in 1916 you were employed in Mesopotamia and, as you say, initiated all the reclamation works at Basra which have transformed the river front of the Shatt-al-Arab. In 1917 you received the K.C.I.E.?

A.—Yes.

Q.—Now, continuing the letter, on page 28, you quote: " I have seen Sir Thomas Holland to-day, and I have arranged to leave Simla for Bombay on the 17th instant. I have at present only a superficial knowledge of the Back Bay scheme, but I assume that plans, cross-sections and borings are available (as there would certainly not be time to have these prepared before the monsoon) and that the reclamation is proposed to be effected by dredging outside a retaining wall marking the limit of reclamation and depositing inside the wall. In that case, one of the principal problems would be to decide on the best type of dredger, and whether at the present greatly enhanced price of these machines the scheme would be practicable from the financial point of view." You will not mind my suggesting that you could hardly have given more excellent advice? At that moment the thing which had to be considered was the best type of dredger, if you were going to rely on dredging, was it not?

A.—Yes.

Q.—Secondly, it would be your duty to consider whether you could advise the Government of Bombay to carry on the scheme in view of the enhanced prices of dredgers, boosters, pipe lines, and everything of that character?

A.—Yes.

Q.—Therefore, you must have had it in your mind when you wrote the letter that it was possible that the cost of the machines might be prohibitive, and that you would have to advise the Government not to carry out the scheme?

A.—Yes.

Q.—I think you arrived in Bombay on the 19th May, 1919, and saw Sir George Curtis; and on the 21st May you received a letter from the Governor, Sir George Lloyd, saying he was glad you had consented to undertake the Back Bay scheme, and that he thought the whole scheme depended upon the mammoth dredger, its cost, and when it could be sent out, and that he believed this was the biggest dredging scheme ever contemplated, and as such would, he was sure, interest you?

A.—Yes.

Q.—Then on the 23rd May, two days later, you wrote to Sir George Lloyd saying you had gone through all the plans and papers and had been able to form an idea of the work required, and as far as the sea wall was concerned there was no engineering difficulty: " But, as I thought would be the case, the crux of the whole scheme lay in the provision and successful working of the dredger or dredgers, and that under those circumstances the sooner I get home to tackle the dredging problem with builders of dredging plant the sooner I shall be able to decide on the best action to take." Therefore, you suggested you should go home on the 31st May?

A.—Yes.

Q.—Will you just look at the passage: " The crux of the whole scheme lay in the provision and successful working of the dredgers or dredgers "?

A.—Yes.

Q.—Was not really the first thing that had to be ascertained with certainty that you had in the harbour a material of a depth and character suitable for dredging?

A.—Yes; and I was quite satisfied.

Q.—I am putting it to you that that would be the first thing to ascertain, obviously?

A.—Yes.

Q.—If no material, no dredging proposition?

A.—Obviously.

Q.—If it should happen that although there was the material it proved to be unsuitable for the dredger, naturally the scheme would fail either wholly or in part?

A.—Yes.

Q.—We are now in May of 1919, but even as late as February of 1922, three years later, after the dredger had been ordered, were you saying: "Much depends on the nature of the matrial dredged, and that can only be definitely ascertained when actual dredging begins?"

A.—That is so; but I take it I shall have an opportunity of explaining that letter later.

Q.—Certainly.

A.—We need not go into details at the present moment. I accept that.

Q.—I am coming back to that. Would you take a copy of your reports, as we might just follow this through. Have you seen that little book before? (*Small book handed to the Witness.*)

A.—No; I have not seen it.

Q.—They are your reports on your visits to Bombay in connection with the Back Bay Reclamation Scheme. I suppose you have a copy of your report of the 11th February, 1922?

A.—I have.

Q.—These have been provided for official use. I assume them to be correct, but if they are not correct you will point out anything which is wrong. I will just take you through the various references as to the quality of the material that occur in this book, and then I would like, and I am sure the Committee would like, you to give us your explanations.

A.—These are my annual reports?

Q.—Yes. Would you turn to page 8 of that? I am just going to give you the references and then I will ask you a question on them. You say on page 8: "Much depends on the nature of material dredged, and that can only be definitely ascertained when actual dredging begins"?

A.—Yes.

Q.—I will just tell you what my suggestion is. My suggestion is, if that was your state of mind in 1922 it must also have been your state of mind in 1919, must it not?

A.—No; I do not agree.

Q.—Why not?

A.—I can explain that; but it was not my state of mind in 1919.

Q.—What had happened then?

A.—I would like to go into the question of clays, but were there any other references you desire to make?

Q.—Yes; a great number of them. Will you turn to page 12: "Wall construction will be easier and speedier than I anticipated, and the only uncertainty concerns the exact nature of the material to be dredged from the harbour and used as filling"?

A.—Yes.

Q.—That is the 11th February, 1922?

A.—Yes.

Q.—By that time the dredger was ordered, and more than £350,000 worth of plant independently?

A.—Yes.

Q.—Taking the dredger and plant up to this date, the cost was somewhere in the neighbourhood of £655,000?

A.—Yes.

Q.—I will just take you to another reference on page 25: "It has always been realised that the successful reclamation of the area enclosed, by pumping through pipe-lines material dredged from the sea bed, is the crux of the whole scheme." Then on page 29, paragraph 6, there is this: "In May, 1921, the Chief Engineer in letters to us raised the question as to the suitability of the material in the harbour for reclamation purposes; he said it had been very unfavourably reported on by experts, and he discussed the possibility of obtaining more suitable material in Back Bay. In our

letters dated the 22nd June and 2nd July, 1921, we quoted the specific statements on the subject made by Mr. Kidd in his report dated 3rd August, 1912, and said that we were unable to accept, without much more information, the pessimistic report as to the unsuitability of the material in the harbour and that it was impossible to come to any conclusion until a dredger had been actually at work for some time on the spot?

A.—Yes.

Q.—Having handed in your report in October, 1919, a dredger on the spot could have reduced this uncertain factor to absolute certainty, could it not, between October and December?

A.—There has never been any uncertainty in my mind as to the suitability of the material for dredging. May I read some notes I have made on that point?

Q.—Shall we just finish this, and then you can read the note, but probably you would like to see the whole of these references to which I wish to direct your attention. The next is on page 30, that is in November, 1922: "I again visited Bombay and was accompanied by Mr. W. T. Halcrow (now a member of my firm). The Chief Engineer had been proceeding with his investigations in Back Bay since my last visit, and on the 8th December, 1922, I convened a conference on the subject of dredging, at which were present the Chief Engineer (Mr. Lewis), Mr. Halcrow, Mr. McMurray, of Messrs. Simons & Co., and myself. During the conference the Chief Engineer again expressed his fears about the suitability of the material in the harbour for reclamation purposes and proposed to abandon the harbour and reclaim the whole area from Back Bay." At one time during that conference did you agree that if sufficient first-class material could be obtained from Back Bay it would be better to use it than the mud and clay in the harbour?

A.—I do not think I ever agreed to use the material from Back Bay. I do not think I ever made an unqualified agreement. The use of the material from Back Bay was not initiated by me, and I do not remember an unqualified agreement.

Q.—I have a memorandum signed by yourself dated Bombay, 16th December, 1922, and it is clearly the memorandum on which you are basing this report, and it says: "The general question of dredging was discussed." Up to this time had there been no dredging at all?

A.—No.

Q.—The dredger had arrived in March, 1922, and was laid up?

A.—Yes.

Q.—This is your own note: "It was agreed that if sufficient first-class material could be obtained from Back Bay without undue risk to the pipe-lines and dredgers, it would be better to use it rather than the mud and clay from the harbour." That was a complete reversal of the scheme, if it had been embarked on, was it not?

A.—Yes.

Q.—Originally your plan was that the "Sir George Lloyd" would go into the harbour?

A.—Yes.

Q.—She would have a pipe-line up to 5,000 feet if necessary?

A.—Yes.

Q.—She would dredge the harbour bottom down to 70 feet if necessary?

A.—Yes.

Q.—And she would pump the material through her 5,000 feet of pipe-line?

A.—Yes.

Q.—Where it would be picked up by the booster, the "Colaba," and pumped along either 5,000 feet or a less number of feet on to the proposed reclamation?

A.—Yes. What was the page in this little book where your last quotation was from?

Q.—I am reading now from a big volume entitled, "The Back Bay Reclamation Scheme," page 65. I am reading from the volume of correspondence. It is the memorandum of the 16th December, 1922, signed by yourself, of a meeting in the Chief Engineer's office. Paragraph 3 says this: "The general question of dredging was discussed. It was agreed that if sufficient first-class material could be obtained from Back Bay without undue risk to the pipe-lines and dredgers, it would be better to use it rather than the mud and clay from the harbour. There was, however, no indication at present that large quantities could be obtained from Back Bay, and therefore the plan must be proceeded with to use the harbour material. Mr. Halcrow suggested the dredger 'Sir George Lloyd' be commissioned and the first pipe-line laid, but only a small area now practically ready at the 'Colaba' end of the reclamation. The plant would be ready in three months and leave two months for experimental pumping." "Experimental pumping" means not merely getting the crew into condition, but it means experimenting as regards the nature of the material that you would be dealing with, does it not?

A.—No.

Q.—Surely it must. Look at the few lines above? The proposal before you was to go into Back Bay and have nothing to do with the harbour?

A.—Yes.

Q.—The reason was that the material in the harbour had been unfavourably reported on?

A.—Yes.

Q.—Mr. Halcrow then says: " Well, get the ' Lloyd ' into commission, and have two months' experimental pumping?

A.—Yes.

Q.—Was not that to find out what sort of stuff you would pump?

A.—It was not to find out whether the dredger could pump the material.

Q.—Was not it to find out the kind of material which constituted the bed of the sea?

A.—Well, yes, taking it in that way, I suppose it was.

Q.—There had been a statement made by Mr. Lewis that a Mr. Mitchell had reported very unfavourably on the stuff in the harbour?

A.—Yes.

Q.—One of the purposes of this meeting of December, 1922, was to discuss what was to be done about the dredging?

A.—Yes.

Q.—Mr. Halcrow put forward the suggestion that the ' Lloyd ' should be commissioned, and you should try to find out in two months what the material really consisted of. " This was considered to be pressing things too much, and Sir Lawless Hepper again asked Mr. Lewis if he could not fix up his barge with a crane and grab which were dismantled some weeks ago to make tests, as Mr. McMurray had received information that the new grab dredger was not likely to arrive before April. Mr. Lewis promised to see what could be done, but did not think he could grab deeper than 15 feet deep in the sea bed. This, however, would give samples of the least suitable material." Anyhow, is it fair to say that in December, 1922, neither you nor Mr. Halcrow, nor Mr. Lewis, nor Sir Lawless Hepper, nor anyone was able to say what was the nature of the sea bed which it was proposed to dredge?

A.—No, I would not say that at all. I should say that we knew the nature of the material, but we did not know how it would dry out. May I explain a little about this phrase " stiff and unctuous clay "?

Q.—I will just finish this. You will have every opportunity at any time you want to make any statement you please. We want all the help you can give us.

A.—My point is there is a complete misunderstanding between us on the subject of the material in the harbour.

Q.—Then page 32 of this little book contains another reference in your reports. I am just giving you the references to the various mentions of material in your reports: " It was an agreeable surprise to see that what was being pumped consisted largely of a hard, compact clay with which we had reason to be quite satisfied "?

A.—Yes. As a matter of fact later on we were not satisfied with it, but that is another point.

Q.—True. Then the next passage is at page 37: " The ' Sir George Lloyd ' and ' Colaba ' were designed to discharge 2,000 cubic yards of soft clay per hour through 10,000 feet of 42-inch pipes. Last season the material actually dealt with was not soft clay, but silt and stiff clay, with some sand and stones "?

A.—Yes.

Q.—Does not that point to the fact that you met material of an unexpected character?

A.—No. In the light of experience we ascertained that the dredger was dredging too deep. She ought not to have gone down where she was.

Q.—" Which, although much better than soft clay from the point of view of suitable material for reclamation, is heavier and more difficult to pass through the pipe-line "?

A.—Yes.

Q.—" Until considerably more work has been done, it is impossible to say of what the bulk of the material to be dredged would consist." That was in 1924?

A.—Yes.

Q.—Is not that a definite statement that even then it was impossible for you to say what the bulk of the material to be dredged would consist of?

A.—No; we knew that the material was soft silt, and what is known as stiff unctuous clay, but we did not know how much soft clay we would get or how much stiff unctuous clay. We knew that we should get ample material, either soft clay or stiff unctuous clay. We knew that we should not have to dig down into the hard stones and clay. A

large portion of the area that Mr. Kidd had proposed, where there was more stiff unctuous clay than silt, had been taken away from us, and we did not know how much stiff, unctuous clay we were going to get, or how much soft silt. Mr. Kidd in his report had said either the silt or the clay is suitable for reclamation purposes, but that the clay was better than the silt. Very well then. We found we could not get as much of the clay as of the silt. The whole discussion was with reference to the quality of the silt for making land, not in any way connected with the capacity of the dredger for dredging it. Shall I now read my notes?

Q.—Let me just finish this passage. You say: " Until considerably more work has been done it is impossible to say of what the bulk of the material to be dredged will consist "?

A.—Yes.

Q.—That is your report?

A.—Yes.

Q.—" But I think it is safe to assume that we shall not get to the full output of 2,000 cubic yards per hour, and that fact must be faced. If we get two -thirds of the estimated total output, we shall be doing well; but naturally the time required to complete the work, and the cost of the pumping, will be increased "?

A.—Yes; that was at a certain date; but in the light of experience we do not say that now. In the light of experience we shall neglect this. We say: Do not go digging away in this heavy stuff. It makes a very good filling but you can get any amount of filling higher up without going down into the clay and sand and stones.

Q.—Where have you ever said that? I do not recognise that as having been said in any instructions which you sent?

A.—Yes; we have repeated the instruction latterly. This was about the very beginning of the dredging operations. I was only in Bombay during two dredging seasons, and then only for a short time, but we have considerably more experience now than we had then. Our latest instructions to people in charge of the dredgers was that they were not to go ignorantly and stupidly digging into the hard ground. We said if they got into the hard ground—and, of course, we know that there is hard ground below the stiff unctuous clay, they should at once lift the ladder and go anywhere round about where there are millions of yards of suitable material. Our point now is in the light of experience there is all the material—in fact, the material is ideal—for filling the reclamation and the dredger is suitable. We are satisfied on these two points: (1) that the dredger can dredge the material; (2) there is the material. That is in the light of our experience to-day.

Q.—Can she dredge the material at a uniform rate of 2,000 cubic yards per hour?

A.—Well, I have not been out there recently.

Q.—What is your opinion?

A.—I should say, yes.

Q.—Then in December, 1924, you were saying: " I think it is safe to assume that we shall not get to the full output of 2,000 cubic yards per hour, and that fact must be faced."

A.—Yes. Now in the light of experience we think that this soft silt which has been so much talked of can make suitable reclamation, and we are not going to dredge this heavy material. We should leave it alone. If you were to use your dredger on anything at all except this bottom layer of clay and stones, the dredger cuts it all right but naturally it is heavier material and you would not get your 2,000 cubic yards. But we shall not do it. If you keep to where there is suitable material then you can dredge as much as you like.

Mr. Billimoria.—Where do you say, " Do not do it "? Is there any letter or correspondence or document in which you say that?

A.—Yes, there are documents on the subject—I think I can produce them—in which we have said, " Lift your ladder and do not go messing about there."

Q.—Dated 1926?

A.—Well, I can produce the letters.*

Mr. Billimoria.—If you please.

The Chairman.—For the moment we are discussing the harbour, are we not?

A.—We are discussing the harbour; we are not discussing Back Bay.

Q.—That is right. I want to put a figure or two to you. In December, 1924, as you were saying, you thought it safe to assume that you would not get the full output of 2,000 cubic yards an hour, and the dredging would be going on well if you got two-thirds of that output?

A.—Yes.

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* See Appendix V.

Q.—In fact, the history is, is it not, that in the first season she began operations on the 8th December, 1923?

A.—I will take that.

Q.—And throughout that season she did an average pumping of 1,020 cubic yards per hour. You have seen the figures?

A.—I have seen the figures, but really I take with great reluctance any figures which have been produced in Bombay.

Q.—Will you repeat that answer?

A.—Really I take with great reluctance any figures which have been produced in Bombay. In reading this evidence I am quite sceptical about any figures which have been produced for the Committee in Bombay.

Q.—At all events, the figures produced before us in Bombay are vouched for by Sir Lawless Hepper, Mr. Lewis and Mr. Elgee, and a number of other witnesses, and point to the fact that the " Sir George Lloyd " dredged 1,020 cubic yards per pumping hour during the season 1923-1924?

A.—Yes.

Q.—That during the season 1924-1925 she did 856 cubic yards per pumping hour, which is a considerable drop, and during the season of 1925-1926 she did 959 yards. Those three figures give an average of 941 cubic yards per hour, which is less than 50 per cent. of her output?

A.—Assuming those figures are correct, you mean?

Q.—Yes.

A.—Assuming they are correct, it does not necessarily imply that there was anything the matter with the dredger. Supposing you went to the Motor Show and brought a Rolls-Royce car, and you took it home, and we will suppose that not you but anyone handed it over to your wife who had only driven a Ford, and she went out with the Rolls-Royce and she could not get speed or anything out of it: you could hardly blame the Rolls-Royce Company if there was a complaint. I maintain that the dredger has never been worked.

Q.—Let us see how that analogy holds. You say a man buys a Rolls-Royce, and hands it over to his wife who had never driven anything but a Ford. Did you nominate Mr. Lewis as the engineer?

A. I did nominate Mr. Lewis.

Q.—Had you complete confidence in Mr. Lewis when you nominated him?

A.—I had complete confidence in him when I nominated him.

Q.—Did you nominate Mr. Speirs as dredging master, or did you get Simons & Co. to nominate him?

A.—I did.

Q.—Had you complete confidence in Mr. Speirs?

A.—At that time I had complete confidence in him.

Q.—He was a very good man?

A.—Yes.

Q.—Did you nominate Mr. Brims?

A.—I nominated Mr. Brims.

Q.—And approved of, and quite rightly pressed the appointment later on of Mr. Elgee?

A.—That is quite true.

Q.—I am trying to work out your analogy.

A.—But I did not nominate Sir Lawless Hepper.

Q.—But Sir Lawless Hepper did not work the dredger, did he?

A.—No.

Q.—Taking the actual conduct of the work, first of all there was Mr. Lewis, who should be the driving force, and secondly there was Mr. Speirs, the dredging master, and the crew?

A.—Yes.

Q.—With confidence in the dredging master and confidence in Mr. Lewis, ought not the dredging people to have got a better result than less than 50 per cent.?

A.—I do not think so. They did not work 24 hours a day, for one thing. Mr. Brims went out with orders to work 24 hours a day. They could not get their staff.

Q.—The point we were on was the quality of the material?

A.—Yes.

Q.—As to whether right the way down to December, 1924, nobody, neither you, Mr. Halcrow, Sir Lawless Hepper, Mr. Brims, Mr. Speirs, nor anybody, knew really what the dredger was going to come up against as soon as the dredger began to work?

A.—No. I beg your pardon. We knew what the material was, but we did not know how it was going to dry out. Perhaps I had better read my notes now on clay.

Q.—Do, please. It is not contained in your statement I understand?

A.—No, but I will give it to you.

Q.—Will you read it?

A.—" There has been so much talk during this inquiry about soft clay, stiff and unctuous clay and hard clay, and the unsuitability of the dredger for the material being dredged in the harbour, that one really gets on reading the evidence a little bewildered. I obtained such information as I possibly could about this material before I specified the dredger for soft clay. I had frequently been over the Sewri Reclamation with Mr. Messent, the late Chief Engineer of the Port Trust. I had also inspected the Bombay Dock works when under construction. I had to make use of land at Sewri, and personally examined it in connection with storing materials. I had frequently discussed reclamation works with Mr. Messent off and on for years past, and he was a friend of mine of 30 years' standing. From all the information I could obtain I diagnosed the material as soft, and I maintain that that is a correct diagnosis. I was, indeed, really rather surprised at Mr. Kidd, with his knowledge of the material, going to the extent of taking such a large number of borings. The very way in which the borings were taken satisfied me that there was at all events no hard rock or moorum above a certain level. Our great trouble and apprehension in Bombay was that we should not get enough of the stiff, unctuous clay, and would have to be content with the silt overlying the clay—we knew that there was silt, and we knew that there was clay. Mr. Kidd had said that both the silt and the clay were suitable for reclamation purposes. The Port Trust and the Indian Marine had deprived us of dredging over a large area where Mr. Kidd's borings had proved there was clay in abundance. The question which exercised my mind and the mind of the engineers in Bombay more than any other was whether this silt above the clay would dry out satisfactorily. A Mr. Mitchell in Bombay had given most pessimistic accounts of the time the material would take to dry out, and I began to be anxious whether, in the absence of the stiff unctuous clay, the silt would really be serviceable. My reason for advocating a test of the material and asking Mr. Lewis to borrow a dredger for experimental purposes was solely based upon this fact and had nothing whatever to do with the suitability of the material for dredging. Mr. Lewis obtained some of the silt and clay and deposited it within a small enclosed area. I carefully examined it on my return to Bombay before the dredging operations started. It seemed to me to dry out well, and I was quite satisfied; but Mr. Mitchell the pessimist came along and told us that the first rains would reduce it to a semi-liquid condition. When the dredger actually started work we were very pleased with the result. The material was clay and stones and sand, which was dealt with quite well by the dredger, and hardened out so quickly that in a couple of days the reclaimed ground could be walked over. The material was most excellent for reclamation purposes, and it was being well cut by the dredger, but it was not the stiff unctuous clay, and quite obviously, if there was nothing but this clay, sand and stones, although it made most excellent material for reclamation, you would not get the same output out of the dredger as you would with stiff unctuous clay. In the light of experience we came to the conclusion that this clay and stones and sand, which were the bottom strata, should be left alone, and it would be preferable, as soon as that was reached, to raise the ladder of the dredger and move on to the silt and clay. In fact, the complaint in one of our letters that the dredger was dredging in unsuitable material was with reference to the fixed determination of the dredging staff to work in stones, sand and clay when there was an abundance of other and more suitable material available.

Q.—What date is that letter; have we got it?

A.—I can give you the date; it is quoted.

Q.—Is it quoted in your statement?

A.—I think it is in my statement, but I can give you the date of it.

Q.—Is there any letter in which you tell them that they are working too deep?

A.—There is, and we can produce that.*

Q.—You will let me have that later?

A.—Yes. It has been stated that I used the words " hard clay " several times in my report; but when one writes one does not do so with the idea that words will be examined years afterwards with a microscope; if that were the case everyone would cease writing altogether. I knew the clay was not hard in a dictionary sense of the term—unyielding to the touch, solid. I used the term in reference to and in comparison with soft silt which did not harden at once on being deposited and in which a man would sink to his middle. In my report dated 14th February, 1924, I said: " I believe that the result up to date has been quite satisfactory; the material in the harbour had proved much harder than we were led to suppose, and the actual reclaimed land can be seen and walked upon by anyone who chooses to go to Colaba. The word " harder " obviously

* See Appendix V.

refers to the quality of the reclaimed land. Further, whatever I said or did not say we know for a fact that the clay is not hard clay. That was also stated definitely by Mr. Kidd in his evidence, with which I concur. If I may I should now like to come to the suitability of the dredger " Sir George Lloyd " which was designed for soft clay, to cut a stiff unctuous clay which Mr. Kidd assumes was in abundance. Mr. Kidd in his evidence said that he had satisfied himself that this stiff and unctuous blue clay is the same all over the harbour. He also said that the dredger " Jinga," the Port Trust dredger, had her best figure of output when she was working for the most part in blue clay, and he says that he was an eye witness of the successful cutting of the stiff unctuous blue clay at the Sewri reclamation when the " Jinga " working in blue clay discharged through 3,465 feet of pipeline at the rate of 1,480 cubic yards per hour. Now it is worthy of note that the dredger " Jinga " which did so extraordinarily well in this stiff unctuous clay was designed to work in soft clay. The " Sir George Lloyd " was also designed to work in soft clay, and has, I understand, the same cutter as that in use on the " Jinga." It seems to follow that if the " Jinga " did such excellent work in this stiff and unctuous blue clay, there is no reason why the " Sir George Lloyd " should not follow suit. Mr. Kidd also says in his evidence that he is satisfied that the material is available in sufficient quantity in the harbour, and that dependence can be placed upon the surveys made in 1912 for dredging in 1919, and that he is perfectly convinced that reclamation can be done to-day more cheaply by dredgers properly worked than by any other method. I concur entirely with Mr. Kidd in these conclusions. Mr. Kidd also had some interesting remarks to make on the magical effect of a bonus, and he relates how when he operated the Port Trust dredger for his own purposes he got outputs very much in excess of the very best outputs that had ever been obtained in the Port Trust operations, and he attributed these results solely to the fact that he had paid the crew a bonus on results. Personally, I have not the slightest doubt that the dredger is designed for soft clay which is the same as stiff and unctuous blue clay. I am satisfied that there is an abundance of material—that in the light of all the experience we have now got—in the harbour for reclamation purposes; but I am quite certain that under the existing organisation you will never get the output from the dredger.

Q.—I will return a little later to that; but your view as expressed here that the dredger is correctly designed for soft clay or stiff unctuous clay is in direct opposition to Mr. McMurray, is it not?

A.—I have never studied Mr. McMurray's evidence.

Q.—It is worth while looking at it. It will repay study.

A.—Mr. McMurray said that the dredger was designed for soft clay?

Q.—I will read you the extracts a little later, but I want to take this in passing. Is it not also in opposition to Sir John Biles' view?

A.—Sir John Biles was never in Bombay. I do not know what Sir John Biles said, but he was not out in Bombay.

Q.—Have you looked at his evidence?

A.—I cannot say that I have read the evidence. I have glanced at it.

Chairman.—I will refer a little later to the passages.

Sir Harry Courthope Munroe.—I have a supplemental statement which was got out last night which has a few additions to the statement you have already had.

A.—I have not got a copy of that. These are only some notes which I made for myself which I thought might be useful in the course of the examination, and naturally I will hand them in from time to time.

Chairman.—Going back to your statement, you speak of the letter of the 23rd May, 1919, but I think you omitted from your statement a passage of importance, namely, the statement: " That the best dredgers in the world were made by one or other of four firms in the Clyde district." Do you remember that?

A.—Probably. I agree to that.

Q.—One of the firms that you had in your mind would be Messrs. Simons?

A.—Yes.

Q.—Mr. McMurray is their London representative?

A.—Yes.

Q.—And a partner?

A.—I do not know what his position is.

Q.—Is he a man who has a very good knowledge of dredgers?

A.—Yes; he has as good a knowledge of dredgers as any man.

Q.—Sir John Biles said in his evidence that there were very few people who would pit their opinion against that of Messrs. Simons. Is that about right?

A.—For the particular type of dredger?

Q.—In dredging matters?

A.—No; for a particular type of dredger.

Q.—I think he said it generally—that generally Messrs. Simons were a firm whom very few people would care to pit their opinion against, meaning that Messrs. Simons as dredger-builders were people of eminence, experience and good judgment.

A.—Yes.

Q.—Do you agree with that?

A.—I agree with that.

Q.—There is a letter to which I must refer of the 25th of May from the Governor of Bombay to Sir George Buchanan. It is an important letter. It is quite short. Have you got the original here?

A.—Is that in my statement?

Q.—No; you do not mention it. I can summarise it and recall it to your recollection. We have had it read in evidence. It is a letter in which Sir George Lloyd said that he wanted you to tell him whether the project was feasible and whether prices made it a reasonable proposition, and that if you said it was not, he would abandon all idea of that project and turn to something else. Do you remember that?

A.—Excuse me; I think that was an interview. I do not think that was a letter.

Q.—I assure you it was a letter. I will find it in Lord Lloyd's evidence. I want to bring that out because it has been said that Lord Lloyd was definitely committed to the scheme, and that nothing would push him away from it. That letter ought to come out in fairness to Lord Lloyd, and you ought to express some opinion about that letter.

A.—Well, the gist of the letter, such as it is, is given in my statement at page 29.

Q.—I must read the letter. You may take it that there was a letter of the 25th May, 1919, in which Lord Lloyd told you that if you advised against it he would finally abandon the whole thing and would turn to some other project without another ten days' discussion. Does that recall it to you?

A.—I do not remember the letter. I remember the interview, because at page 29 of my note I have said: "On the 28th May, 1919, I had an interview with Sir George Lloyd. Sir George Lloyd discussed with me my terms of reference, asked me a number of questions, and said that the Back Bay scheme had for years past impeded progress in Bombay." He would give me his entire and absolute confidence, and if I said the scheme was impracticable he would turn it down at once and start on something fresh; but once my opinion was given he would refuse to allow any other expert to report; and he asked me not to let him down. That was the interview, but I do not remember the letter.

Q.—We have had the letter, and I will find it. That interview, when he asked you not to let him down, satisfied you that you had his full confidence, did it not?

A.—Certainly.

Q.—His full confidence?

A.—Yes.

Q.—If you wrote a report saying: "This is a feasible scheme. This can be done at such-and-such a price," you knew that Lord Lloyd would accept that as decisive and final and go ahead with the scheme?

A.—Yes.

(Adjourned for a short time.)

Chairman.—The letter which I mentioned before the adjournment is dated 25th May, 1919, and is in reply to your letter of the 23rd, which you have set out in part at page 29 of your statement: "My dear Sir George. Thank you for your letter of May 23rd. I should wish to leave the date of your departure entirely to your own discretion, and if you think that the enquiries and final report which I am asking you to undertake will be hastened rather than delayed by your getting to England at once, please make plans accordingly. All I am anxious for is to know as early as possible whether a Back Bay scheme is feasible, and, on present prices, is a desirable enterprise. If not to abandon it finally and turn our energies in other directions, or if it is found practicable to get on with the job without another ten days' discussion. I shall hope to see you on Wednesday next and discuss the matter fully with you." Do you recollect that letter?

A.—I seem to recollect that letter, but I do not seem to have got it among my papers.

Q.—It is an extremely business-like letter, is it not?

A.—Yes.

Q.—It goes to the two points—whether the scheme was feasible, and, on present prices, a desirable enterprise. It really follows out what you had said a little time before

when you had taken the two points up—whether it was practicable, and practicable at the prices then ruling?

A.—Yes.

Q.—Then he says " If not to abandon it finally "?

A.—Yes.

Q.—Do you read that letter as an indication that Lord Lloyd at this date, 25th May, 1919, was not in any way pledged to the carrying through of the Back Bay scheme?

A.—I do.

Q.—That if you had advised against it that would have been absolutely final, and, as he says, he would have turned his energies into other directions?

A.—Yes.

Q.—He says he wants to get on with the job without another ten days' discussion?

A.—Yes.

Q.—He may have had in his mind Mr. Rudyard Kipling's lines, that " the more we work and the less we talk the better results we shall get." It is not a bad working rule in life, even with Committees, is it, Sir George?

A.—I agree, Mr. Chairman.

Q.—Now, you concluded just before the adjournment by referring us to the substance of your interview with Lord Lloyd on the 28th May, 1919?

A.—Yes.

Q.—In which he places himself entirely in your hands and asked you not to let him down?

A.—Yes.

Q.—In writing a report the duty, of course, of every professional man is to put the pros of the scheme and the cons of the scheme fairly forward?

A.—Yes.

Q.—You set out whatever advantages you conceive the scheme has, and equally you must set out in full prominence the disadvantages. Is that so?

A.—Yes.

Q.—And the difficulties?

A.—Yes.

Q.—And the uncertainties?

A.—Yes, the uncertainties.

Q.—Of course, neither Sir George Lloyd nor Mr. Curtis, or anybody in Bombay, would be likely to be aware of the immense technical difficulties?

A.—No; if I may interpose a few words here, Mr. Chairman, I was not initiating a scheme which had not been previously considered. I was examining and reporting on a scheme which had already been accepted by the Government of Bombay, and which they had sent up to the Government of India for sanction, about which they said they had absolutely no doubt.

Q.—True. At the same time they were referring the matter to you as the final authoritative expert, were they not?

A.—Well, my terms of reference——

Q.—Wait a moment. Were not they referring the matter to you as the final authoritative expert?

A.—Yes.

Q.—In Lord Lloyd's own letter he makes it clear to you that if you pronounce against it he will turn his energies into other directions?

A.—Yes.

Q.—Will you continue?

A.—I agree, Mr. Chairman. I would again emphasise that I was not initiating a scheme which had not been considered before. I was examining and reporting on a scheme which had already been accepted by the Government of Bombay in terms, really, which you would have though might even have convinced the Government of India, but they did not.

Q.—That is putting the position quite exactly; that is right. It was because the Government of India were still unconvinced that they said " Let us have someone on whose decision we can rely "?

A.—Yes, but were not the Government of India unconvinced more especially on financial grounds?

Q.—In a moment we will come to the terms of reference and have a look at them. Did you, at the interview of 28th May, page 29, or at any other interview, tell Lord

Lloyd that the nature of the material could only be ascertained when the dredger actually began to work?

A.—No.

Q.—You must have known that, must you not, when you went to the interview?

A.—No.

Q.—Let us see what information you had. This was 28th May—two days before you were leaving for England?

A.—Yes.

Q.—By that time you had concluded your enquiries?

A.—Yes.

Q.—You had, of course, read Mr. Kidd's report at that time?

A.—Yes.

Q.—And you had seen his description of the clay?

A.—Yes.

Q.—You had seen that he had taken 1,314 borings and had recorded 1,159?

A.—Yes.

Q.—And you had seen plan No. 5?

A.—Yes.

Q.—What information had you between 28th May, 1919, and February, 1922, which led you, in February 1922, to say that the nature of the material to be dredged could only be ascertained when the dredger began to work? What had happened in the interval?

A.—The only thing that had happened in the interval was that Mr. Mitchell had expressed the opinion that this silt would not dry out. There was never any question as to whether the dredger would dredge the material or not. It was nothing to do with the dredger. When the Indian Marine and the Port Trust deprived us of a large area of land, we were left with a superfluity of silt, and the question arose whether this silt would dry out and make satisfactory filling. We now think that it will, but there were insistent statements in Bombay that this stuff would remain always in a semi-fluid condition, that it would not make good filling. I used to go down and look at the Sewri reclamation and examine that.

Q.—But did not the Sewri reclamation come to an end in 1913?

A.—The Sewri reclamation came to an end in 1913, but the land was still there.

Q.—The reclaimed area?

A.—Yes.

Q.—On plan No. 5 recording the 1,100 borings there are in each circle three sets of figures, are there not?

A.—Yes.

Q.—One is the silt?

A.—One is the silt.

Q.—So that a study of plan No. 5, if Mr. Kidd's borings were correct, would show you exactly the quantity of superimposed silt with which you had to deal?

A.—Yes.

Q.—When did you first begin to be uncomfortable about the silt as a possible material for reclamation?

A.—We have to go farther on into the statement for that.

Q.—Can you just indicate it to me, and I will pass away from it?

A.—On page 97 of the statement you will find there is correspondence initiated by Mr. Lewis.

Q.—That Mr. Mitchell had reported adversely?

A.—Yes.

Q.—On the 12th May, 1921, you write to Mr. Lewis " Mitchell's poor opinion of the material for reclamation is certainly disconcerting, but it cannot be any worse than the material used at Sewri "?

A.—Yes.

Q.—So that by the 12th May, 1921, you were disconcerted by Mr. Mitchell's opinion?

A.—I was disconcerted by Mr. Mitchell's opinion about the silt.

Q.—We are on silt now, Sir George. Ought it not to have occurred to you—or might it not have occurred to you—when you were studying Mr. Kidd's plan No. 5, that you would have a great deal of silt to deal with before you got at the clay?

A.—Yes, but we were going to put the silt at the bottom and the clay at the top.

Q.—Quite true. Therefore you did regard, in 1919, the silt as a material worth dredging?

A.—Yes.

Q.—It had to be dredged. You could not get to the clay?

A.—It had to be dredged, but in the light of events we are now quite satisfied with the silt.

Q.—You mean since the sealing of the sea wall?

A.—Not necessarily since the sealing of the sea wall. We will bring evidence later on.

Q. Are we going to have the pleasure of seeing Mr. Halcrow?

A.—Mr. Halcrow and Mr. Settle.

Q.—So be it. The first season's dredging, for some reason or other, was said to give an output of 1,020 cubic yards per hour instead of 2,000, and that matter was brought to your attention, was it not?

A.—Yes. Well, as I say, I do not accept any of these figures, but we will take them.

Q.—At all events let us put it generally. Was it brought to your attention that the output of the dredger in the season from 8th December, 1923, to April or May, 1924, was very disappointing?

A.—It was, yes.

Q.—Did you tell Mr. Cowasji Jehangir, Sir Lawless Hepper, and other gentlemen, that the first season's working must always be regarded as experimental?

A.—It depends on what you call experimental.

Q.—I am asking you first of all the question, did you in fact tell Mr. Cowasji Jehangir, Sir Lawless Hepper, Sir Leslie Wilson, the present Governor of Bombay, and other gentlemen, that the first season's dredging must always be regarded as experimental? You can explain afterwards.

A.—Yes, I will agree to that.

Q.—That being so, that was a fact which, of course, you would have known on 28th May, 1919, when you had the interview with Lord Lloyd. It was not a new fact to you?

A.—No.

Q.—Did you tell Lord Lloyd that the first season's working must be regarded as experimental?

A.—No.

Q.—Did you tell him that the cost of the dredging and filling must be an uncertain quantity until you had had actual experience?

A.—No, I did not think it would be an uncertain quantity.

Q.—Did you not? You thought it even as late as 1924, did you not? Look at page 39: "So far as I can see Mr. Lewis's figures are generally acceptable, except that the cost of dredging and filling must be an uncertain quantity until we have had experience of this season's work"?

A.—Yes. By "uncertain quantity," you have to take into consideration the hours of working and—well, everything connected with the working of the dredger.

Q.—Your estimate in your report of October gave the figure of eight annas per cubic yard, did it not?

A.—Yes.

Q.—That was an all-in figure for supplying the plant, supplying the dredger, the booster, the pipe lines. reconditioning of vessels, engagement and payment of crew?

A.—Yes.

Q.—All the operations necessary to dredge the silt and clay from the harbour, transport it across the peninsula and put it on the reclamation?

A.—Yes.

Q.—And I think in your report you expressed yourself as confident that your figures could be relied upon?

A.—Yes, I think they were based on reliable data.

Q.—How was it, if you were confident in October, 1919, that the figure for dredging and filling was eight annas a cubic yard, you were found saying in 1924 that the cost of dredging and filling must be an uncertain quantity?

A.—Because I was not so confident of the general arrangements. We were not working 24 hours a day.

Q.— As regards 24 hours a day, you never recommended that in your report, did you, Sir George?

A.—Not in my report, but when Mr. Brims went out, he went out with instructions to work 24 hours a day. He gave it in his evidence.

Q.—One of the matters that would always give a reduced output in the first year would be the necessity of training the crews, would it not?

A.—Yes. It would depend on whether you could get trained crews.

Q.—Anyhow, it is one of the uncertainties. You might be able to get a trained crew; on the other hand, you might have to train the crew?

A.—Yes, you might have to train your crew.

Q.—Was that a matter which you mentioned to Lord Lloyd at all as one of the uncertainties that might reduce the output in the first year?

A.—I did not discuss with Lord Lloyd all the contingencies that might possibly arise. I thought that the dredger was a practicable proposition. I still think, with proper working, it is and should always have been a practicable proposition.

Q.—With regard to these matters which I have mentioned——

A.—May I just interpose one remark here? When I went out to Bombay in the first year of the dredging, I found one man at work on the dredger. I said, " What is going to happen if that man falls sick? "

Q.—You mean Mr. Speirs?

A.—I was told, " Well, the dredger will have to stop work if that man goes sick." Surely that is an uncertainty? If you have all these uncertainties, what are you going to do about your prices, or anything else? That was the beginning of the dredging season.

Q.—That was December, 1923?

A.—Yes.

Q.—In your capacity as expert adviser, and supervisor of the work, did you make any representation to anyone with regard to that?

A.—I constantly made representations.

Q.—On that one point?

A.—Certainly I did, on that one point.

Q.—You wanted an assistant dredging master out, did you not?

A.—Yes.

Q.—And did they, in fact, get one?

A.—In fact they did get one.

Q.—The first year's working anyhow, must have been a failure, must it not?

A.—No. I do not see why it should have been a failure.

Q.—Do you not? They were only working one shift?

A.—From that point of view, certainly.

Q.—The first season's working must have given a very reduced output. Let us put it in that way?

A.—Yes, certainly, only working one shift.

Q.—I think the committee would very much like to know from you whether when you found one shift working, you discussed this matter with Sir Lawless Hepper, and said " You must get a second shift on at once." What did you do with regard to it? You see the position is this,is it not.? Sir Lawless Hepper has disclaimed any technical knowledge. He says " I was a mere administrative head." You were on the spot. You were seeing that there was only one shift, contrary to your advice. What did you do to force them to get a second shift trained?

A.—I was always faced with a *non possumus*. Certainly I discussed it with the dredging superintendent. Certainly I discussed it with Sir Lawless Hepper, but, as I say, we were always faced with a *non possumus*.

Q.—That puzzles me a little. You will forgive my trying to get at this. We want your help about it. You see you said in your report " This reclamation will be done in this manner."

A.—Yes.

Q.—" The dredger will pump 2,000 cubic yards per hour for 15 hours a day for 170 days of the working season working double shift."

A.—Yes.

Q.—The whole essence of the thing depended on double shift, did it not, according to you?

A.—Yes.

Q.—On at least double shift?

A.—Yes.

Q.—You went out there. You were the man whom Lord Lloyd said would, it was fairly obvious, be selected. Whatever you had said would have had to be obeyed I should have thought?

A.—Oh, no, Mr. Chairman.

Q.—Let us hear what difficulties you had in the matter. If you had said to Sir Lawless Hepper " You must get a double shift trained at once " and if Sir Lawless

Hepper had raised difficulties, ought not you to have told the Government of Bombay that you could not remain as engineer to the works?

A.—Yes, I might have resigned, certainly. But I was not carrying out——

Q.—Would not the slightest hint of your resignation have made everybody in Bombay do anything you wanted them to do?

A.—No, Mr. Chairman, I do not agree with that at all.

Q.—What would have been the position of Sir Lawless Hepper, who had assumed office on the strength of your report that the dredger was to work double shift, if he had said " Oh, we cannot get a double shift." ? He would have had to have got it, would he not?

A.—No, he would have said he could not get it.

Q.—Very well.

A.—I would like to produce the various letters in which we have urged them to get it.

Q.—Are they in your statement?

A.—I am not certain whether they are in my statement, but there are letters in which we have said " Will you get a double shift "? In the second year's dredging we sent out a cablegram saying " We must have a double shift, have you got the staff? "

Q.—But that was the second year?

A.—Never mind. The chief engineer replied, forwarding five references which he had made to the Development Department, to which he had had no reply at all, and in which he had asked that arrangements should be made.

Q.—I do not think we have got that correspondence?

A.—I will see that you have it.*

Q.—Thank you very much. We have just touched on the question of the first year's working being experimental, and on the reduced output owing to the possibility of having to train a crew, and matters of that kind. Are any of those difficulties indicated in your report?

A.—In my report of 1919?

Q.—Yes?

A.—No. You do not in a report indicate every possible contingency or difficulty which you may come across in the course of working. You cannot possibly know a lot of them.

Q.—But surely the object of an expert is that he should have had experience of similar works, and that he should know these things?

A.—It is admitted that this is the largest dredging proposition that has ever been done. Naturally, from time to time you would be up against new contingencies. It was not like building a house. You cannot foresee everything. You cannot foresee every small thing which is going to happen.

Q.—I am only on the broad things. You must have known in 1919, when you were writing your report, that the first season's work was likely to be experimental. Indeed, I think you have told us so. Ought not it to have been put in the report—just a passage saying something like this : " In all these big enterprises unexpected matters occur. For instance, the first season's working may be largely experimental because of the fact that we may be only able to get an untrained crew; we are not aware of the strength of the tides and many other difficulties,"—something of that sort?

A.—I can see circumstances where it would not have been experimental, where the dredger would probably have done most excellent work for the whole of the season. I admit that under the circumstances which existed in Bombay the dredger did not do the full output, but I do not admit that those were normal circumstances. I say that under other circumstances with competent and energetic men, they would have got additional output. I say, on page 116 of my statement : " Mr. Merritt, the assistant dredging master of the dredger ' Sir George Lloyd,' in the course of his evidence summed up the situation admirably. When asked in what respects the dredging in Bombay differed from work done elsewhere he replied : ' One is run by a private company, and they want their pound of flesh. If you do not turn over the percentage you have to make room for someone else.' " Under other circumstances, with a bonus on output and continuous working, those dredgers would undoubtely at all events have come up to such an output that there would have been no complaint about them.

Q.—I will return to that when we are dealing with the character of the material. Going back to page 29 of your statement, on the 29th May you wrote to the Joint Secretary of the Government of Bombay, Public Works Department, as follows : " With respect to the proposal to obtain my professional opinion and advice on what is know as the Back Bay Reclamation Scheme, I have read the terms of reference, and beg to reply as follows. I have examined the site on several occasions, and have satisfied myself that the survey and borings made by Mr. Kidd are sufficient to enable me to write my report." How had you satisfied yourself that the surveys and borings were sufficient?

* See Appendix VI.

A.—I do not think you ought to read those together, Mr. Chairman. I have examined the site on several occasions. I have been all over the site. By saying that I had satisfied myself about the survey and borings made by Mr. Kidd I did not mean that I took any borings. I had satisfied myself because I had got his.

Q.—I accept that interpretation of it. "By satisfying yourself" you meant, "I am satisfied in my own mind"?

A.—I am satisfied in my own mind.

Mr. Billimoria.—Is that the impression which an ordinary reader of that letter would get, Sir George—that it was in your mind that you were satisfied?

A.—We do not always write letters with a view to people being impressed with them later on.

Chairman.—I think, Mr. Billimoria, that is a reasonable interpretation.

A.—"I have examined the site on several occasions, and have satisfied myself about the survey and borings."

Q.—We have now arrived at the point when you had received Mr. Kidd's estimate of 1912?

A.—Yes.

Q.—You notice that on page 2 of that report he says: "The clay which is stiff and unctuous hardened into perfectly solid ground in a very short time"?

A.—Yes.

Q.—Stiff clay is one thing and soft clay is another?

A.—Stiff clay——

Q.—Stiff clay is stiff clay?

A.—Stiff clay in this sense is soft clay; it could not be anything but soft clay; it might be stiff and unctuous.

Q.—You say that stiff clay in the passage I have read from Mr. Kidd's report really means soft clay, is that it?

A.—Yes.

Sir Frederick Hopkinson.—And that it cannot be anything else?

A.—It cannot be anything else.

Chairman.—In the passage in your report where you refer to it as hard clay does that mean soft clay?

A.—I dealt with that in the note that I read before lunch.

Q.—Let us see if we can get it right because I have not had an opportunity of reading that carefully. Do you mean then that the phrase in your report, "hard clay," was a mistake, and that you used the wrong adjective?

A.—I used it in a different sense. I used it with reference to the hardness with which it would dry out. I did not use it with reference to the hardness in which it was in the ground.

Q.—You say that you used it with reference to the solidifying properties it would display after being reclaimed?

A.—After being reclaimed. I never for one moment used it with reference to the state in which it was in the ground.

Q.—Let us see about that. The passage in your report is: "The soft mud will form the bottom layer of filling and the hard clay which lies below the mud over the area to be dredged will be superimposed on the clay"?

A.—Yes.

Q.—That is the passage, is it not?

A.—That is the passage.

Q.—Are you quite right when you state that you have never used the phrase "hard clay" with reference to the clay as it was in the bed of the sea?

A.—Quite certain, because I am absolutely certain that it is not hard clay.

Q.—Have you ever described the clay in the bed of the sea as being compact hard material?

A.—Never to my knowledge as hard compact material. Certainly if you go deep enough down into the earth you will find any material, but down to Mr. Kidd's borings there was never anything hard.

Q.—Will you turn to page 32 of document No. 18: "In forwarding the findings of the Conference to you"—that must have been the meeting of the 9th January?

A.—Yes.

Q.—It says: "At a conference on dredging operations held in the Chief Engineer's office on the 9th January, the following conclusions were arrived at." we can pass over those conclusions.

A.—Yes.

Q.—Then it says: "In forwarding the findings of the conference to you I observed in the covering letter dated 10th January, 1924, that after the grave doubts which had been expressed at various times as to the suitability of the material in the bed of the harbour for reclamation purposes, it was an agreeable surprise to see that what was being pumped consisted largely of a hard compact clay with which we had reason to be quite satisfied." Does not that mean a compact clay because for centuries it had been pressed in on itself?

A.—No, that means, as I explained before lunch, that they were then dredging below the clay on to the hard material. Subsequently we told them that they were not to dredge on to that hard material. If they came across it they were to lift their ladders. May I put it in this way: *There* is the silt, *there* is the clay, and below the clay, as is shewn on all Mr. Kidd's borings, you get to moorum, hard clay, stones, silt. (*The Witness drew a diagram*).

Q.—That is right?

A.—As I tried to explain, that makes most excellent filling. The dredger cut it without any difficulty at all, but you would not get your whole output from it.

Q.—Surely you never anticipated that they were going into the moorum, did you?

A.—We do not want to go into the moorum. We later on told them to go out of the moorum.

Q.—The evidence that they have given is that they never tried to get into the moorum because the moorum was composed of rocks, stones, and all sorts of things. Here clearly at page 32 you are not referring to moorum at all, are you?

A.—Yes.

Q.—"It was an agreeable surprise to see that what was being pumped consisted largely of a hard compact clay with which we had reason to be quite satisfied."

A.—Certainly; it was an agreeable surprise. Here we had been told by the Bombay pessimist that we should get nothing but silt, and that the silt would not dry out, and we saw excellent material coming through the pipes. It was one of their best season's work, but there were stones and sand with it. Later on, as one of my witnesses will tell you, when he went out there we insisted that to get the output they must get up from this and get on to the clay and the silt. I maintain that they were dredging at that time down below Mr. Kidd's silt and clay into the clay stones and silt in which although it is very good for reclamation you do not get your full output.

Q.—If you will take the paper in your hand which you have drafted out, No. 1 we might call the silt?

A.—Yes.

Q.—No. 2 is the clay and No. 3 the moorum?

A.—Yes.

Q.—One layer above the other?

A.—One layer above the other.

Q.—Will yon please read at page 32 and tell me whether the material to which you were referring there, a hard compact clay, did not come out of No. 2 and not out of No. 3?

A.—No, it must have come out of No. 3.

Q.—Why do you say that it must have come out of No. 3?

A.—Because we know the facts of all these borings. Where he took his borings he could not have gone into clay and stones; it must have been No. 3.

Q.—Did you at one time express the hope that there would be a great deal of hard clay to be found in the dredging?

A.—As I say——

Q.—Will you answer the question first. Did you at one time express the hope that there would be a great deal of hard clay found in the dredging?

A.—Very likely I did, but what did I mean by it?

Q.—How was a dredger designed to cut soft clay going to deal with hard clay?

A.—Because the hard clay was with reference to the hardening out. We have got samples of the material, and I still say that the soft clay is the material there, that the dredger was properly designed for soft clay, and that there are millions of cubic yards ready to be dredged. I should like to show you some examples.

Q.—We have one here somewhere. If you have any samples that you would like to show us we should be most happy to see them, not necessarily now, but at any time you like?

A.—Yes, we have got samples.

Q.—Are they as heavy as that sample? (*Sample of hard clay handed.*)

A.—Yes, that is the material below the unctuous blue clay.

Q.—That is what you would say was in compartment No. 3 of your diagram?
A.—Yes, I would say that that was in compartment No. 3.

Q.—Let us keep that in our minds. Compartment No. 1 is silt, compartment No. 2 clay, and compartment No. 3 moorum, rock, stones. Mr. Kidd uses an alternative word for silt. He calls it mud, does he not?
A.—Yes.

Q.—Do you accept that?
A.—You can call it mud, yes.

Q.—It is the recent washing down from the monsoon rains through the rivers, is it not?
A.—Yes. You can call it silt or mud; it is immaterial to me.

Q.—On the 25th July, 1919, which would be when you were half way through your report, you wrote a letter to Mr. McMurray in which you spoke of the material as "clay"?
A.—Yes, as clay.

Q.—A day or two before that, according to Mr. McMurray, you had had an interview with him at which you had discussed the general design of the dredger?
A.—Yes.

Q.—Do you remember that?
A.—Yes.

Q.—Had you told him at any time that the dredger would have to work in material that Mr. Kidd had described as stiff clay?
A.—As stiff unctuous clay.

Q.—Yes.
A.—We did not want any better material than stiff unctuous clay.

Q.—That is not my question. I am asking you whether, at the interview with Mr. McMurray, you said to him, "You have got to build a dredger which will do 2,000 cubic yards per hour in stiff clay"?
A.—We discussed it with Simons & Co. in Glasgow.

Q.—Let us get it by steps. At the first interview with Mr. McMurray you did not tell him that you wanted a dredger that would do 2,000 cubic yards per hour in stiff clay?
A.—No, I did not want to dredge stiff clay.

Q.—I am using Mr. Kidd's phrase?
A.—Yes, but I say Mr. Kidd's stiff unctuous clay and soft clay are the same. Mr. Kidd has told you in evidence that the dredger "Jinga" got a better output in the stiff unctuous clay than she did in anything else, and that the "Jinga" was designed for soft clay. The cutter of the "Jinga" is the same as the cutter of the "Sir George Lloyd." If, in the case of the "Jinga," which was designed for soft clay, it did better work in this stiff unctuous clay than in anything else surely the "Sir George Lloyd" dredger also designed for soft clay with a similar cutter, ought to do equally well in this stiff unctuous clay.

Q.—You must have studied the lamentable figures of the "Kalu" and the "Jinga"?
A.—I attribute the lamentable figures of the "Kalu"——

Q.—Will you please answer my question first. We will have to come to those figures later. The figures of the "Kalu" and the "Jinga" are lamentable, are they not, as regards output?
A.—I have not studied them in detail.

Q.—I will take you through them, and we will see what sort of performances the "Kalu" and the "Jinga" did when they got to work. They are lamentable figures if they are true?
A.—I can quite understand them, and I can appreciate what Mr. Kidd says, that when he took one of the Port Trust dredgers and worked it properly, and paid a bonus to the crew, he got a far, far better output than the Port Trust had ever had at their very, very best. I attribute it to the working of the dredger.

Q.—When did you ever mention to the Government of Bombay, or to Sir Lawless Hepper, that they should pay a bonus?
A.—I mentioned it in one of my early annual reports, but the Government of India were so opposed to paying bonuses of any description to anybody that I looked upon it as almost hopeless to think that they would. They never do pay bonuses.

Q.—That is to be found in one of these annual reports, is it?
A.—It is in one of the annual reports.

Q.—I will find it later.

A.—It is not a specific request for bonuses for the dredger. It is simply stating that the disadvantage that the Government has in carrying out works in comparison with a contractor is because they cannot give any encouragement for good work.

Q.—Did you think, in 1919, that you would not get 2,000 cubic yards per hour unless a bonus were paid to the men?

A.—I did not know, in 1919, under what conditions the dredger was going to work.

Q.—As technical adviser to the Government of Bombay, do not you think that you must have put that forward as one of the necessary conditions of employment?

A.—I was not carrying out the work.

Q.—You were technical adviser?

A.—I was technical adviser.

Q.—You say that you mentioned this question of stiff clay at Renfrew. Mr. McMurray has put that interview round about the third week in August, I think. Would that be about right? At all events it is before the letter of the 12th September. Was the interview to which you are referring before the 12th September?

A.—It was on the 29th August.

Q.—What did you say to Messrs. Simons & Co. about its being necessary for the dredger to work in stiff clay?

A.—What happened was this——

Q.—Will you deal with this one point for the moment?

A.—I remember a long discussion on the subject of the material to be dredged. In my letter I had used the word " clay," which is rather indefinite. We read Mr. Kidd's description of the material. Mr. McMurray gave his experience in working the " Jinga " and the " Kalu " which were specified for soft clay, and we considered the material in the harbour to be more or less the same as at Sewri. Colonel Brown, who is I think dead, said that obviously what we wanted was a dredger to cut soft clay, the same kind of dredger as they had had at Sewri. I agreed, and I still maintain that it was the correct designation for the dredger, a dredger to dredge soft clay.

Q.—Were not you greatly astonished when you read Mr. McMurray's evidence?

A.—I have not read his evidence yet.

Q.—Have you not?

A.—Not the whole of it.

Q.—I will take you through some of the material passages in a moment. The letter of Messrs. Simons & Co. on 12th September, which you appended to your report, specifies a dredger designed for soft clay?

A.—Yes.

Q.—And you were content, of course, to let that description pass?

A.—Yes.

Q.—First of all he puts great insistence upon the fact, with which, of course, you do not disagree now, that his firm only promised to deliver a dredger to give 2,000 cubic yards per hour in soft clay?

A.—Yes

Q.—You and he are agreed about that?

A.—Yes.

Q.—Did you notice in that evidence that he disclaimed any possibility of the dredger being able to do that amount in hard clay?

A.—I quite agree. Naturally she would not do 2,000 cubic yards an hour in *this* sort of stuff. (*Indicating sample of hard clay.*)

Q.—Is there any distinction to be drawn between stiff clay and hard clay?

A.—Yes. *That* is hard clay. (*Indicating sample of hard clay.*) Naturally the dredger would not do 2,000 cubic yards an hour in this, but she would do 2,000 cubic yards an hour in stiff clay, which is synonymous with soft clay.

Q.—Stiff is synonymous with soft?

A.—I would like to show a sample of my clay.

Q.—Do you know of any other material in this world in which stiff is synonymous with soft except clay? I thought they were two opposing ideas. I thought that stiff meant one thing and that soft meant another?

A.—No, not when you are dealing with material under water. A stiff clay is a clay that is like hard cheese or butter. You can cut it easily with a cutter. That is what I call stiff clay. You could not have anything better than stiff unctuous clay, stiff greasy clay for a dredger designed to cut soft clay. You could have nothing better in this world than stiff unctuous clay. Mr. Kidd has told you, as I have said before, that the dredger " Jinga " was better (he uses the words) in stiff unctuous clay than in anything

else. Mr. Settle brought these samples back. Here is a bit of the stiff unctuous clay. (*Producing sample.*) May I have a little water?

Sir Frederick Hopkinson.— Of course the Committee has seen the clay as it exists to-day on the Reclamation.

Chairman.—We sent a man in for about 25 yards to get some, and he very nearly got drowned.

Sir Frederick Hopkinson.—That is in the mud?

A.—Even *this* stuff (*indicating sample of hard clay*) the dredger deals with well.

Q.—Would you mind telling us what you are going to do?

A.—I merely want to see what in a few minutes time this is reduced to. This water will show you what it is like in the ground.

Chairman.—Does *that* come from No. 1, No. 2 or No. 3 (*indicating sample of hard clay*)?

A.—That is No. 2.

Sir Frederick Hopkinson.—May I see the dry sample that you have produced?

A.—Yes. (*Same handed.*) (*The Witness placed a piece of the sample of hard clay in a glass of water, and in another glass of water a piece of the sample which he had produced.*)

Chairman.—Have you also noticed with regard to Mr. McMurray that he says that if he had had to specify for a dredger to deal with hard clay he would have had to put forward a very much bigger and indeed unworkable dredger and one much more costly?

A.—Yes, but he was not asked to design a dredger for hard material.

Q.—In your letter of 25th July you asked for a minimum rate of 2,000 cubic yards per hour. Did you notice in the reply of 12th September that they do not offer you a minimum rate, but they say " at the rate of 2,000 cubic yards per hour "?

A.—At the rate of 2,000 cubic yards per hour.

Q.—There is a distinction, is there not, between a request that a machine shall do a minimum rate of 2,000 cubic yards per hour and an offer that it shall do at the rate of 2,000 cubic yards per hour?

A.—Yes. I think you will find somewhere in the correspondence a statement that the pump will do a great deal more than 2,000 cubic yards per hour.

Q.—Not in any document that formed part of the contract with Messrs. Simons & Co.?

A.—I did not make the contract with Messrs. Simons & Co.

Q.—I think you will find that Messrs. Simons & Co. are very canny, and all that they were offering you was a dredger that would do at the rate of 2,000 cubic yards of soft clay per hour?

A.—Yes. I was going to say that nothing will make me change my mind. I have seen the dredger, and I have seen the material. If I were to start to work all over again I should not specify for any dredger other than a dredger to dredge soft clay for that material that is in the harbour. If I had it all to do again I would not have a different dredger at all. I would have the same dredger designed to dredge soft clay as is working there now.

Q.—Did you want a trial of the dredger at Bombay?

A.—No. I think I mentioned it, but it is so very unusual. I cannot recall a single instance of a dredger ever being tested thousands of miles, or even hundreds of miles, away from the builders' yard. I mentioned it, but I never seriously expected that I should get a test in Bombay. I did not want it.

Q.—Did you know that the " Kalu " and the " Jinga " had been taken out and given a trial at the site?

A.—I was told that they were. I do not know what the particulars are. I was told they were given some sort of test, but it is a thing that we never do. I do not know of any other instance of a dredger being tested on the site. I have heard that the " Jinga " and the " Kalu " had some sort of test, but I do not know any other instance whatever of the builders giving the guarantee hundreds or thousands of miles away from the yard. There may be such cases, but I certainly do not know of them.

Q.—Curiously enough, Messrs. Simons & Co. were the builders of the " Kalu " and of the " Jinga," and they did, in fact, take both those vessels out to Bombay, and they did an eighty hours' test of each?

A.—Yes.

Q.—In your letter of 25th July you had stated that you would be satisfied with a test on the Clyde?

A.—Yes.

Q.—Mr. McMurray has told us a very singular story. He says that when you had your interview in August at Renfrew you re-opened this whole question about a test on the Clyde, and pressed very hard for a test at Bombay; is that true?

A.—No, I never pressed for a test at Bombay. I mentioned it, as you may say, *en passant*: "Give us a test at Bombay," but it was instantly rejected. I never regarded it as serious. I was quite satisfied with the test on the Clyde. I never wished a test at Bombay. It never seriously entered into my mind that I should get a test there. I have had dredgers before, and I have never wanted a test for the dredgers on the spot; it is unusual.

Q.—Mr. McMurray has told us in evidence that extends over two or three pages that there was quite a considerable discussion about this matter at Renfrew. He says at Renfrew again you re-opened it, and you did want a test on the site; they were emphatic, and they would not give you a test on the site, would they?

A.—I remember some discussion about a guarantee, but I certainly never pressed for a builders' trial in Bombay. All the dredgers with which I have ever had to do, or about which I have had knowledge, were tested in the neighbourhood of the builders' yard. I am told that the Bombay Port Trust specified for some sort of guarantee in Bombay, but that is, I think, a unique case; at all events, I was satisfied with delivery in Bombay, and trials on the Clyde, and that is the usual procedure.

Q.—The only point I want to make is this: Mr. McMurray, to your knowledge, understood Bombay conditions, did he not?

A.—Yes.

Q.—When he refused to have anything to do with a trial at the site at Bombay did not that make you a little suspicious or doubtful?

A.—Not at all.

Q.—It would be only a question of money, would it not? The dredger and plant cost £655,000?

A.—Yes.

Q.—You could have said to Mr. McMurray: "We want a trial at Bombay. What is your price for a trial at Bombay?" They were going to work her out to Bombay?

A.—Yes.

Q.—Why should not they test her out there? It can be nothing more than money, can it?

A.—There are plenty of places in the world with analogous cases where they did not want to have guarantees. It never occurred to me as necessary, and I still think it was not necessary.

Q.—The under-current in Mr. McMurray's evidence, which can be brought out with a little care is that Mr. McMurray was going to give you no test in Bombay Harbour, because he knew perfectly well that he had come across clay in Bombay Harbour which the "Sir George Lloyd" might cut at only 500 cubic yards per hour. Between now and Monday will you look into Mr. McMurray's evidence?

A.—I will read Mr. McMurray's evidence.

Q.—That is a matter with which I think you ought to deal. Mr. McMurray was almost cynical about the matter, and he was not prepared, under any conditions, to give you a test at Bombay because he knew the conditions of Bombay, and the capabilities of the "Sir George Lloyd." If you will look at the evidence between now and Monday we will go through those passages, and see if we can make that point good.

A.—If Mr. McMurray thought that his dredger was going to dredge in strata No. 3 of course he knew it would not give the output.

Q.—If it was going to dredge under ordinary dredging conditions the material which would be found in Bombay Harbour, as distinguished from Sewri?

A.—We have already got Mr. Kidd's evidence who, presumably, knows a great deal more about the material than Mr. McMurray. Mr. Kidd tells us as a fact that the material is exactly the same in the Harbour as it is at Sewri. After all, you must attach some importance to Mr. Kidd's evidence. He was out there for a number of years. Mr. Kidd tell us, in substance, that he satisfied himself that the material is the same at Sewri as it is in the Harbour, and the same as in the Marine Dockyard.

Q.—As far as you remember, were the words "soft clay" first used in the document of 12th September, that is the letter attached to the Report? You had said "clay" on 25th July?

A.—Yes.

Q.—"Soft clay" are the words used by Messrs. Simons & Co.?

A.—Yes.

Q.—You had asked other firms for tenders, had you not?

A.—No, I asked other firms afterwards.

Q.—Was that in 1920?
A.—That was in 1920.

Q.—Messrs. Lobnitz?
A.—Yes.

Q.—Messrs. Ferguson?
A.—Yes.

Q.—Messrs. Fleming?
A.—Yes, Messrs. Fleming and Messrs. Ferguson.

Q.—Do you remember whether, in writing to them, or sending them any particulars, you described the clay as stiff, or hard, or soft?
A.—As a matter of fact it was not done by me. The whole of that was done by the late Mr. Meik.

Q.—He died in July, 1923?
A.—He died in July, 1923.

Q.—But still, it was your firm of Messrs. Meik & Buchanan who were under the Agreement of 7th March, 1921?
A.—Yes

Q.—Do you happen to know whether in sending any particulars to Messrs. Lobnitz, Messrs. Ferguson, or Messrs. Fleming, your firm described the clay as soft, or stiff, or hard?
A.—I do not think there is any record on that subject, because it was a matter of personal discussion with Mr. Meik, as far as I remember.

Q.—Have you looked through the documents lately to satisfy yourself about that?
A.—I have, and I will look again.

Q.—I suggest to you that in correspondence with Messrs. Lobnitz, your firm definitely stated that the material was soft clay?
A.—In that case it was a right designation.

Q.—Did Messrs. Lobnitz, in reply, state that the output of the dredgers that they proposed to specify, whilst being 2,000 cubic yards per hour in soft clay, would not do 2,000 cubic yards per hour in harder material?
A.—If they did, they said the truth undoubtedly. Of course, with a dredger specified to do 2,000 cubic yards in soft clay, no one would expect it to do 2,000 cubic yards in *that* material, for instance. (*Indicating sample of hard clay*).

Q.—I have not referred you to the documents. You took exception to producing the tenders?
A.—We do not usually do that.

Q.—It does not matter, because we have got all the documents from Messrs. Lobnitz, Messrs. Ferguson, and Messrs. Fleming. We have got them here.
A.—Yes.

Q.—I am right in thinking, am I not, that in your Report you approved of the description of the clay as given by Mr. Kidd?
A.—I did, yes.

Q.—In terms?
A.—In terms.

Q.—As stiff?
A.—As stiff clay; stiff clay, that is stiff unctuous clay, in which the "Jinga" did such extraordinarily good work.

Q.—The suction dredging pumping horse-power of the "Sir George Lloyd" was 3,000 horse-power, was it not?
A.—I think it was 3,500.

Q.—I suggest to you that it is 3,000?
A.—3,000.

Q.—On a matter such as horse-power may not Mr. Kidd be regarded reasonably as an expert?
A.—I have no information about that; I could not say.

Q.—Mr. Kidd, when giving evidence, was reading out certain items to show how he arrived at 325·23 lakhs?
A.—Yes.

Q.—At page 42 of Mr. Kidd's evidence he was asked: "The total cost of the dredging plant supplied for the Back Bay reclamation was about £855,000"; that is including, of course, the purchase of the "Kalu" and the "Jinga"?
A.—Yes.

Q.—" Can you give me any idea of the amount included in your estimate for plant? —(A.) I think I can. I have carefully kept my original estimate book.—(Q.) I want you to include the pipe lines.—(A.) Perhaps you would like me to run over the items? —(Q.) Yes, if you will. I will put them down if you will call them out." Then Mr. Kidd had a very old book with him. This was the original estimate book?

A.—Yes.

Q.—He said: " (A.) Pump filling, plant delivered and erected at Bombay; a dredger of 7,500 horse-power." At that he was interrupted, and the assertion was made: " That is two-and-a-half times the horse-power of the dredger sent out there." Then Mr. Kidd made a most expressive gesture, and he said: " Your difficulties are explained." Mr. Kidd's view was very definite that a dredger of the horse-power of 3,000 could not deal with the clay in Bombay Harbour, as he knew it to exist. What do you say about that?

A.—What I say about it is this: " Mr. Kidd's dredger was an American dredger. It was an American dredger of 7,500 horse-power. I am not speaking as a fact, but I rather think that if you investigated it you would find that, in the case of an American dredger, they add up all the horse-power together, the horse-power on the cutter, and the horse-power on the pumps. The total horse-power of the vessel is 7,500, whereas in the " Sir George Lloyd " the horse-power was only on the pumps.

Q.—Surely Mr. Kidd, when he spoke of 7,500 horse-power, meant on the pumps?

A.—I would like to know what Mr. Kidd meant.

Q.—At the bottom of page 43 Mr. Kidd was asked: " There is one thing to be noticed, and that is that your plant in 1912 gave two-and-a-half times the horse-power of the ' Sir George Lloyd '?—(A.) Quite so. That is a very important point." It was obvious that the question was with regard to the suction-dredging power, and not the propelling power?

A.—I think, if you were really to get the facts of that, you would find it was as I state, that it was not 7,500 horse-power on the pumps. The American practice is to combine all the horse-power together. That is my impression. My impression is that it is not 7,500 horse-power on the pumps.

Q.—Do you know the indicated horse-power of the " Sir George Lloyd "?

A.—No; I cannot remember it. I have not it in my mind.

Q.—In connection with the actual ordering of the dredger, you and Sir John Biles were jointly responsible for it?

A.—Yes.

Q.—Before accepting Simons' offer of 12th September, did you ever discuss with Sir John Biles the fact that Mr. Kidd had spoken of the clay as stiff clay?

A.—No; never.

Q.—Did Sir John Biles have your report before him?

A.—That I could not tell you.

Q.—Did you never give him a copy of the report?

A.—Never.

Q.—I ask you because the letter of 12th September was appended to your report, so all that Sir John Biles had was the letter of 12th September to begin with—Simons' offer.

A.—Really, I do not know what Sir John Biles had, because it was taken entirely out of my hands.

Q.—He said in practice the civil engineer tells him what the dredger has to do, and he tries to produce something that will do it. Of course, there was an interview at which you and he discussed the fact that the dredger had to be built?

A.—Yes.

Q.—The question was, who was to build it?

A.—Yes.

Q.—You described to Sir John Biles the sort of work you wanted the dredger to do?

A.—Yes.

Q.—Two thousand cubic yards of clay per hour in Bombay Harbour?

A.—Yes.

Q.—Did Sir John Biles never ask you what the clay was like?

A.—No; he certainly never asked me what the clay was like.

Q.—He had before him the letter of 12th September. At page 6 of his evidence this question is put to Sir John Biles: " Suppose a buyer wanted a dredger to cut soft clay, and indicated his wish that it should be a dredger to cut soft clay, would that

dredger be different in its construction to one that another buyer ordered which was wanted to cut stiff and unctuous clay "? That is the point, you see.

A.—Yes.

Q.—" Would there be likely to be any difference in the specifications by the makers "? he is asked, and Sir John Biles says: " You mean in the case of stiff and unctuous clay instead of soft?—(Q) Yes.—(A) Yes; I think there would, but 'stiff and unctuous ' is not a very definite term.—(Q) Neither is ' soft.'—(A) No; that is quite true.—(Q) But the word ' soft ' indicates a different consistency to the word ' stiff,' does it not?—(A) Yes; I suppose you would say it is different. You want to know how you would give effect to that difference." Then he says: " Well, I do not think he would make any difference, except perhaps a little in the cutter. The result necessarily is that he could not get as much output from the stiff and unctuous clay, or he might consider that he would not get as much output as he would from soft clay."

A.—The answer to that is: Why did Mr. Kidd with the " Jinga," which is designed for soft clay, get a better output in stiff and unctuous clay than in anything else? The fact remains that stiff unctuous clay is admirably suited for a dredger designed to cut soft clay.

Q.—That was at Sewri, was it not? That was not the harbour. It was the Sewri reclamation. We will deal with that later. Then, talking still about this clay, the question put to him is: " The clay might be so stiff as actually to stop the cutter?—(A) Yes; it might be so stiff.—(Q) I think some of the witnesses have said that that hard clay was hard enough to stop the cutter." Then Sir Frederick Hopkinson says: " No witness has ever said it was pulled up by the clay, only the moorum or rock." In point of fact, the evidence in Bombay with regard to the clay was that the " Sir George Lloyd " was a thoroughly good machine which would cut through the silt, of course, and the clay, but slowed up in the moorum. That is the evidence, is it not?

A.—Yes; and I accept that. Of course, it would slow up in the moorum.

Q.—But cut through the clay?

A.—Yes.

Q.—That is No. 2 in your little plan?

A.—Yes.

Q.—Nobody in Bombay has ever suggested that the " Sir George Lloyd " cannot cut through all the clay that is in the harbour. You have noticed that, of course?

A.—I think I have noticed that.

Q.—The question is: Could she do it at the speed of 2,000 cubic yards per hour? That is the only point.

A.—Yes; in my opinion, for what it is worth, I say she can under proper conditions, and later on I hope to put the evidence by Mr. Settle before you, who personally went out to investigate the dredger at the time that I was so ill that I was not able to go.

Q.—Have you seen the report of Sir Alexander Gibb?

A.—I have seen it, but I do not think I have studied it very much.

Q.—That report would be in 1926?

A.—Yes.

Q.—He says at page 2: " The results of the dredging up to the present are most unsatisfactory, and though they may at times show some improvement, I am of opinion that even though the restrictions by the Royal Indian Marine and the Bombay Port Trust authorities were removed they are never likely to be economical; that the reason for this is the unsuitability of the dredging plant for dealing with the material as it exists, both in the harbour and in Back Bay."

A.—Well, that is Sir Alexander Gibb's opinion, but it is not mine.

Q.—We have got to take opinions, have we not, and consider them?

A.—Yes.

Q.—You have given your opinion and Sir Alexander Gibb has given his. If that is the fact, that the horse-power of the " Sir George Lloyd " is not sufficient to deliver 2,000 cubic yards of stiff clay an hour, is not that to some extent borne out by the figures from 1923 to 1926?

A.—No; I have seen no evidence to show that the " Sir George Lloyd " will not deliver the 2,000 cubic yards per hour. She has done it frequently. I think you will find that Mr. Brims in his evidence says that she has done it for a certain period. She has done that for a few weeks. If she will do it for a few weeks, she will do it for six months. I maintain that there has never been any proof whatever that the " Sir George Lloyd " will not deliver 2,200 cubic yards of soft clay per pumping hour.

Q.—Assuming that, the question is whether the " Sir George Lloyd " was working in what can fairly and properly be described as soft clay. That is the difference between the opposing sets of views?

A.—Then as I have pointed out, we have not once but several times said: " You are working in the wrong material. Get away. Get your output. Do not go digging away in the moorum."

Q.—You will let us have those letters?

A.—Yes.

Q.—I do not know of any letters where that has been said.

A.—This is a letter, dated the 15th October, 1925, from my firm to the Secretary of the Government of Bombay. I do not know whether you have seen this: " The lowness of the output of the ' Sir George Lloyd ' is in our considered opinion due to one of two causes, or probably a combination of the two: (*a*) unsuitable material; (*b*) inefficient handling of the plant. It is obvious that if the dredger is put to work in such hard material as that the cutter blades are damaged, as we understand was the case last season, or if the dredger with the booster is asked to deliver continuously through a length of pipe-line largely in excess of 10,000 feet, the output must be greatly reduced. We are, therefore, of opinion, and so informed Mr. Brims when he was here, that when the dredger is found to be working in this hard material the suction pipe should be lifted and the operations continued in the softer clay overlying the rock." Mr. Settle will confirm that from his investigations in the winter of 1925, when he was out there.

Q.—In point of fact the " Sir George Lloyd " was designed to dredge down 70 feet below low-water level?

A.—Yes.

Q.—By reason of the orders of the Royal Indian Marine the dredging was limited to 35 feet?

A.—Yes.

Q.—Is it the fact that at 35 feet you encountered moorum rock in any quantity?

A.—I do not think we ever did any dredging at all along the area prohibited by the Indian Marine. So far as I know, we have not been there.

Q.—Were you dredging at any point down to 70 feet?

A.—I cannot tell you. I have no information on that.

Q.—Was not the limitation by the Indian Marine a general limitation: " You shall not dredge anywhere below 35 feet "?

A.—No, only certain areas.

Q.—So be it. Can you explain the figures of output as I have given you, which for 1923-24 was 1,020, for 1924-25 856, and for the last year 959 per hour, instead of 2,000?

A.—I can explain it.

Q.—What is the explanation?

A.—I say if you get rid of all these people in Bombay, and are free from all Government restrictions, from all the incubus of Government control, and let somebody get hold of these dredgers, you will find an enormous difference. That is my solution. If you will pay them a bonus, you will observe a great difference. I must repeat again Mr. Kidd's remark on the enormous increase when he paid a bonus to the men he had. He said he got a better output than the Port Trust ever had. I say again and again that the dredger has never been given a proper show, and the sooner the present personnel are got rid of and the dredgers made to work properly and an incentive given to the crew and superintendents in the shape of a bonus for output, you will see the most astonishing change there.

Q.—As to the present personnel, Mr. Speirs is still the dredging master?

A.—He is still the dredging master.

Q.—Is not he an efficient dredging master? He has got a very good record?

A.—Yes, he has got a very good record; but he is getting on in years. He only went out the last time on a special medical certificate. First of all he was rejected at the India Office; and it was only by my interfering and saying: " If you do not let this man go out we shall not be able to start dredging at all " that the Indian Government gave him a sort of special licence to go out and work for a certain time; but he has not got a first-class bill of health, and he is getting on in years, and certainly I should ask him to retire.

Q.—You notice that the first year's output was 1,020 cubic yards a pumping hour; and the second year's output was 856?

A.—Yes.

Q. Does not that point to the fact that in the second year they were getting into harder material?

A.—No, they had a most extraordinary series of accidents in the second year. No one was more annoyed than myself. I happened to be out there when it was proceeding. They had one misadventure after another, and they lost a whole month at the beginning of the season. It was very difficult to lay the blame on anybody. Those were mis-adventures that came about, but it was nothing whatever to do with the dredger.

Q.—I do not think you quite appreciate the point. I am not giving you the volume of the year, I am giving you the average of 856 per pumping hour when the machine was actually working. Instead of doing 2,000 cubic yards, she did 856, so that it does not matter whether she worked for 50 hours, or 500 hours or 5,000 hours, the average was 856 cubic yards per pumping hour instead of 2,000. Does not that point to the fact that she was working in the second season in harder material than in the first season?

A.—As far as I can say from personal observation when I was there she was working in very much softer material in the second season than she was in the first.

Q.—We were told you were on the " Sir George Lloyd " for an hour or two occasionally. Is that about a fair description?

A.—I was on the " Sir George Lloyd " for an hour or two occasionally, but I do not think a single day passed when I did not go and look at the output the whole time I was there.

Q.—Coming from the end of the pipe?

A.—Coming from the end of the pipe; and my distinct impression is—I know I am correct—that the second year's material was considerably softer than the first year's.

Q.—Did you see at the office of the Development Directorate the soundings that were taken each day? You know the practice? We have been told that the " Sir George Lloyd " began to dredge on 8th December, 1923?

A.—Yes.

Q.—We were told on the next day it was the practice to take soundings and see what amount she had dredged from the bed of the sea. We were told that these soundings were taken every day and were sent to the Director of Development. Did you ever see those?

A.—Never.

Q.—They would have told you as an engineer at once what the position was?

A.—I do not think any regular soundings were taken; but I can bring evidence later on about that.

Q.—There is the evidence. There is a point as to why it was that Mr. Lewis, and why it was that Sir Lawless Hepper and other people did not realise at once that the dredger was not giving the guaranteed results. They have said that every day there came into the office of the Development Directorate soundings recording the workings of the previous day and that therefore anybody looking at them would be able to get a very fair idea of what the vessel was doing. Did they never show them to you?

A.—It is the very first I have ever heard of it.

Q.—Really? Did it never occur to you that in ordinary practice they would take soundings?

A.—Yes; I have often spoken to them about soundings; but I did not know that they took soundings every day. In fact, I find it hard to believe that they took soundings every day; but I will bring evidence about that point.

Q.—Did they never show you any document recording soundings?

A.—I cannot remember any document regarding soundings. I have often discussed soundings with Mr. Brims; but I do not remember any document recording soundings.

Q.—If it is the fact, as Mr. Lewis and other witnesses have said, that every day they had a record of the preceding day's work, it ought to have been known week by week approximately how the dredger was doing, ought it not?

A.—They ought to, yes. But I cannot accept that statement that they took soundings and calculations every day.

Q.—I am not saying " and calculations," I am saying that they took soundings?

A.—Well, I hope to be able to bring evidence on that point.

Q.—They may have taken soundings and the soundings may have come into the office and may have been put away?

A.—They may have been put away.

Q.—Mr. Lewis went out as Resident Engineer?

A.—Yes.

Q.—By the agreement of 7th March, 1921 (I do not know that it is important), he stood in rather a curious position to you?

A.—Is this in the statement?

Q.—No; I will go on with that in a moment, but I want to finish this. It is the 7th March, 1921. I am not going to elaborate this now, but it says " The Resident Engineer will be nominated by the firm "—that is yourselves?

A.—Yes.

Q.— ——" and will carry out the details of the work in accordance with the firm's instructions."

A.—Yes.

Q.—We will discuss what the agreement means afterwards, and if you can tell us what it means we shall be very glad; but was it not Mr. Lewis's duty to keep you informed of the progress of the work?

A.—Certainly it was his duty to keep us informed of the progress of the work.

Q.—If after the first or second or third week the dredger " Sir George Lloyd " began her working he had ascertained from soundings that she was not delivering 50 per cent. of her guaranteed output. Was it not his duty to communicate that to you at once?

A.—Yes.

Q.—In fact you were not told of it until after July of 1924?

A.—As far as I can remember we were not told of it till after July.

Q.—Now may we get back to your statement at page 31? You say that you left Bombay on the 31st May, so that in fact you spent from the 19th May to the 30th May at Bombay, and those 11 days only?

A.—That is all.

Q.—Then you mention the fact of your partnership with Mr. Meik?

A.—Yes.

Q.—I have referred to the Rangoon River Training Scheme and the appreciation with which your work was received there. At the conclusion of the Mesopotamian work you received a letter from the Government of India which said: " I am also to convey the appreciation of His Majesty's Secretary of State for India of the valuable services rendered by you in the appointment mentioned, and to say that the Government of India associate themselves with the Secretary of State's appreciation of your work. The success of our arms in Mesopotamia has been sensibly promoted by your valuable advice, great powers of organisation, and experience of the conditions of Indian ports." Then you say: " In discussing the question of dredging at Bombay between ourselves, that is the firm of Messrs. Meik & Buchanan and firms of dredger builders, we considered that we were reasonably safe on two points, namely, the area over which dredging should take place, and the precise nature of the material to be dredged." The precise nature of the material to be dredged you had been informed was stiff and unctuous clay?

A.—Yes.

Q.—" The scheme on which we are asked to report had already been definitely accepted by the Government of Bombay and had been sent to the Government of India for sanction. I cannot recall in my professional experience a single instance where more complete borings had been taken." The fact that borings had been taken, and most complete borings, lent weight and emphasis to Mr. Kidd's description of stiff and unctuous clay?

A.—Yes, soft clay, stiff and unctuous clay.

Q.—I did not quite catch that?

A.—Soft clay, stiff unctuous clay.

Q.—But Mr. Kidd's report does not contain the word " soft " clay at all?

A.—But it was soft clay.

Q.—I appreciate that. I am only on the point of Mr. Kidd's report. You have made your point perfectly clear, and we shall have to examine it. You say the clay was soft. All I am pointing out is that at the moment when you were discussing this matter with Mr. Meik and the firm of dredger builders, the only information that you had was the fact that Mr. Kidd had taken most complete borings and that he asserted that clay to be stiff and that you in your report said you agreed with Mr. Kidd as regards his description of the character of the clay?

A.—Yes, but the very method in which Mr. Kidd took his borings is sufficient proof that there could not have been on any of his borings anything very hard. The way in which he has taken his borings he would have not gone through hard.

Q.—Did you notice that Mr. Kidd said in every case he went fully 70 feet below the low water level, or got alternatively into moorum or rock?

A.—Yes.

Q.—So that he did get through in many places, as you can see in plan No. 5—he did get down to 70 feet?

A.—Yes.

Q.—By that curious method of wash boring?

A.—He could not have gone through hard with wash borings.

Q.—We do not quite know what part that (*i.e., hard clay specimen*) was in, but he has told us there were four men holding on to the pump and putting the whole of their weight on to it as it sank through the stiffer clay.

A.—Yes. If it would interest you here are three photographs of Mr. Kidd and his staff actually taking borings.

Q.—I think we can accept your statement that that clay as it is would not yield to any wash borings of the nature described by Mr. Kidd.

A.—Quite so.

Q.—That must be so. These photographs show the thing exactly as he described it. These are the men working with Mr. Kidd in 1912?

A.—Yes.

Q.—It is just as he described it. Then you refer to the letter and say: "Such a letter from a responsible Government presupposes that all questions as to the right to dredge within the area selected by Mr. Kidd had been considered and disposed of." You say this scheme had already been accepted by the Government of Bombay in 1912 who had stated in their letter to the Government that the drawings might be considered as complete working drawings. We have that letter.

A.—Yes.

Q.—The point you are making now is that such a letter from a responsible Government presupposes that all such questions as to the right to dredge within the area selected by Mr. Kidd had been considered and disposed of?

A.—Yes.

Q.—Let us discuss that for a few moments. The position was, was it not, that the Development Directorate started out with a proposal to dredge 25,000,000 cubic yards of material in which they had no proprietary right at all?

A.—Apparently they had no proprietary right, but nobody knew they had no proprietary right.

Q.—Did not anybody know of Section 28 of the Bombay Port Trust Act, which vested the whole of the bed of the sea in the Port Trust? I am implying no criticism of you naturally, but I want to get the facts out. Did nobody know that?

A.—Apparently. The Port Trust themselves were not aware of it.

Q.—They may not have been, but somebody became aware of it, did they not? It is a ludicrous situation.

A.—It is a most ludicrous situation.

Q.—On 3rd August, 1920, Lord Lloyd makes a speech in which he announced the creation of the Development Directorate. The Development Directorate solemnly propose to take 25,000,000 cubic yards of somebody else's property, and then the Port Trust and Indian Marine wake up and begin to ask questions. Then the Port Trust and Royal Indian Marine cut out of the dredging proposition over 15,500,000 cubic yards of the 25,000,000 cubic yards that were wanted for the reclamation. That is the fact, is it not?

A.—That is the fact.

Sir Frederick Hopkinson.—No, out of 75,000,000 that was available.

Chairman.—We must take the letter of Mr. Lewis's of the 31st August, 1921. If that is wrong, it must be put right.

Sir Frederick Hopkinson.—Of the portion they had selected; I agree with that.

Chairman.—Let us get it right, because it is a very curious position. This is Mr. Lewis's letter on the subject. As I say again, it does not imply any criticism of you, but I only want to get the facts.

A.—Yes.

Q.—This is the letter of the 31st August, 1921, from your Resident Engineer to yourselves: "The reduction of material available due to exclusion of the area to the north of the pencil line on the chart sent by the Port Trust amounts to 8,280,450 cubic yards." The Port Trust had said: they would not allow you to come north of a certain line.

A.—Yes.

Q.—"The reduction of material if dredging is limited within the naval anchorage to 35 feet below low water of spring tides, amounts to 7,292,446 cubic yards, or, both together, 15,572,896 cubic yards." The Development Directorate were bound to obey anything the Port Trust or Indian Marine said about this matter, were they not?

A.—Yes.

Q.—Let us continue: "The amount available over the total area, down to 70 feet below mean water level is 38,094,785, which reduced by 15,572,896 cubic yards becomes 22,521,889 cubic yards. The amount of filling required is estimated at 30,126,856 cubic yards. We are therefore 7,604,967 cubic yards short."

A.—I think, if I may say a few words, it is even more extraordinary that scheme after scheme had been prepared and sent up to the Government of India for approval by the Government of Bombay before the creation of the Development Directorate, and not one single word had been said about the rights of the Port Trust.

Q.—For 20 years no one had said one word about it?

A.—For 20 years.

Q.—The Port Trust and Indian Marine may have been waiting—I think there is a letter which suggests that until some step is taken there is no need for them to intervene.

A.—I think you will see in the correspondence a letter from Mr. Lewis to myself, dated the 4th March, 1921.

Q.—What is that?

A.—It says: "One point has been brought forward not officially as yet which is interesting. It appears that the only authority which can sanction any alteration of the Port of Bombay, such as the removal of the bed of the harbour, is the Port Trust. Well, although the Back Bay scheme has been based on the pumping of the bed of the harbour since 1905, the Port Trust have never been approached on the subject. I was told by one of the Port Trust engineers that should we start dredging, his duty would be to inform the port officer and have the work stopped. I mentioned this to Hepper, who remarked that that was not going to stop the Back Bay reclamation." Then in the same letter he says: "Apparently since 1905 it has always been the idea that dredging should be done in the harbour and pumped across to Back Bay, but the Port Trust have never been officially told that such was the intention. They only discovered this a short time ago, and this is the result." Whether he means they only discovered then they had never been officially consulted, or whether they had only just discovered after 20 years what their duties were, I cannot pretend to answer.

Q.—However, eventually was the deficit of 7,000,000 cubic yards proposed to be made up by Mr. Lewis by going out and adding four strips of 250 feet, which would have given 9,000,000 cubic yards?

A.—Yes.

Q.—That, however, was found out not to be practicable, and was never done—going further out into the harbour?

A.—I do not know about that.

Sir Frederick Hopkinson.—It has been partly done now. There is no question about its practicability.

A.—There has never been any question about its practicability.

Chairman.—I did not know that that had been done.

Sir Frederick Hopkinson.—A little has been done outside the area.

Chairman.—One consequence was that further pipe-line was required on the proposal to go into Back Bay, was it not?

A.—Yes.

Q.—That pipe-line came to 28 lakhs?

A.—On the proposal of going into Back Bay.

Q.—Do you remember that when the "Kalu" was bought further pipe-line was ordered?

A.—For the "Kalu"?

Q.—Yes. One of the reasons that the "Kalu" ever went into Back Bay was because the Port Trust and the Royal Indian Marine had cut off this area, was it not?

A.—That was one reason.

Q.—We are in agreement about that. If you had had no interference by the Port Trust or the Royal Indian Marine you need never have gone into Back Bay?

A.—We never contemplated going into Back Bay at all.

Q.—When you did contemplate going into Back Bay 28 lakhs had to be spent in buying further pipe-line?

A.—Not 28 lakhs spent on the pipe-line. I think the "Kalu" and her repairs and her pipe-line, and everything else, cost 28 lakhs.

Q.—There was a very vehement discussion about this in the Legislative Council concerning the 42-inch floating pipe and shore connections as costing 28 lakhs' worth of more pipe-line than was originally intended?

A.—I would like to verify that. Twenty-eight lakhs for pipe-line alone seems to me to be a very great deal.

Sir Frederick Hopkinson.—The amount required in accordance with the original arrangement was 10,000 feet. Ultimately they bought 35,000 feet.

Chairman.—Do you recollect that? The original amount was 10,000 feet?

A.—Yes; it was 10,000 feet.

Q.—Ultimately when you got the whole lot you had bought 35,000 feet, which is another 25,000?

A.—Yes.

Q.—It is put down there as an amount of 28 lakhs, and I can show you to-morrow, if you like, many pages of vehement discussion in the Legislative Council with regard to this item of 28 lakhs?

A.—Yes.

Q.—Twenty-eight lakhs is roughly £200,000?

A.—Yes; but according to my notes here I have got the purchase of the " Kalu " and pipe-line as 20 lakhs. I do not think the pipe-line alone cost 28 lakhs.

Q.—Let me go over that purchase. The " Kalu " cost £75,000?

A.—Yes.

Q.—You advised her purchase in 1919?

A.—Well, I shall say something about that—about my advising the purchase of the " Kalu."

Q.—We have got the actual text of your letter in which you suggested to the Government of India that she should not be disposed of as she might be of use in the East Colaba reclamation. That is the position, is it not?

A.—Well, there is something more than that.

Q.—Let us get it in this way. The " Kalu " was mentioned by you as a possible acquisition by the Government. Is that a formula you will agree to?

A.—No; my recollection about the " Kalu " is this. I have a distinct recollection of a conversation with Sir George Curtis in 1919 on the subject of the reclamation of East Colaba. Sir George Curtis said his pet scheme was the reclamation of East Colaba before the reclamation of Back Bay was taken up. Cotton Green was about to be removed shortly, and he thought it was imperative to use all the land at East Colaba as soon as possible. He knew the Back Bay scheme was in the ascendant, but he asked me whether I thought the " Kalu " could be made use of for East Colaba, and the two projects were to be worked concurrently. It was an unofficial conversation which took place when Sir George Curtis was showing me over East Colaba. I replied that I thought a dredger like the " Kalu " would be quite suitable for the work. A dredger was bought, but apparently without any inspection.

Q.—There was a letter written by you in September. It has been read in the proceedings of the Legislative Council?

A.—I think that letter was written after this conversation.

Q.—Have you got the letter?

A.—No; I do not seem to have the letter.

Q.—Here it is. This is a letter to Sir George Curtis dated the 24th July, 1919: " I think your Government ought to ask the Government of India not to sell the " Kalu " at present, because with new pipe-line she would do very well for reclamation on the East of the Colaba between Pilot Bunda and Sassoon Dock, which work might go on almost at once."

A.—Yes.

Q.—It is a matter of construction, but was not that a recommendation to the Government of Bombay to buy the " Kalu " for the purposes of reclamation?

A.—Yes; but certainly it did not begin on my initiative. The initiative was Sir George Curtis's, who had a very great desire to start reclaim at East Colaba, and who was not very much in favour of starting at Back Bay.

Q.—We need not mention East Colaba again because it is not within the terms of our reference. Therefore we make no point about that. The only point I am making is that it would appear from that letter written to Sir George Curtis that you were saying that the " Kalu " would do very well for reclamation?

A.—Yes.

Q.—That is the only point?

A.—I remember that letter. That letter was written with Sir George Curtis's knowledge after this conversation.

Q.—It was written to him?

A.—Yes; after this conversation that I had with him when he asked me about East Colaba.

Q.—Was I right when five minutes ago I put it that you had advised the purchase of the " Kalu "?

A.—Yes; put in that way—I had recommended it, or I had agreed to the purchase of the " Kalu."

Q.—You had recommended it?

A.—But not for Back Bay.

Q.—But for reclamation?

A.—For reclamation purposes.

Q.—As a suction dredger?
A.—As a suction dredger.

Q.—That is good enough.
A.—But I certainly had nothing to do with the inspection.

Q.—I am going to follow that up. Did you know the condition she was in?
A.—I had not the faintest idea. Naturally, I did not suppose anyone was going to buy a pig in a poke, and buy a thing without inspecting it.

Q.—Therefore, your letter to Sir George Curtis ought to be read with the understanding that the Government should acquire her if she was reasonably fit for the purpose of reclamation?
A.—Certainly.

Q.—Your letter said that she would do very well for reclamation.
A.—Well, a dredger of that type, on the supposition that she was in a good condition, would have done very well for the East Colaba reclamation. You could not want a better dredger for the East Colaba, but that letter was no guarantee that the dredger was in proper working order.

Q.—You used the " Kalu " in Mesopotamia, did you not?
A.—No.

Q.—Did you not have the " Kalu " over there?
A.—The " Kalu " was over there. The " Jinga " and the " Kalu " were taken up to Mesopotamia by the Royal Indian Marine. When I arrived in Mesopotamia I found the " Jinga " and the " Kalu " there. They had done no work at all, and the obvious reason that they could not do any work was that they drew about 12 feet of water, and they had been taken up to dredge a channel where there was only three feet of water, and sometimes no water at all. They could not cut their own flotation and so they did no work at all. They never even turned their engines in Mesopotamia. The pontoons were taken away and used for military purposes, bridges, and in due course the " Jinga " and " Kalu " having remained in Mesopotamia doing nothing for a year or two, returned to Bombay. That is the history.

Q.—Then they were bought by the Government of Bombay, and the " Kalu " remained idle for five years, did she not?
A.—I do not know how long she remained idle.

Q.—I will give you the figures in a minute. The Government of Bombay in November, 1920, agreed to pay £75,000 for her. You have heard of that figure?
A.—I heard that, but I was not consulted.

Q.—I am only asking you about the figure.
A.—Yes; I heard that.

Q.—In point of fact, did she do a single stroke of work until 1925?
A.—I think that is quite probably correct.

Q.—Interest at 6 per cent. on £75,000 would result in a dead loss of £22,500?
A.—Yes.

Q.—When the Government had bought this vessel for £75,000 did they find she required more than £25,000 worth of repairs?
A.—I am told so.

Q.—Did you expect her to be ready for work at the end of 1923? You need not trouble your recollection; I can show you at page 32 of these reports that you evidently did.
A.—Yes.

Q.—You expected her to be ready for work at the end of 1923, but, in point of fact, the repairs to the " Kalu " were begun in May, 1923, and completed in September, 1924?
A.—Yes.

Q.—You then say: " The dredger ' Kalu ' placed in thorough repair has cost, along with her pipe line, 23 lakhs, 63,367 rupees."
A.—Yes.

Q.—Roughly, £180,000?
A.—Yes. I remember telling Sir Lawless Hepper that I had never heard of anything more disgraceful, and that a new dredger could have been purchased for less than the money that had been spent on the repairs, almost.

Q.—Did you recommend that she should go into Back Bay to dredge?
A.—The " Kalu " was bought specially for East Colaba. They did not carry out the East Colaba scheme, and so it was thrown into the Development Directorate scheme.

Q.—But you were in possession of the " Kalu " and in possession of the pipe line?
A.—Yes.

Q.—Something had to be done with her. She had to be used in some way?
A.—Yes.

Q.—Did you recommend her to go into Back Bay?
A.—I did not initiate the Back Bay business.

Q.—Did you approve of her going into Back Bay? She was to work in series. I do not want to make a long story of this.
A.—Certainly I approved of doing anything to make use of her.

Q.—But did you approve of her going into Back Bay?
A.—Yes; I did approve of her going into Back Bay.

Q.—Let us see what happened when she got into Back Bay. To make that point quite certain, your firm had said in a letter of the 5th June, 1924: "'Kalu.' We adhere to our opinion that whatever the future decision respecting cables in Back Bay is"—there were certain cables laid which were going to be removed at the trifling cost of £25,000—three cables?
A.—Yes.

Q.—"Whatever the future decision respecting the cables in Back Bay is, the 'Kalu' should begin work next season in the area north of the cables and coloured pink on our drawing 3496, and in order that the work may be commenced by the 'Kalu' without any intermediate pumping station we recommend that the vessel be taken at high water to the nearest point to the new sea wall. She would go to this position at high water, and would then either dredge a hole for her flotation or float in a hole previously prepared by the 'Priestman' Grab Dredger. We have considered this matter very carefully and can see no difficulty, as when the 'Kalu' and 'Jinga' were working on the Sewri reclamation the first operation was to take the dredgers at high water and place them in a position where they had to dig their own flotation before they started work, and we understand the digging of the hole took three tides."
A.—Yes.

Q.—Though you are comparing the Sewri reclamation with the Back Bay reclamation, were not the two very different? You yourself had described Back Bay as shallow and rocky?
A.—Yes.

Q.—You could not compare the two things. In the Sewri reclamation we have had evidence it was nearly all mud and a very small proportion of clay.
A.—Yes.

Q.—If a dredger was caught in Sewri with a receding tide all she did was to sit down and nothing happened; but if the dredger was caught in the shallow Back Bay what would happen would be that she would become a wreck. That is the evidence. The two bottoms at Sewri and Back Bay in the evidence have been said to be completely different. What do you say to that?
A.—I would like to draw your attention to page 102 of my statement which shows how going to Back Bay was initiated.

Q.—Would you first answer my question as to whether comparing the bed of the sea at Sewri with the bed of the sea at Back Bay was a fair comparison?
A.—Not for the whole of Back Bay or for the whole of Sewri; but if you went and found a particular place in Back Bay where you could put your dredger you would do it; but I think in this letter we gave alternatives. We said they were to do one thing or the other.

Q.—As a matter of fact, you had said in that letter that at Sewri the dredger dug her own flotation in three tides?
A.—Yes.

Q.—Do you know that the "Kalu" was dodging in and out of Back Bay, going in when there was sufficient water on a rising tide under her keel to carry her in, and coming out before the water receded so that she would not lie on the rocks; and do you know that it took her the whole season before she made her own flotation?
A.—I do; and anything more disgraceful I have never heard of in my life.

Q.—Then let us follow it through.: I am taking this from one of your reports. Is this the fact: that she worked for an hour or two each day? She went in on the 28th November for an hour or two and kept that up till the 1st December—that is, three days?
A.—Yes.

Q.—She then had to stop because of the neap tide?
A.—Yes.

Q.—She started again on the 10th December and continued till the 14th December, and then she had to stop?
A.—Yes.

Q.—That is how it went on all the season through?

A.—Yes; it went on all the season through—I quite agree with you.

Q.—Were you there?

A.—I was there for part of the time.

Q.—What did you say about it?

A.—What did I say? What could I say?

Q.—You could say: "Stop it," could you not? Could not you have said: "Stop it"?

A.—It is very difficult to say "Stop it." I do not suppose there was a single day when I did not ask Mr. Brims about it, and he always said: "Well, we are just going to do it next tide," and so it went on day by day—"we are just going to do it next tide." Then I left Bombay; but in point of fact, I think they made a mistake in their borings. The borings in Back Bay on which our desire to go to Back Bay was founded were found afterwards to be quite inaccurate. Here is a letter from Mr. Lewis dated 7th May, 1923, in which he wishes to take the whole of the dredging from Back Bay. It is a letter from Mr. Lewis to my firm: "I send herewith the final results of the boring in areas 'A' in Back Bay." Then he goes on and says that the total volume required for the Back Bay reclamation is 25,000,000 cubic yards "so that there should be ample material available in Back Bay for the whole of the reclamation. The material is decidedly good. Even the worst material is a sandy clay which dries out very rapidly and would therefore seem very suitable for filling, much more so than the material we are likely to get in the harbour. The use of the Back Bay material would therefore seem to be clearly indicated." I understand that since I was in Bombay they have found that the borings were quite unreliable, and that they had not got sandy clay in Back Bay. When the "Kalu" was performing this laborious operation of going in every afternoon and back again the next day, it was on the supposition that there was some softish material, but really there was rock there. Later on I will return to that subject again. I have evidence which will be given you by Mr. Settle, because he was there after the date I was there.

Q.—Were you there for two or three months at the period when the "Kalu" was working?

A.—I was there, I think, for about two months.

Q.—I do not understand this. After all, you were looking out over Back Bay; you would see the "Kalu" going in, staying there for a couple of hours, and coming out again, a vessel costing £200,000, with the crew on board. Why did not you take some very drastic step about it? It must have been evident to you that there was a terrific waste of money going on?

A.—I do not remember exactly how many times I saw the "Kalu" doing that. Most of this I found out afterwards; but in any case I was not the Executive.

Q.—No, you were not, but you were the technical adviser to the Government, and you were in Bombay to supervise the work. You were there for two months while the "Kalu" was piling up an enormous cost against the enterprise, and I ask you why you did not intervene and stop it? You had recommended it to go into the Back Bay.

A.—I will find the exact date, but I certainly did not watch the "Kalu" for several months doing this; I was not there long enought for that; but I will give you the exact date.

Q.—Can you give me the date in 1924 when you arrived in Bombay?

A.—Yes.

Q.—Then we can follow it up. The "Kalu" started working on the 28th November, and was carrying on through the season. Would you be there during two months of that period?

A.—Did you say she started in November?

Q.—She started on the 28th November—that is, six weeks after the monsoon. I think you arrived on the 24th November of that year?

A.—I left on the 7th January.

Q.—You arrived on the 24th November and left on the 7th January?

A.—Yes.

Q.—The "Kalu" began these performances on the 28th November?

A.—Yes.

Q.—We now know what the result was. The result of that season's work was that in 10 weeks' work she gave less than nine hours of her guaranteed output. I am not sure that I have put that correctly. Sir Frederick Hopkinson tells me she did 15,400 cubic yards in the whole season, that is less than eight hours' work according to her guaranteed output; the result was that the amount reclaimed cost 15½ rupees per cubic yard.

A.—I quite understand that.

Q.—That is 31 times your figure of eight annas per cubic yard?
A.—Yes.

Q.—And your figure included the cost of the plant?
A.—Yes.

Q.—Whereas this figure of the cost of the " Kalu " is simply for ordinary working costs. Before we adjourn to-day I think we would like to know how it was that you, being in Bombay, allowed the " Kalu " from the 28th November down to 7th January to go on doing these ludicrous performances?

A.—Well, my explanation is that I was not the Executive. I was not in control of the works after I was told what borings they had taken. There was a chief engineer there, there was also a superintendent of dredging. On several occasions I asked them how they were going on, and they always told me that they were just on the verge of getting into it and getting her in flotation. It is very easy for a thing to go on for a considerable time under such circumstances and conditions. It is very difficult for me to go and say : " Well, you none of you know your business, you had better stop." I was not in charge of the Executive. Sir Lawless Hepper never even mentioned it to me, in fact nobody ever suggested that the dredging of the " Kalu " should stop. They all said : " Well, the borings are all right. We are just going to get on it, and then we shall go ahead."

Q.—If Mr. Lewis made a mistake in the borings, somebody let you down over that?
A.—Yes. It was not Mr. Lewis. It is on record who took the borings, but undoubtedly the borings were quite unreliable, but we did not know that the borings were unreliable.

Q.—What is the letter on which you rely as showing that the borings were satisfactory? You wrote a letter in May, but I do not appear to have that letter in my correspondence. I have an earlier one in which Mr. Lewis reports very badly about the borings in Back Bay?

A.—This particular letter is dated the 7th May, 1923 : " The material is decidedly good. Even the worst material is the sandy clay."

Q.—Mr. Lewis in his evidence was relying on a letter in which he spoke about the material in Back Bay. The only letter we have in the correspondence is an earlier one than that, which is also by him, but is condemnatory of Back Bay. No, I am wrong. This letter is out of order. It has been printed in the April correspondence instead of May, and it is on page 79, so I need not trouble you with that.

A.—I should like to say that we never initiated going to Back Bay; it was initiated by Sir Lawless Hepper and Mr. Lewis. They wanted to go to Back Bay; we did not want to go to Back Bay.

Q.—To finish off the performances of the " Kalu," not only did she do that very small volume, but do you know that she was actually turning out 225 cubic yards per hour instead of 2,000 at that period?

A.—I can believe anything about what the " Kalu " did in light of experience.

Q.—Am I right in gathering from your evidence that you do not regard that as an entirely satisfactory dredging operation?

A.—I regard that as a most unsatisfactory dredging operation. I would just draw attention to a letter from Mr. Lewis to myself dated the 20th May, 1921, in which he first of all talks about Back Bay, and says : " Hepper is quite keen on the investigation of the bottom of Back Bay." That is paragraph 131 of my statement. We always threw cold water on dredging in Back Bay. That is also on record.

Q.—You say on the 22nd June : " We have always held the view that there is so much rock in Back Bay, and in very many cases near the surface, that it would be quite impracticable to use a suction cutter dredger on a large scale "?

A.—Yes. Then we got a number of borings taken, and apparently taken reliably. We got a report from the Chief Engineer telling us how delighted he is with Back Bay, how it is fine, sandy clay, and how there is enough material really in Back Bay to reclaim the whole of the area. We were very sceptical. We said : " We do not believe this, and you cannot go and alter the whole plan of operations and think you are going to get everything from Back Bay." So matters proceeded; but the Chief Engineer was so enamoured of Back Bay that he seriously proposed to his Director that we should concentrate on Back Bay. I have heard since about the borings, and I really have serious doubts as to whether the borings were taken. They are absolutely unreliable. Still, you have the Chief Engineer, a man of responsibility, who comes and says : " Look here, here are all these borings; here are 25,000,000 yards of most suitable material for this dredger, and a nice sandy clay."

Q.—I think we now understand the circumstances under which the " Kalu " went into Back Bay, and I am much obliged to you for your explanation.

A.—Thank you.

Sir H. Courthope-Munroe.—We have heard nothing about the samples which have been produced.

Chairman.—Would you like to say something about them?

A.—I would like to say something about this stiff unctuous clay. (*The witness held up a glass in his hand containing some substance in water.*) This is stiff unctuous clay after it has been for, shall we say, half-an-hour in a glass of water. There it is. That is just what describes it—it is stiff unctuous clay, thoroughly suitable for a dredger designed for soft clay.

Q.—But as the dredger cuts it it is cutting a closely compacted material?

A.—You may take it from me that the material is naturally harder than this; the material when the dredger cuts it is very like a cheese; it could not be anything else.

Q.—Does it come out at the discharge end of the pipe in that fashion?

A.—It comes out at the discharge end of the pipe like that. It is rolled round and round as it comes out. It comes out sometimes in balls, balls of clay that you can squeeze like that. I should call it stiff clay but soft clay. Many times I have been to the end of the pipe-line and taken out the balls and you can squeeze them together. Here it is after a little water has been added.

Q.—That is the sample brought from Bombay?

A.—Yes. But now I would like you to see a piece of this material. This is as it comes out of the dredger. I have seen this material coming out of the dredger. This is the way it comes out of the dredger. It is all melted up. The cutter of the "Sir George Lloyd" cuts off the material perfectly, but because it is so hard it does not get along the pipe-line at the rate of 2,000 cubic yards an hour.

Q.—It does not cut it at such a rate, but it can get it along?

A.—No, it can cut it at that rate.

Q.—Surely it is the cutting quite as much as the friction through the pipe that reduces the rate?

A.—No, I should say the "Sir George Lloyd" could cut this all right.

Q.—Could cut it at such a rate as would deliver 2,000 cubic yards?

A.—Yes; you can see it here yourself.

Sir Frederick Hopkinson.—There is nothing unusual about all this.

Chairman.—This No. 2 is stiff unctuous clay. The other is the clay from No. 3 on the sketch of Sir George Buchanan.

(*Adjourned to to-morrow morning at* 11 *o'clock.*)

The Committee Assembled at 11 a.m. on the 29th October, 1926, all the Members being present.

Sir George Buchanan, re-called and further examined.

Chairman.—Have you got a piece of that grey material which you handed in yesterday—the clay?

A.—I do not know whether it is here, but it is available.

Q.—Might we have a piece of it? Will the gentleman produce it? (*The material was produced.*) Who is going to prove that, Sir George?

A.—Mr. Settle.

Q.—Yesterday you mentioned that Mr. Kidd had spoken of the clay as soft clay. On Page 61 of his typed evidence I find the following passages:—"(Q.) As far as your information, your survey and your borings go, can you say that the material in the harbour is soft clay and not hard clay?—(A.) I have never described it as soft clay. I do not agree that it is hard clay, but I have never described it as soft clay. (Q.) You described it as stiff clay?—(A.) Stiff and unctuous." Then the questions go on to the dredger.

A.—May I make any remarks now?

Q.—I was just going to give you this last question, and then invite your answer. Mr. Billimoria says, "Therefore, if they"—that is, the dredger builders—"were supplied with a specification to build a dredger for soft clay, that dredger could not be expected to get out hard clay." Then Mr. Kidd makes this answer—"Or even stiff clay. (Q.) In that respect, therefore, the specifications would be absolutely incorrect? —(A.) If the specifications said it was soft clay, they were absolutely incorrect." That is Mr. Kidd. Now, Sir George, would you deal with that. Would you like to have the quotations before you? (*Handing document to witness.*)

A.—Well, Mr. Chairman, I tried yesterday to convince you that there was nothing inconsistent in a stiff material being a soft material, and I must emphasise that. I maintain that Mr. Kidd's stiff unctuous clay is soft clay, and it is not capable of any other interpretation. I may say that " stiff unctuous clay " is a nomenclature invented by Mr. Kidd, because I have never before heard of any material called stiff unctuous clay. Let us just analyse the word " stiff " for a moment. I have been puzzling about this, Mr. Chairman, since we left last evening, and I have looked up the word in the dictionary, and I also looked it up in Mrs. Beeton's cookery book. Now, " stiff " as regards paste. You have a stiff paste. Mrs. Beeton's cookery book says, " Rub the butter into the flour, add the sugar and mix the whole into a stiff paste." You also have a stiff jelly, but it does not mean it is hard. In the Oxford dictionary it says, moist clay, batter, etc., thick and viscous, not fluid, in or approaching the plastic state. I assert most positively, Mr. Chairman, that " stiff and unctuous clay," which, as I say, is a name invented by Mr. Kidd, is soft clay for all practical purposes, and nothing will induce me to express any other opinion.

Q.—Then, in your view, when you are dealing with clay as a substance, " stiff " and " soft " are interchangeable terms. Is that it?

A.—I would not go so far as that.

Q.—Does it mean that it does not matter which word you use; whether you say the clay is stiff or the clay is soft, both are correct?

A.—As regards the material we are discussing, it does not matter whether you say " stiff " or whether you say " soft." I say you can use one or the other. After all, there are many words in the language, and some of us use one word and some use other words. I maintain that it is soft clay.

Q.—We were dealing with the " Kalu " when we left off last night, and we were on the question of cost. I just want one more figure from you. We know from the cost accounts which have been taken out that that season's working of the " Kalu " cost in wages and fuel and stores and sundries and things of that kind, 2 lakhs 42571 rupees. That is roughly £18,000, is it not?

A.—Yes.

Q.—That emphasises your criticism, does it not, that this was a terrible waste of money?

A.—It does, yes.

Q.—Had you ever hoped that the " Kalu " would go into Back Bay and settle down on the sea bed?

A.—On the borings, I do not see any reason why she should not. I would like to put in this document, Mr. Chairman. Here are the borings which were supplied to us, taken by the Executive. You will see in those borings sand and clay, soft clay, sand and soft clay, sand and soft clay, sand and soft clay, sand and soft clay. In every instance there is sand and soft clay. No. 1 is 9 ft. 6 ins. of sand and clay.

Sir H. Courthope Munroe.—Had not you better give a copy of that to the Committee, Sir George? *

A.—This is the only copy I have. On these borings I saw no reason at all why the "Kalu " should not go in. It now appears that these borings are absolutely incorrect. We had a letter from the chief engineer saying: " The material is decidedly good. Even the worst material is a sandy clay." When they put the " Kalu " in apparently there was no sandy clay. Apparently they got on to some hard material. The borings were incorrect.

Chairman.—The material which they got into was very stiff?

A.—Very stiff, yes, but they never told me that.

Q.—In fact, the material into which they got is described by you at Page 35 of your report of 1924 as follows: " The material met with has proved to be very stiff "?

A.—Yes, but it was not, according to these borings.

Q.—Originally you had disbelieved in the policy of sending a dredger in to work in Back Bay, had you not?

A.—I was never enthusiastic about Back Bay at all.

Q.—You had expressed an opinion against sending a dredger in to work into Back Bay, had you not?

A.—I had, yes.

Q.—I want to get the history of this. Then you got those borings which you have just read to us?

A.—Yes.

Q.—And, on the assumption that those borings are correct, you alter your opinion?

A.—I alter my opinion, yes.

Q.—Then the " Kalu " goes into Back Bay with disastrous results?

A.—With disastrous results.

* Copy handed in. See Appendix VII.

Q.—I pass from that, and come back for a moment to the limitation of area by the Port Trust and the Royal Indian Marine. I gather the reason why you never discussed the question of dredging either with the Port Trust or with the Royal Indian Marine was because from the documents you assumed that the matter had been settled between the Government of Bombay and the Port Trust?

A.—Yes.

Q.—Or at all events you may have assumed that the Government were the paramount power, and that if they wanted to dredge in Back Bay they would do so. It was one or other of those considerations?

A.—Yes. It never occurred to me for one moment ——

Q.—What did occur to you, Sir George?

A.—What occurred to me was, as you say, that arrangements had been made.

Q.—If arrangements were necessary, they had been made; if they were not necessary the Government, as the paramount power, would order the work to be done?

A.—Yes. I will give you one instance——

Q.—You need not do so.

A.—I would like to give you an example of another case. The reclamation works extended in front of a long row of buildings called Marine Parade. I raised the question with Sir Lawless Hepper. I said, " Have these people got no rights? Suppose you build your wall in front of them, and fill up, and build new buildings on the reclaimed land, what about these people's rights? Have you looked into it "? I have had experience of that kind of thing, and I know it is a matter of common knowledge that if you interfere with a person's approach to foreshore rights you get into trouble. I do not even know now whether that matter has been squared up.

Q.—But it never occurred to you (I am not putting it by way of criticism at all) to ask anybody whether the Port Trust and the Royal Indian Marine would raise any objection to the dredging?

A.—Never. For 20 years they had been discussing it.

Q.—But I suppose you will agree that, the bed of the sea being vested in the Port Trust, it was somebody's duty before announcing the decision, to have put that matter right?

A.—The Government is the paramount power, is it not?

Q.—Is it, with regard to the Port Trust who, by Act of Parliament, have this bed of the sea vested in them?

A.—It is not a matter I can discuss, Mr. Chairman.

Q.—I am asking you just generally. Does it not occur to you that, if that were the position, somebody clearly ought to have made it perfectly certain that the Port Trust would not intervene?

A.—Would not intervene. Sir Lawless Hepper, when it was pointed out to him (it is in my statement) said, " At all events it is not going to stop the Back Bay reclamation schemes."

Q.—I am sorry to take this matter piecemeal, but a passage has just been pointed out to me which I have overlooked. This is Sir Lawless Hepper's extract from your report to Government, dated 15th December, 1924. Indeed it was the passage I was, reading from a minute ago. Let us get it from that little book, the reports of Sir George Buchanan, page 37 at the top, " The ' Sir George Lloyd ' and ' Colaba ' were designed to discharge 2,000 cubic yards of soft clay per hour through 10,000 feet of 42-inch pipes. Last season the material actually dealt with was not soft clay, but silt and stiff clay." Are you not there drawing a clear distinction between soft clay and stiff clay?

A.—I must again point to my little sketch which I made yesterday. I think I said several times yesterday that the dredger in the first season was working in the third layer. That is what the stiff clay refers to. It was working in the third layer, and we have since instructed them to get out of that layer.

Q.—That does not really quite meet my question, which was: " Are you not, in that passage, contrasting soft clay and stiff clay as if they were two different matters? Will you take this copy of the document? (*Handing same to Witness.*) It is at the top of page 37. That is the only question I am asking you. The way in which you put it is " was not soft clay but stiff clay."

A.—It is very difficult for me, Mr. Chairman, years afterwards to analyse actual words. " Silt and stiff clay, with some sand and stones."

Q.—You do appreciate that I am trying to get from you everything you would wish to say? You have read, have you not, hundreds of documents such as engineering reports?

A.—Yes.

Q.—You are as familiar with them as you could possibly be. Just detach yourself from this case for a moment and imagine that you are reading that as the report of some eminent engineer. You see that he says, "The material actually dealt with was not soft clay but stiff clay." Would you not, in your own mind, consider that there was a difference in consistency, in specific gravity, and in density between the soft clay and the stiff clay?

A.—If you analyse these sentences, I agree; but I state facts. I say, irrespective of analysing these words, that you have silt; you have soft and stiff clay; stiff, unctuous clay and soft clay, and you have clay and sand and stones. If I was writing this again to-day, or if I had thought when I had written this, "Now, let me see, this is going to be analysed in several years time," I should certainly have written it differently. If you want my real candid statement it is that notwithstanding anything which is written, I happen to know what the material is: there is silt at the top; then there is stiff unctuous clay, which I will always say is soft clay, and then you get on to the moorum and clay and stones, such as we had a specimen of on this table last night.

Q.—Had the result, up to the 14th February, 1924, of the pumping operations in the harbour been satisfactory in your opinion?

A.—No. I could not call them satisfactory. You could not call them satisfactory.

Q.—It was obvious that, for the many reasons which you have given, the dredger was not giving her output?

A.—That is right, yes.

Q.—In your statement of 11th February, 1924, at the top of page 26, you say, "I believe I may say that the result up to date has been quite satisfactory." What about that?

A.—You must remember, Mr. Chairman, (I think I am right in saying it) that there had been no measurements taken then.

Q.—Just consider. Mr. Lewis was the gentleman sent out by you, and very highly recommended. Mr. Speirs was the dredging master. Mr. Lewis had said that every day the result of the previous day's soundings came into the office. Mr. Lewis must have known?

A.—He must have known, but he certainly did not——

Q.—But, as technical adviser and supervisor, ought not you to have extracted from Mr. Lewis exact information?

A.—This sentence says: "I believe I may say that the result up to date has been quite satisfactory. The material in the harbour has proved much harder than we were led to suppose. Actual reclaimed land can be seen and walked upon by anyone who chooses to go to Colaba." Taking that as a sentence, that is what we all believed. We were always talking about actual reclamation. I do not see anything inconsistent in it. When this was written, Sir Lawless Hepper, and all of us, thought it was satisfactory. The material in the harbour was good, and the actual reclaimed land could be seen. I maintain that it was not until much later that, by measurements, they found out what they had been doing per hour.

Q.—But they could unquestionably have found out on the 10th December, 1923, what the dredger had done on the 8th December, and similarly every other working day of that season?

A.—Well, they certainly did not.

Q.—I think you are right there, Sir George. Mr. Lewis could not tell us that in fact he had investigated the results of the soundings. That passage says: "I believe I may say that the result up to date." The result, surely, must include output?

A.—No. The idea at that time was to reclaim land. We were all obsessed with the idea that the silt would be full of water, and so on. I remember going with Sir Lawless Hepper and Mr. Lewis and others, and everyone was very pleased indeed with the land which was being reclaimed.

Q.—But surely the result that was promised to the people of Bombay was the reclamation of 1,145 acres in five years from the commencement of the pumping? That was the result promised was it not?

A.—That was the result.

Q.—When you use the phrase, "I believe I may say that the result up to date has proved quite satisfactory," would not anybody reading that be led to think that the output, as well as the quality, of the material were satisfactory?

A.—Well, all I can say is that when this was written we were all satisfied. Sir Lawless Hepper went over this report with me. He made no comment.

Q.—Have you read the reports of the Development Directorate?

A.—I cannot say that I have read them.

Q.—They make very curious reading, do they not?

A.—There are so many reports. I have not read them.

Q.—Sir Lawless Hepper has had to admit that every report of the Development Directorate dealing with this scheme has had material omissions?

A.—I had nothing to do with that.

Q.—You had nothing to do with that; Sir Lawless Hepper has taken on himself the whole responsibility for the authorship of those reports; but those reports, with the evidence as given by him, show there were designed omissions, and omissions which could only have been intended to mislead the public. You had no responsibility for them, and your reports, if I may say so, are in very different terms.

A.—I said yesterday, Mr. Chairman, that I would produce a letter showing the difficulty which we had in getting double shift. This is a letter from the Chief Engineer, Back Bay Reclamation Scheme, to the Secretary to Government, Development Department: " I forward herewith a copy of a telegram received from Messrs. Meik and Buchanan for information: ' Anxious about dredging. Have you made arrangements for complete staff for working double shift on all dredgers? ' I would refer to my numbers 2432 of 30th June, 1924, 2672 of 22nd July, 1924, and 2673 of 22nd July, 1924, asking for arrangements to be made for the engagement of officers to complete the staff required, and would again point out urgency of immediate action being taken if the services of these men are to be obtained in time for the commencement of the dredging season."

Q.—What date is that telegram, Sir George?

A.—The telegram is not dated, but the date of the letter is the 24th July, 1924.

Q.—Was one of the minor difficulties encountered the inability of the anchors and insufficiency of the anchors to keep the pipe-line straight?

A.—Yes, it was. It was a minor difficulty.

Q.—In point of fact, did the specification provide for one anchor of 7 cwt. for every four or five pontoons?

A.—I have not got the specification, but if you say so I will accept it.

Q.—I am taking it from the evidence. If you would like to check it, the reference is at page 12, line 6. Perhaps I had better read it to you. This is the evidence of Sir Lawless Hepper. He is being asked about the output of the dredger, and he is being shown that the addition of the figures for the first two seasons still gives a less figure than one working season; and of course he has to accept that. " (Q.) Then there must have been, both in 1923 and 1924, considerable interruptions and delays? —(A.) In 1923/24 the dredger did not commence until the 8th December, and then immediately after commencement there was bad weather, and considerable damage was done to the pipe-line. Throughout the season we had trouble, because the anchors that had been supplied for holding the pipe-line were not heavy enough, and the tides were very strong, and the pipe-line was continually getting out of position and breaking. It was not until we got a complete new set of heavy anchors that we were able to get the work going in the season." Then, at page 119, line 15, one of the technical witnesses takes up that matter. He is asked what were the various factors that combine to produce the very poor result, and he is asked to tell us all of them. It is said to him: " Is there any possibility of insufficiency of material? " and he says " In some cases. Other factors that we have to contend with are very strong tides, and this is an important factor. The difficulty especially is with the strong tide which keeps the dredger away from the face. Then there is difficulty also with the moorings of the pipe-line. They get carried away, and during the first two seasons we experienced considerable difficulty in keeping the pipe-line in position. We had to get a large number of extra anchors, the difficulty was so great. (Q.) Was that during your time?—(A.) Yes. Furthermore, to show the difficulty of holding the pipe-line in position in the original pontoons that we ordered there was one anchor allowed for every four or five pontoons, and that was absolutely useless. We have, on the later pontoons, allowed two anchors and winches to each pontoon instead of one for four or five, and even that has not proved sufficient." The gentleman who suggested one anchor of 7 cwts. for four or five pontoons must have made a miscalculation, must he not?

A.—Not necessarily, Mr. Chairman. These are all matters that are ascertained by experience. I remember discussing with Messrs. Simons & Company the question of the anchors to be put on the pontoons. In a dredger that I had worked in Burma with 5,000 feet of pipe-line, we had an anchor on each pontoon. Actually in working the dredger we found we did not want the anchors—that the pipe-line adjusted itself to the

tide. There was a strong tide, and I think we only had three or four anchors in the whole length of pipe-line. I say, Mr. Chairman, that this is a minor point in regard to which you cannot lay down any law beforehand. The man in charge of the dredging, when he found he wanted more anchors, ought to have gone round Bombay and got more anchors. What I suppose happened was the usual Government procedure. He had no power to buy an anchor. He would have to write to the Superintendent of Dredging, and he would have to write to the Chief Engineer; the Chief Engineer would have to write to Sir Lawless Hepper, and Sir Lawless Hepper, if it was within his own powers, would sanction it, but if not, it might go up to the Hon. Member. It takes a very long time to purchase necessary articles when you are working under Government control.

Q.—I am not on the question of time at all. I am on the question of insufficiency of the number of anchors and insufficiency in weight. The anchors that were supplied subsequently were 30 cwt. anchors. You had joined in the specification with Sir John Biles, had you not?

A.—Yes.

Q.—That specification provided for one anchor of 7 cwt. to four or five pontoons. In practice it was found necessary to provide two anchors and winches of 30 cwt. each to each pontoon. Was not that a serious miscalculation in the specification?

A.—No, Mr. Chairman, I cannot agree.

Q.—Was it a miscalculation?

A.—No, I cannot agree. It was the ordinary procedure. You could not tell exactly how many anchors you wanted. The specification was the usual procedure. I call it quite a minor point that they wanted more anchors when the work started—quite a minor point. As I say, all they had to do was to get some more anchors. You cannot go and lay down cut and dried rules for dredging operations of this kind.

Q.—The Port Trust, or the Royal Indian Marine, must have had people in 1919 who had a good deal of experience on the strength of the tides?

A.—No; I do not admit that they would have any knowledge of the exact strength of the tides.

Q.—Let us consider it. Between 1908 and 1913 they had done dredging operations with pipe-lines on a very large scale, had they not?

A.—Yes, at Sewri.

Q.—The people who were employed in that had the same problem as the people on the " Sir George Lloyd," namely, of getting their pipe-line in position?

A.—Yes.

Q.—Did you ever go to the Port Trust, or the Royal Indian Marine, people and ask them how they had gone on at Sewri in 1919?

A.—No. The very last people I would go to would be the Indian Marine.

Q.—Why the very last people?

A.—After the experience I had had with the Indian Marine in Mesopotamia, in connection with the dredgers " Jinga " and " Kalu," I should not be likely to go to them for any information on dredging.

Q.—Do you mean they would not give it to you, or what?

A.—No, I did not think it was of any value.

Q.—Would you have considered the experience of the Port Trust, spread over five years of dredging, of any value?

A.—I should not consider it so valuable as the experience I had obtained myself in connection with pipe-line dredgers. After all, we consulted the builders. Mr. McMurray had been actually in charge of the dredging on the " Jinga " and " Kalu." As a matter of fact I do not know what anchors they had there.

Q.—But do you think, Sir George, that the spending of 12 days in Bombay from the 19th May to the 31st May gave you sufficient time to study local conditions?

A.—Yes.

Q.—You do?

A.—It gave me ample time.

Q.—You left, however, without any personal knowledge of the quality of the material at the bed of the sea?

A.—If you mean that I did not go and dig up the material myself, you are perfectly correct.

Q.—I am merely using your own words. You have yourself said in your statement that you had no personal knowledge of the quality of the material at the bed of the sea, and this is right, is it not?

A.—That is perfectly right, Mr. Chairman, but you must qualify it by saying that if I had taken 1,000 borings I could not have obtained any more information than I had already obtained from Mr. Kidd's borings.

Q.—If you had taken 10 borings, would you not have been able to satisfy yourself whether the silt or mud, as it has been described, would make good reclamation—10 borings?

A.—No, I do not think so.

Q.—With 10 borings you could have brought up silt from various places in the harbour, That is right, is it not?

A.—Yes.

Q.—You could have had them tried out; you could have submitted them to Mr. Mitchell, or to any other expert; you could have examined them for yourself and have seen whether, in your view, the silt would make good reclamation. That could have been done, could it not?

A.—I think it would have been superfluous.

Q.—But it caused you a great deal of anxiety later, did it not?

A.—It does not cause me any anxiety now.

Q.—Did not it cause you at one time a great deal of anxiety?

A.—Certainly, it caused me anxiety at the time to know whether the silt would dry out properly.

Q.—Right through your reports, from 1922 to 1924, are not you emphasising the fact that you did not know the nature of the material and that the nature of the material never would be known until actual dredging commenced?

A.—The nature of the material now——

Q.—No, do answer the question first. Are you not, throughout your reports of 1922, 1923 and 1924, making it clear that you had no personal knowledge of the nature of the material, and that exact knowledge of that material would only come when actual dredging operations commenced?

A.—Certainly; but you must remember that I did go down and very carefully examine the reclamation at Sewri, which is the same material.

Q.—When did you do that?

A.—I did it between the 12th and 19th. I did it when I was in Bombay.

Q.—19th to the 31st, you mean?

A.—Yes, certainly.

Q.—Did you have any discussion with any representative of the Port Trust or of the Indian Marine, who was then connected with the Sewri reclamation?

A.—I had a great many discussions. I cannot remember them in detail now. I had a great many discussions with Mr. Messent, and I got a great deal of information from him.

Q.—Did you attach importance to the information he gave you?

A.—Certainly. I attached importance to the information which he gave me.

Q.—Am I right in saying that there is not any mention in your report of any conversations which you had with Mr. Messent?

A.—We do not put all those sort of things in. Why should I put it in my report?

Q.—Am I right in saying that in no correspondence which has been laid before us, or in any letter that you have ever written to the Director of Development, has it ever been mentioned that you had had interviews and discussions with Mr. Messent?

A.—No; we do not put records of the private conversations which we have.

Q.—But the point is this, Sir George. When Mr. Lewis began to raise the question about the quality of the material in the harbour, you and he had considerable correspondence about it, did you not?

A.—Yes, and I said, " At all events, it cannot be worse than at Sewri."

Q.—Would it not have been natural, when Mr. Lewis was putting forward the opinion of Mr. Mitchell, for you to have put forward the opinion of Mr. Messent, and to have said, " It is all very well, but I had endless conversations with Mr. Messent, who knew more about it than anybody else, and he assured me of the quality of the material."

A.—It was really more to the point, Mr. Chairman, if I may say so, to say, as I did say, that at all events the material cannot be any worse than it is at Sewri. I constantly looked at the material at Sewri.

Q.—Very well. I will ask you what I hope is the last question about stiff and soft clay, and it is this. Can you point to any document of any date you like made by the Development Directorate, the Government of Bombay or the Government of India—any document official or non-official—which uses the words " soft clay," before 12th September, 1919, when Messrs. Simons used the phrase?

A.—No, I cannot point to any.

Q.—I have looked through all the papers very carefully and I cannot find it either. As far as the documents before us go, and all the official reports and everything, the

very first mention which I can find of " soft clay " is in Messrs. Simons' letter of 12th September, 1919. If you can find anybody ever having described that material as " soft clay " before, it would be a very great help to the Committee?

A.—No, I cannot.

Q.—Very well. Now at page 35 of your statement we get to the point where, having completed your report, you arrived in Bombay on the 14th November, 1919?

A.—Yes.

Q.—Did you stay at Government House?

A.—I did.

Q.—For about how long?

A.—I think I was there for five or six days.

Q.—That would give you ample opportunity for discussion with Lord Lloyd?

A.—Yes.

Q,—Did you and he go over your report together?

A.—I really cannot remember that.

Q.—Even if you and he did not go over the report together, obviously you and he were discussing the substance of your report and the feasibility of the scheme.

A.—Yes.

Q.—No doubt you impressed upon Lord Lloyd the feasibility of the reclamation from an engineering point of view?

A.—Yes.

Q.—And impressed upon him also that the proposed work could be done for 367·61 lakhs?

A.—Yes, undoubtedly I must have told him that.

Q.—And that it could be done within the period stated by you in the report?

A.—Yes. I saw no difficulty at that time in completing it within that period.

Q.—Did you point out to Lord Lloyd at any of those interviews the possibility that there were difficulties ahead?

A.—No, I do not remember pointing out specifically what difficulties there were ahead, but it was generally understood, I think, that you cannot carry out any very large public work without having difficulties ahead. I think Lord Lloyd emphasised that himself.

Q.—He did?

A.—I do not think we discussed specific difficulties.

Q.—If there were 10 per cent. of delay in time and 10 per cent. of increase in cost, nobody would trouble about a thing like that, would they?

A.—Certainly not, on the figures which they expected to get at that time from the land.

Q.—But this is something a good deal more than 10 per cent. increase in time, is it not, Sir George?

A.—This is more than 10 per cent. increase in time.

Q.—And must be more than a 10 per cent. increase over your estimated cost of 367 lakhs?

A.—Yes.

Q.—On page 36 you are referring to your report: " I said that on the assumption that Mr. Kidd's borings and surveys were correct (and I saw no reason to doubt their accuracy as a great many borings had been taken), I accepted his conclusion both in respect of quality and quantity of material. In this I consider I had full justification, as I do not believe any responsible engineer in the face of such overwhelming evidence as to the nature of the material would be so foolish as to say he wished to take up another year's time (to say nothing of the expenditure involved) in making fresh investigations." That is how you put your case as regards that point, is it?

A.—Yes.

Q.—In point of fact, certainty could have been arrived at in far less than another year's time, could it not? You told us so yesterday?

A.—Certainty? No, Mr. Chairman. There was the monsoon. You could not do any boring in the monsoon.

Q.—I have been careful, if you notice, to suggest to you the date for the commencement of your borings—October, 1919. I am going now to suggest to you that it would have been prudent for you to have advised Lord Lloyd to have taken borings for a period not exceeding one month, and that if that had been done you would then have known with certainty the nature, quality and approximately the extent of the material to be dredged?

A.—I am sorry to say I do not agree, Mr. Chairman. I am perfectly satisfied.

Q.—At the bottom of page 36 you say: 'Finally I submitted plans, specifications and tenders for dredging plant by British firms; also an analysis I had prepared of the working cost of the dredgers. I modified and very considerably cheapened a section of the wall proposed by Mr. Kidd for reasons given in my report.'' Mr. Kidd had estimated that the sea wall would cost 64.22 lakhs?

A.—I will take that figure.

Q.—It is in your report; you may take it as being correct. You estimated it to cost 118.11 lakhs. At present some 1,850 feet is uncompleted?

A.—Yes.

Q.—Have you followed the evidence enough to ascertain that the cost up to the present moment is in the neighbourhood of 200 lakhs?

A.—I am quite prepared to discuss that, Mr. Chairman. Yes, I accept all those figures.

Q.—That is quite double the amount for which you said it would be done, because we have to take into account the unfinished portion?

A.—Yes.

Q.—What was the section of Mr. Kidd's wall that you considerably cheapened?

A.—As far as I remember, we adopted a rubble mound instead of concrete blocks. I cannot remember now precisely.

Q.—One object of the sea wall, of course, was to retain whatever material was pumped into it?

A.—Yes, within reason.

Q.—If the material which was pumped in was not worth retaining it was not worth pumping?—

A.—Yes.

Q.—Did your sea wall in fact retain the material?

A.—There are a number of questions involved in that. I am not prepared to answer that question without being allowed to elaborate it.

Q.—Have you any doubt, Sir George, that you are allowed to elaborate any question that you wish? Have you any doubt about that?

A.—No.

Q.—Then come along. First of all, did the sea wall in fact permit large quantities of the silt to escape through it?

A.—So I am told, yes.

Q.—Did not you see it yourself?

A.—I did not see very much of it.

Q.—Did you see any of it?

A.—I saw some of it, yes.

Q.—You saw some of it. That is the first point. The silt that was escaping through it was part of the material pumped by the "Sir George Lloyd"?

A.—Yes.

Q.—And believed to be, when you put in your report of October, 1915, good material for reclamation?

A.—Yes.

Q.—Your sea wall must have been designed to retain that material?

A.—Yes, it was.

Q.—Why did it not retain it?

A.—Well, there are certain reasons. I should think that construction had something to do with it.

Q.—Were you supervising the construction of it?

A.—No, I was not there all the time.

Q.—But you were there for two or three months each year, were you not?

A.—Each year, yes.

Q.—Is there any letter which you have ever written complaining to Mr. Lewis or to Sir Lawless Hepper or anybody, that they were building the sea wall in such a way that they were permitting the reclaimed material to escape?

A.—I shall have to look that up. There are a good many letters on the subject.*

Q.—Would you just make a note of it?

A.—I will.

Q.—As to whether you can find any memorandum or letter addressed to Mr. Lewis or to Sir Lawless Hepper or to anybody in control of the works criticising them for the way in which the sea wall was being built, and saying that in the result they would have reclaimed material passing out again into the open sea—something to that effect?

* See Appendix VIII.

A.—Yes. When we are inspecting works, Mr. Chairman, we do not always put down in writing everything we say to the engineers in charge.

Q.—Then I will put it to you in another way. Will you pledge your word that you ever complained to Sir Lawless Hepper that the wall was being built in such a way as that it permitted the escape of reclaimed material?

A.—No, if you put it exactly in those particular words.

Q.—Yes, I do.

A.—No, I do not think I did.

Q.—Or to Mr. Lewis?

A.—Or to Mr. Lewis.

Q.—I am obliged to you.

A.—Not exactly in those words.

Q.—Anything in the nature of a complaint—a complaint that they were building the wall in such a way that it permitted the material to escape. I must put that particular point for a reason which will be apparent in a moment. You had contemplated, had you not, that your sea wall would allow material to escape through into the sea?

A.—No.

Q.—The silt is carried in suspension by the sea, is it not?

A.—It is.

Q.—Did not you write a letter to Mr. Lewis saying that the sea wall would be porous for a very long time to come?

A.—Naturally it would be porous. With the sea water going in and out you cannot make a rubble wall that is absolutely water-tight at once.

Q.—Your letter of June 3rd, 1922: "In any case the sea must pass through the porous rubble wall for a long time to come," means that the sea would go on passing through it despositing silt until the time when the wall became a retaining wall? Is that right?

A.—A rubble wall is not a watertight wall. As the reclamation proceeded the instertices would be filled up by the silt and the wall would gradually——

Q.—Seal itself?

A.—Would seal itself.

Q.—That is what I was trying to put, only I did not put it in that way. The silt being carried in suspension by the sea would be deposited gradually in the interstices of the wall and eventually would seal it?

A.—Yes; it would seal it.

Q.—It did become a very expensive matter, did it not? Do you remember an interview between Sir Lawless Hepper, Mr. Lewis and yourself within one month of the commencement of the dredging? That is early in January, 1924.

A.—Yes.

Q.—Did they tell you that the silt which was being pumped was escaping through the sea wall, and could, in fact, be seen on the seaward side of the sea wall?

A.—Yes.

Q.—Did they tell you later that of 1,020 cubic yards per hour that were dredged by the "Sir George Lloyd" there was found on measurement of the reclamation only 627?

A.—Yes, they told me that afterwards.

Q.—That is a loss of nearly 40 per cent., is it not?

A.—Yes. As I said yesterday, I do not accept any of the measurements at all.

Q.—If those figures were correct, was that serious?

A.—It was undoubtedly very serious.

Q.—In the season 1924-25 did they also tell you that of 856 cubic yards per hour pumped only 452 were found to be retained in the reclamation?

A.—Yes.

Q.—That is a loss of about 55 per cent., is it not?

A.—Yes.

Q.—Did they urge upon you the desirability of sealing the sea wall with moorum?

A.—I do not think they urged it upon me. I think we urged it upon them, as far as I remember.

Q.—It has been put quite the other way. It has been put that Sir Lawless Hepper and Mr. Lewis were both very anxious that that sea wall should be sealed with a bank of moorum, and that you thought it was unnecessary. Does that accord with your recollection of the matter?

A.—It accords with my recollection at that particular time; but I should like to amplify that, if I may.

Q.—Please do; but shall I just finish the questions on this, and then I would like you to deal with that. As a matter of fact, did not Sir Lawless Hepper obtain the sanction of Government in February, 1925, to the expenditure necessary for sealing the wall, and did not they, in fact, do it between February, 1925 and September, 1925?

A.—I do not think I was there then. I believe that something did happen, but I think it was on our representations, not on theirs.

Q.—When you say " on our representations " do you mean on the representations of your firm?

A.—Yes.

Q.—If so, that is a representation that would be sent by a letter from England to India?

A.—Yes.

Q.—Would you make a note that if you have got any letter of that character we would be very much obliged if we could have it?

A.—Certainly.

Q.—The letter would be somewhere about January, 1924, and later. Perhaps I can help you a little with regard to that. Will you just take again the large volume of correspondence? (*Same handed.*) At page 106 there is a letter from Mr. Lewis to Sir George Buchanan: " Undated, but must be January, 1924," and is a reference to the interview of which you spoke: " Dear Sir,—In a discussion in Sir Lawless Hepper's room a few days ago it was suggested that the rubble mound should be lined on the inside with a layer of quarry spoil to prevent any leakage of dredged material. Would you agree to have this spoil placed in position from the present time onwards? " The answer is the 24th January, 1924, on page 107: " I am not in favour of beginning at present the lining of the rubble mound on the inside with quarry spoil." The next letter to which I would call your attention is the 15th October, 1925, paragraph 3, on page 167: According to the figures given in your letter under reply, 1,261,986 cubic yards of material were dredged from the harbour during the last season, but only 680,438 cubic yards were deposited in Back Bay. The smallness of this latter figure obviously points to a great leakage from the area under reclamation, and the advisability is indicated of tipping a watertight moorum bank alongside along the inside face of the sea wall."

A.—Yes.

Q.—You were there suggesting in October, 1925, what had been impressed upon you in January, 1924, and with which you then disagreed?

A.—Yes, apparently.

Q.—In fact at the date of this letter of October, 1925, the Development Directorate had already completed the sealing of the sea-wall on their own initiative?

A.—Well, I would not like to say it was on their own initiative.

Q.—Subject to any document you can produce, at present the case does appear as though it was on their own initiative. Do you agree with that?

A.—I agree, yes.

Q.—Is there anything on this question of the porousness of the sea-wall further that you would like to say about it that would help us?

A.—Yes.

Q.—Thank you very much.

A.—At page 107 you read two lines of my letter: " I am not in favour of beginning at present the lining of the rubble mound on the inside with quarry spoil. I believe that later on, when the reclamation towards the wall is more advanced it may be desirable to put a lining on the inside up to high-water neap tides only." If later on, when I was not there, the people who were every day looking at the work saw material going through the wall and did not take any action at all, continued looking at it and continued taking no action at all, well I do not think I have any words too strong with which to blame them.

Q.—But this must, must it not, relate back to the design of the sea-wall, which was intended to preserve and retain all that was pumped into it? Is not that the original cause of the trouble?

A.—No, there are other ways of doing it. No one would expect to make a rubble wall which would take water. May I read what I was going to say?

Q.—Please do?

A.—The wall was properly designed.

Q.—Is that some document we have got that you are reading from?

A.—You will get a copy of this, I think. I do not think we have got copies at the moment.*

Q.—I beg your pardon.

A.—The wall was properly designed with small material—that is the run of the quarry—in the middle and the large stones outside. Properly constructed, the wall should have blinded itself in time, because the silt-laden water would have filled up the small interstices and made the wall watertight, though in the case of water with silt in suspension in the way that it was, as I shall point out later, much more drastic measures might have to be taken. Naturally, above the filling tidal water will flow through the wall. The wall was not built according to the plan and specifications. It really lay with the engineers in charge of construction. They had a specification and they had a plan, and I was not the executive and I was not always on the works. Here is the cross section of the wall, and here is the specification (documents produced).

Q.—Will you hand in that plan and specification?

A.—Yes. (Same handed in.)

Q.—We will mark them, and then they will be returned. If the wall was not being built to specification, as you were out there each year for two months or so, why did you not intervene?

A.—If I went out after they had done six months' work, I could not see with my own eyes exactly the size of the stone they put into the interior of the wall. We were always instructing them to put the run of the quarry in the middle of the wall; and that will be supported by Mr. Halcrow, who will give evidence on that.

Q.—Supposing you were there on the 20th November, 1922, on the 20th November, 1922, they were building the wall?

A.—Yes.

Q.—You could have gone down and seen the stuff being brought from the quarry, seen it being tipped, and seen the whole operation?

A.—I did. I constantly did see it.

Q.—Did you ever complain to Sir Lawless Hepper or to Mr. Lewis that they were not building the wall according to the specification?

A.—Yes.

Q.—You took exception to the size of the stones on one occasion, did you not?

A.—Yes.

Q.—Is there any document you know of in which it has been stated that they were departing from the specification?

A.—There is a document in which we said that we wanted the run of the quarry. We did not want them to divide it up, but we wanted the run of the quarry in the middle. I think that was with reference to Mr. Halcrow's inspection.

Q.—Is there anything further on that point that you would like to say?

A.—Yes. When the dredging started, I have already described to you how pleased we were with the first year's dredging, and we were getting material—I dare not use the words " hard " or " soft."

Q.—But we must have the word that you used—you said hard material?

A.—I thought we would not go into that again.

Q.—That is the word.

A.—Whatever it was, the material was particularly good, and so far as I could see —I remember this occasion—very little was being lost through the wall. On the occasion when I was asked if certain blinding could be done, in that letter you refer to, I remember pointing out that I would rather have the material elsewhere. I cannot remember all the details, but I do remember distinctly on several occasions—I do not think it is in writing—that I pointed out to Mr. Billington and Mr. Lewis, and I think to Mr. Brims—but of that I cannot be certain—that if there was material which was escaping anywhere, it was down a large storm water drain, and that this should be closed. When at a later date it was apparent to the engineers on the spot, who were looking at the work all day, that there were actually large quantities of the material escaping through the wall, surely it was their obvious duty to take action. I understand that Mr. Brims, the Superintendent of Dredging, asked repeatedly that this should be done, but he was refused sanction by Mr. Elgee, the Chief Engineer; and we will bring evidence on that point when Mr. Settle gives his evidence, because Mr. Settle reports that when he went to Bombay in 1924, the very first thing he did was to call attention to the material going through the wall, and said: " Now why do not you do something? " And that he had great difficulty in getting anything done. But you will hear Mr. Settle on that point. Then to show how we thought about the material, originally we intended to divide the reclamation area by putting in a number of cross-

* See Appendix VIII.

walls. In my report, dated 10th January, 1923, I said with reference to cross-walls: "The Chief Engineer of the Reclamation Branch has allowed for eight cross-walls against our four, the amount of stone involved being equivalent to that required for the whole of the sea-wall. Until the nature of the material dredged is actually seen"—so we come to that again, that is to say, whether we are getting water with silt in suspension, or whether we are getting water with balls of clay, or what we are getting—"it is impossible to say how many walls will be required, and it may be necessary to divide the area into still smaller sections. But I hope by using moorum in conjunction with stone that a saving in the latter may be effected." In the report dated 10th January, on seeing the material, I reduced the number of cross-walls to two, and proposed to use for dividing up the area the storm-water drains. Obviously, when the Chief Engineer and Superintendent of Dredging saw what was practically the water with silt in suspension flowing through the wall, they should at once have increased the number of bunds and made settling tanks, as I had contemplated. I said that it may be necessary to divide the area into still smaller sections. You might have a big area and make a series of settling tanks, and experience will teach you what to do. But to think the engineers, because on this one occasion when, as I say, there was practically nothing going through the wall, and I saw the material—I remember distinctly telling them that I did not think at that particular date they need do anything—should for two years afterwards do nothing at all, and then hold up their hands in horror——

Q.—It is one year from January, 1924?

A.—Yes—and hold up their hands in horror and say it is impossible, and take no action—well, I have no words too strong in condemnation of, as it seems to me, such strange conduct.

Q.—Is that all you have got to say about the sea-wall?

A.—Yes.

Sir H. Courthope Munroe.—May I just correct a date? I think the witness stated that Mr. Settle went to Bombay in December, 1924.

Chairman.—Did he say that?

Sir H. Courthope Munroe.—In point of fact, I am told by Mr. Settle it is 1925; I do not want to get a mistake in the notes.

Chairman.—December, 1925.

Sir H. Courthope Munroe.—Yes. Later on we may get into a difficulty.

Chairman.—Yes; it becomes of importance.

Sir H. Courthope Munroe.—December, 1924, should be November, 1925.

Chairman.—Will you correct that, Sir George?

Sir H. Courthope Munroe.—The date you have given has been given in error; the real date is November, 1925.

A.—Yes. That is for Mr. Settle.

Chairman.—There is one passage in that statement I would like to ask you a question about. 'You said you came to the conclusion that a large amount of this silt was escaping through an old storm water drain?

A.—Through a storm water drain.

Q.—Was it an old one or one that was put in by the reclamation people?

A.—One that was being put in by the reclamation people.

Q.—But no storm water drains were put in before 1922, surely?

A.—Yes, there was one being put in.

Q.—Do you mean a little one?

A.—Yes; there was a culvert.

Q.—Is *this* the one you are referring to—that little one?

A.—That is the one. There was a hole in the wall, I remember.

Sir Frederick Hopkinson.—It was not done till 1923.

A.—There was certainly a hole in the wall; in 1923 the wall was built.

Chairman.—We can check this afterwards. I just want to get your evidence on it. Do you say there was a hole through the wall through which the storm water drain would pass?

A.—Yes.

Q.—Out into the open sea?

A.—Out into the open sea.

Q.—In your view a large quantity of silt was escaping through that?

A.—Through that hole in the wall.

Q.—You said that was one of the storm water drains constructed during this reclamation?

A.—Certainly. I do not know how many lineal feet of the drain had been made, but certainly I remember looking at the hole in the wall.

Q.—What date are you fixing for this? Is it January, 1925?

A.—I am fixing it at the date of——

Q.—The interview?

A.—At the date of that letter.

Q.—Letter 107?

A.—Yes.

Q.—That is January, 1924?

A.—Yes. I say that there was a hole in the wall in January, 1924, through which there was silt and storm water escaping; I have it distinctly in my memory. There is no record of it, but I remember distinctly saying, " There is water going through, but what is going through the main wall is insignificant."

Q.—By January, 1924, it is probable that there was a storm water drain passing through that sea wall. I think one can satisfy oneself about that by looking at some papers?

A.—Yes.

Mr. Billimoria.—Where was the hole? Was it in the middle, in the top, or in the bottom?

A.—It was in the bottom of the wall.

Q.—Did you take any steps to rectify that at once? A hole in the bottom could be easily filled in.

A.—I had no power to take steps. I say that I remember pointing it out to the Executive.

Chairman.—As a matter with which they should deal?

A.—Yes. I remember incidentally discussing it on the ground.

Q.—As the supervisor of the works it would be part of your duty to point that out to them?

A.—Yes.

Q.—It being pointed out to them as a real cause of the loss of the material, it was their duty to fill it up?

A.—Yes.

Q.—And later on, perhaps, it was your duty to see that they had done it?

A.—If I happened to be in Bombay.

Q.—On page 38 of your statement you say: " On the 24th November, 1919, on instructions from the Bombay Government, and accompanied by the Secretary to the Government, I proceeded to Delhi to discuss the scheme with the Government of India, and had a series of conferences with the member of the Council concerned, the Finance Member, and the Secretary to the Government of India Public Works Department." What was the name of the Secretary to the Government who went with you?

A.—I rather think it was Mead.

Q.—He is now dead?

A.—Yes.

Q.—Then you had a series of conferences with the Member of the Council concerned —who was he?

A.—Sir Claude Hill.

Q.—And the Finance Member?

A.—The Finance Member also.

Q.—Who was the Finance Member?

A.—The Finance Member was the officer who is now Governor of the Punjab.

Q.—Sir Malcolm Hayley?

A.—Yes.

Q.—And who was the Secretary to the Government of India Public Works Department?

A.—That was Sir Sydney Crookshank.

Q.—Those are four officials?

A.—Yes.

Q.—Had any one of them any personal experience of suction dredging, do you imagine?

A.—I cannot speak for Sir Sydney Crookshank, but I cannot believe that Sir Claude Hill or Sir Malcolm Hayley had any experience of suction dredging.

Q.—Or Mr. Mead?
A.—Or Mr. Mead.

Q.—Or any idea of how to set about building a sea wall?
A.—No, I do not suppose that they did. Sir Sydney Crookshank ought to have.

Q.—Have you read his evidence?
A.—Well, I really have not had time.

Q.—You may take it that he disclaims any knowledge of anything about suction dredging, and would not be offended if one put his knowledge of these matters as most superficial. If you expressed to those four gentlemen any opinion about the output of dredgers, weight of anchors, forces of tide, percentage of solid material passing through the pipe, or any of those technical matters, of course, none of them would have dared to say anything in contravention of it, would they?

A.—I would not say that of the Chief Engineer. The Secretary of the Government of India Public Works Department is supposed to know everything about engineering—every branch of it.

Q.—Is he supposed to know about marine engineering?

A.—He is supposed to be able to have access to people who do know, in the marine engineering branch. I put it in this way to you : I do not know whether they do it now under the Government of India Act, but certainly not so many years ago all marine works went up to the Secretary of the Government of India Public Works Department. They were frequently very severely criticised, and they assumed a complete knowledge of the subject.

Q.—Lord Lloyd has expressed the opinion (I am going to put it to you as a very fair way of meeting it) that they would be very largely in your hands. I am not suggesting anything improper at all, but you were the expert. You were the man known to them as having done work in Rangoon and in Mesopotamia, and had obtained a Knighthood and the K.C.I.E., and have been all your life an engineer. Would not that put them very greatly in your hand?

A.—It would depend upon the temperament of the men; it depends very largely on the temperament of the men. When I was carrying out the river training works in Rangoon, there was an officer at the head of the Public Works Department who was very different in temperament—I say it without any disparagement to Sir Sydney Crookshank—and he and I disputed for four or five years before the river training works were begun; so that I say it is a matter of temperament. Some Secretaries might say: " Well, I do not know about this," and others might argue the point. I do not think it could be laid down as a rule.

Q.—Sir Sydney Crookshank did induce you to increase the dredging cost from 6 annas to 8 annas, did he not? Do you remember that?

A.—I do not remember that.

Q.—Was your figure always 8 annas?

A.—I think my figure was always 8. I remember that as my completed estimate was increased from 367 lakhs to 400 lakhs.

Q.—Did Sir Sydney Crookshank at the interview you had with him at Delhi go into the matter as a man understanding it, as a man of any degree of quality, with you?

A.—He has his technical staff. I cannot say that he devoted very much time to personally discussing the matter with me. An officer in that position has his technical staff. I did not know what inquiries they made or what action they took. It was open to Sir Sydney Crookshank to take any action he liked to ascertain whether my plans and estimates were accurate or not—in fact, I go further and say, that it was his duty to do so.

Q.—Did he make any criticisms whatever upon the text of your report?
A.—I do not know; I do not remember that he made any.

Q.—Or on the feasibility of the scheme?
A.—No, I do not think he made any criticisms to me.

Q.—Or the fact that the work could be done at 367·61 lakhs?
A.—No, I do not remember that he made any such criticism.

Q.—Can you suggest any criticism that Sir Sydney Crookshank made of your scheme, or any useful contribution that he made?

A.—I have never seen Sir Sydney's report on the subject. I am hardly in a position to answer that question. I have seen no report.

Q.—We have not seen it.

A.—I have seen no report, so that I really do not know what he said or at what length he commented on anything.

Q.—When you were discussing it did he make any useful comment that you remember—any comment showing that he was bringing a skilful and trained engineering mind to it? That is what I want to know.

A.—I cannot remember that he made any very useful comment.

Mr. Billimoria.—You say in this paragraph that you left Bombay on the 24th November, and returned to Delhi on the 29th November. If you left on the 24th you would not have reached Delhi until about the night of the 25th; that would be the earliest at which you could reach Delhi?

A.—Yes.

Q.—So that you would not have any interview with Sir Sydney Crookshank before the 26th?

A.—If I left on the 24th November?

Q.—I am reading your paragraph 47.

A.—Yes.

Q.—So that you would not have discussed the proposition with Sir Sydney Crookshank before the morning of the 26th?

A.—Excuse me one moment; I should have to think of the train I left on the 24th by, and the time I got to Delhi. I think we started the discussions as soon as we arrived. I remember having discussions in the evening with Sir Claude Hill. I really cannot answer that question without looking at the time tables and finding out what time I arrived.

Q.—I can tell you no train arrives in Delhi before 8 o'clock in the evening, so that it would not have been possible for you to have discussed the proposition except at the dinner table, if you were dining with Sir Claude that night?

A.—This is the 25th?

Q.—Yes, the 25th.

A.—Very well, then, we had the 26th and 27th and 28th. I rather think the train leaves on the 29th at midnight from Delhi to Bombay.

Q.—Do you think that a discussion of four days with the Secretary of the Public Works Department would enable him to go through your estimates thoroughly and to express any opinion thereon?

A.—It was not for me to say how long I was to be in Delhi, but as soon as the officials in Delhi told me that they had received all the information they required, I left Delhi. If they had wanted me to have stayed a long time in Delhi I would have stayed a long time in Delhi.

Chairman.—The theory probably would be that they had papers laid before them, and then when they were ready they would send for Sir George.

Mr. Billimoria.—That could not be, because Sir George in his evidence has said he brought the report out to Bombay although it is dated September. He brought it out from England, but it was not sent over.

Chairman.—We must be a little careful about this. The report was in existence in September and it was laid before the Government of Bombay in October. If it was sent to the Government of India it could easily reach them in the month of October. It is on the 24th November, three weeks later, that Sir George has his interview, so that there was plenty of time for the Government of India to instruct itself before sending for Sir George.

A.—I should like to make it plain that it was no business of mine to dictate to the Government of India how long they would consider my report. As soon as they said they did not want me any longer I naturally left Delhi and returned to Bombay. I did not go of my own free will.

Q.—At all events, did you give to the Government of India as much time as they wanted you to give for the discussion of this matter?

A.—I gave them all the time they wanted for discussion. I had no desire to hurry anything.

Q.—All I am suggesting to you is that three of these people had no expert knowledge, and one had not sufficient expert knowledge of these highly technical matters to be on any real equality with you in the discussions. At page 39 you say: " Sir George Lloyd said definitely and repeatedly that he did not wish the work to be carried out by the Bombay Public Works Department. On the 3rd December, 1919, I submitted a note giving my views as to the execution of the work on the supposition that my firm would be the engineers." Can you tell us if you have it in your recollection, what was the point that Lord Lloyd made with regard to the non-employment of the Public Works Department?

A.—As far as I can remember, Lord Lloyd's idea was to have the work done free from, what shall I call it? the incubus of Government control—free from the intolerable

delays caused by having to ask sanctions every day, and meeting audit objections; then there was the lack of costing, and generally the procedure which is inevitable in carrying out work under the Public Works Department. Sir George Lloyd discussed it with me several times, and his idea was to be free from these restrictions.

Q.—To create a body that would be more elastic and quicker in procedure?
A.—Yes.

Q.—At that time there was no idea of the Development Directorate. That came subsequently. At that date I think it must have been in Lord Lloyd's mind to create a body of that character, because we have had it in evidence that in January, 1920, he was discussing it with Sir Lawless Hepper. Of course he may not have mentioned it to you?
A.—He did not mention it to me. My recollection of the way in which he discussed the Back Bay scheme was that, at all events at that date, he had not contemplated the Back Bay scheme being merged in the Development Directorate. He may have had the Development Directorate in his mind, but he had not contemplated merging the Back Bay scheme into it.

Q.—In your view, was it an advantage to the Back Bay scheme to include it in a large number of other schemes for the development of Greater Bombay?
A.—No; I was always rather sceptical about it, and I never thought it was desirable for the Development Directorate to carry out the Back Bay scheme.

Q.—The other matters which were in the hands of the Development Directorate from the reports appear to have been immense—the development of Salsette and the building of chawls?
A.—Yes.

Q.—This was only one of many?
A.—It was one of several schemes.

Q.—Returning to page 39, you say: "On the 3rd December, 1919, I submitted a note giving my views as to the execution of the work on the supposition that my firm would be the engineers": "At the time this memorandum was prepared the Bombay Development Directorate had not been created, and I understood my firm would be in sole charge and control, and that our resident engineers would be free from the numerous restrictions on the economical execution of work which obtains in India on works carried out by the Government." At that time what did you gather would be the extent of your responsibility if you were in sole charge and control? Would you, in that event, be practically in the position of a contractor?
A.—No; I do not think we should ever have been in the position of a contractor.

Q.—Practically?
A.—Not a contractor.

Q.—If you were in sole charge and control with your resident engineers, and so on, would not that be so?
A.—If the work is being done departmentally it does not necessarily mean that the engineers are contractors.

Q.—You mean you would have been in a commanding position—that you would have been able to discharge members of the staff, and done things of that character?
A.—Certainly we would have had control of the staff, and we would have known what the work was costing. In fact, we would have been in a very different position from that which obtained under the Development Directorate.

Q.—You then refer to the interview of the 24th December, 1919, at which you discussed the purchase of the dredger, and it was decided to despatch a cablegram to your London office asking for tenders for the construction of a dredger to be obtained from various dredger-builders?
A.—Yes.

Q.—Then on the 14th January, 1920, you, being in Burma, got a telegram saying that the Bombay Government had decided to appoint your firm the consulting engineers of the Back Bay scheme?
A.—Yes.

Q.—I think you got back to Bombay on the 18th February?
A.—Yes.

Q.—And on the 21st February you had an interview with Sir George Lloyd?
A.—Yes.

Q.—And discussed with him how the work could best be pushed forward, as he was very anxious to see a start made?
A.—Yes. May I hand you in an accurate list of the dates for all the years of when I arrived at and left Bombay?

Q.—That would be very useful for us to have. (*Document handed in.*) At the very first interview, when you saw Lord Lloyd in connection with this matter, did he impress upon you that the matter was an urgent one?

A.—He did, undoubtedly.

Q.—Again, on the 21st February, 1920, was he anxious that the work should be proceeded with as quickly as possible?

A.—He was always anxious that the work should be proceeded with as quickly as possible; but not having technical knowledge, he did not realise the extent of the preliminary work which one had to do.

Q.—Before you could show some results?

A.—Yes.

Q.—Equally in May, 1919, was he anxious to have your report at the earliest possible moment? When you were first asked to prepare a report on Mr. Kidd's scheme, was he anxious to have your report at the earliest possible moment?

A.—Well, he wanted to start the work before the next monsoon. I do not say that he specifically said: "Rush through this report and let me have it as soon as possible." He certainly did not do that; but he indicated that once the work was sanctioned he did not want to lose another monsoon.

Q.—That is right. So that that really meant that the report ought to be out at the end of the monsoon, if it could be done?

A.—Yes.

Q.—It was desirable?

A.—It was desirable.

Q.—I think it was on the 22nd February, 1920, that you learned that the Council had approved of your appointment?

A.—Yes.

Q.—Then it was Sir George Lloyd told you of his scheme for a Bombay Development Department?

A.—Yes.

Q.—Did you arrive in London on the 17th March, bringing with you a letter of introduction from Lord Lloyd to Mr. Montagu?

A.—Yes.

Q.—Who was then the Secretary of State for India?

A.—Yes.

Q.—Did you write a letter to the Private Secretary to Mr. Montagu, in which you say this: "I have had the advantage of discussing the subject fully with the Governor in Council, Bombay, the Government of India, and personally with Sir George Lloyd, and if the scheme is sanctioned by the Secretary of State His Excellency wishes no time to be lost in placing the order for the dredger, as it is necessary for everything to be ready to begin the reclamation as soon as the first section of the wall is finished"?

A.—That is correct.

Q.—The plan in your mind, if I may go to the map for a moment, was this. You were to begin the wall from the Military, Colaba, end?

A.—My very first idea was to begin it at Colaba.

Q.—And the scheme was to carry the sea-wall along to a certain point, and then shut in a lagoon by building a cross-bund?

A.—Yes.

Q.—So that you had an enclosed area composed of a section of the sea-wall, and at right-angles to it a cross-bund joining up with the land?

A.—I think before we got to that stage we had decided that, owing to transport difficulties, it would be preferable to begin the work at Marine Lines.

Q.—Anyhow, was the same plan to be followed? If you went to Marine Lines you would build this section of the sea-wall?

A.—Yes.

Q.—And then build a cross-bund?

A.—Yes.

Q.—Enclosing completely that little area?

A.—That is right.

Q.—As a matter of economy, you would naturally carry your sea-wall to an extent just beyond the point necessary for your cross-bund?

A.—That was the idea.

Q.—Otherwise you are putting too much money into your sea-wall?

A.—Yes.

Q.—You would go on with the reclamation in this block; and you would then at the same time be producing your sea-wall; and again, when you had reached a sufficient length, you would enclose the area by a cross-bund?

A.—That is correct.

Q.—But, again, having only just sufficient sea-wall to keep ahead of your reclamation?

A.—That was the programme of works; but, as I say, the very first idea was to start at Colaba, but transport difficulties were so great that before we had really got any plans out for Colaba we had decided that it would be much cheaper to begin from Marine Lines and proceed as you have described it.

Q.—In this letter of the 17th March you are intimating that the reclamation should begin as soon as the first section of the wall is finished?

A.—Yes.

Q.—By that you mean what I call the lagoon, the enclosed lagoon at Marine Lines end?

A.—Yes; I think it was at Marine Lines end.

Q.—Or either end?

A.—Or either end. That was the idea. The idea was that the work would be started on the wall at the end of that monsoon, so that considerable progress would have been made with the wall the following year.

Q.—You hoped, and indeed it was part of your plan, that the dredger would arrive at a time when one area, be it Colaba or Marine Lines, would be ready to receive the pumped material?

A.—Yes.

Q.—The two were to synchronise?

A.—The two were to synchronise.

Q.—They failed to do so, did they not, very badly?

A.—They failed very badly.

Q.—Why was that?

A.—Well, I think I can explain that in a few words.

Q.—I wish you would?

A.—I have pointed out to you that in the first instance it was proposed to begin at Colaba, but then we changed our plans owing to the expense of transport, and the proposal was then to begin at Marine Lines, and arrangements were being made to begin at Marine Lines. It was intended by the Bombay Government that the wall construction should be put in hand in October, 1920, and a contract was actually let in Bombay by the Bombay Government. I was not present and do not know the details, but a contract was let by the Bombay Government. It was subsequently cancelled and a resolution of Government passed that the work should be done departmentally. The work was not, therefore, begun till October, 1921, so that a whole year was lost in beginning the work because, instead of the work being begun in October, 1920, according to the original desires and wishes of the Governor, they decided not to accept that tender, and the work was postponed. Then in July and August there was correspondence between the India Office and myself on the subject of whether it would be possible to begin at both ends simultaneously. I think you have that.

Q.—I will deal with that as a separate matter, unless you would like to do it now. Let us see if we can shorten that. Is the substance of that that you received an enquiry from the Secretary of State here?

A.—Yes.

Q.—Asking whether it was practicable to begin the sea wall at both ends?

A.—Yes.

Q.—To that you replied that it was practicable, but that it would mean an increase of cost?

A.—Yes.

Q.—Am I right in thinking that on those documents, while you were saying it was practicable you were not enthusiastic about it, as it meant a complete change of plans? It meant an increased cost and an increase of plant?

A.—I do not know that I was exactly not enthusiastic about it, but as you know, the reason was given that they really wanted the land more urgently at Colaba than they wanted it at Marine Lines. That was emphasised later on by Sir Lawless Hepper.

Q.—We might take these telegrams and I will just read them, as they are short. There is a telegram from the Governor of Bombay dated the 4th July, 1920.

A.—Yes.

Q.—"Following for Buchanan. Telegram begins: Back Bay. His Excellency would be glad of your telegraphic opinion as to feasibility of beginning work at both

ends at the same time. Military authorities concerned in getting reclaimed land adjacent to Colaba, are anxious that Colaba end should be reclaimed as early as possible. On the other hand, his Excellency believes you considered necessary to start Western end first on account of railway communications." That is his telegram?

A.—I did not get that telegram, but I got it in the form of a letter.

Q.—The letter is the 7th July. The letter, though not setting the telegram out textually, gave you the exact substance of it?

A.—Yes.

Q.—Then in reply to that letter your firm suggested the following reply for transmission by cable to the Government of Bombay: " Buchanan reports that it is practicable to begin work on the Back Bay scheme at both ends simultaneously. In constructing the wall the bulk of the work would be carried out from the Western end, the stone being conveyed to the site by rail from quarries near Andheri, but a considerable length of wall could be built from the Eastern end, as the wall would be of concrete throughout, and sufficient stone could be procured locally. To begin building the wall in two places will not materially advance matters unless reclamation can also be proceeded with, and Buchanan is considering whether the new dredger and the ' Jinga ' "—was that a misprint for " Kalu "?

A.—Yes.

Q.—" —whether the new dredger and the ' Kalu ' can work simultaneously at Eastern and Western areas. Buchanan understands Lewis is on his way home, and he will discuss all these points fully with him. Message ends." Then on the 15th July your firm sent a letter to Whitehall saying: " With reference to your letter of the 7th July and our reply dated 10th July, we beg to suggest the following additional message for transmission by cable to the Government of Bombay." Then: " Buchanan has now satisfied himself that the dredger ' Jinga ' "—again that must be the " Kalu "?

Q.—" and the new dredger "—that is the " Sir George Lloyd "?

A.—Yes.

Q.—" Can work together on Bombay reclamation, and therefore work on construction of the wall can proceed from both ends simultaneously. Buchanan asks for very early orders as to whether he is to proceed on these lines, as considerable changes in designs for execution of work will be necessary." On the 29th July the Governor of Bombay telegraphs to the Secretary of State: " Work may start from both ends." That was communicated to you, and that is your warrant for saying in your report of 1922 on page 2: " Under the orders of the Government the construction of the new wall is being proceeded with from both ends simultaneously "?

A.—Yes.

Q.—That was an order of the Government?

A.—Yes.

(Adjourned for a short time.)

Chairman.—Before the adjournment we were on the question of the sea wall?

A.—Yes.

Q.—It amounted, did it not, to a proposal to do two independent dredging operations?

A.—Yes.

Q.—It would have involved four crews?

A.—Yes.

Q.—Two dredgers and two boosters?

A.—Two dredgers, yes.

Q.—And two boosters?

A.—I would not like to say about the two boosters at the present moment.

Q.—It was ultimately proposed to buy the " Jinga," was it not?

A.—I think the " Jinga " had been purchased then.

Q.—That is right; she was purchased?

A.—Yes.

Q.—She was supposed to work eventually in conjunction with the " Kalu "?

A.—The " Kalu " was purchased, yes.

Q.—The " Kalu " was purchased, and so also was the " Jinga "?

A.—The " Jinga " has been purchased since.

Q.—Yes. The " Jinga " was bought in order to work in conjunction with the " Kalu "?

A.—Yes, that is right.

Q.—She has never done any work yet?
A.—No, I do not think she has done any work yet.

Q.—She was bought for £10,000?
A.—Yes.

Q.—Have you any idea how many thousand pounds the repairs will be when eventually they are done?
A.—No, I have not.

Q.—She is still in dry dock being repaired, is she not?
A.—I have no information on the subject.

Q.—We thought she was a phantom ship for a long time, but eventually we found her in dry dock in India?
A.—I have never been consulted about the cost of repairs. I am in ignorance of the cost of anything.

Q.—In addition to all the plant there were two sets of floating pipe line?
A.—Yes.

Q.—One of the immediate results of deciding to build the sea wall from both ends was that you had to bring down 2,000 tons of spoil from the quarry each day instead of 1,000 tons, had you not?
A.—Yes, we had to bring down more, certainly.

Q.—2,000 tons?
A.—Yes.

Q.—Did that involve a purchase of some 130 wagons?
A.—Yes.

Q.—At a cost of about £375 each?
A.—Yes.

Q.—Half a million of money?
A.—Half a million of money. I am not going to say that if it was necessary to build the sea wall from both ends at once it was necessary to have double the plant and 2,000 tons of stone a day.

Q.—If the sea wall had to be carried on according to programme from the Marine Lines and it was supposed to involve, and it would involve 1,000 tons of stone a day, would it not?
A.—I would not bind myself to that.

Q.—Was not that the estimated figure to which they were working?
A.—They were working to that.

Q.—They were working to 1,000 tons a day. When you decided to have it built from both ends it had to be twice 1,000 tons, which is 2,000 tons?
A.—Yes, 2,000 tons.

Q.—It was rather an expensive decision, was it not?
A.—It was rather an expensive decision, but the atmosphere then was that money was no object.

Q.—You mean that the belief was that the land reclaimed, with which you had, of course, nothing to do, would be sold at such a great profit?
A.—At such an enormous profit.

Q.—It would be sold at such an enormous profit that two million pounds or three million pounds thrown away made no difference one way or the other; is that your point?
A.—Exactly, that the one million pounds would be spread over so many square yards of land. If you put one million pounds into so many million square yards of land in consequence of the enormous profits that were going to be made it really did not matter.

Q.—Buying a dredger at £75,000, spending £25,000 on her for repairs, and keeping her idle for five years, with the consequent loss of interest of £20,000 or £30,000, was really a matter of no importance?
A.—Not in the estimates of the revenue in those days.

Q.—So be it. Anyhow, do you suggest that building the sea wall from both ends was a business proposition?
A.—I wanted to do it from the top end.

Q.—I know that you did. The telegrams are quite clear, and nobody is suggesting that it was done on your initiative?
A.—No, it was not a business proposition.

Q.—That is what I wanted to know. It was not a business proposition?
A.—In that connection, to show how urgent the development at Colaba was considered, the Director of Development in a note addressed to the Chief Engineer, dated May, 1922, made the following remarks: " So far our energies have been directed

mainly to the Marine Lines end of the work, and at the commencement in the absence of information as to the proposed lay-out there was no particular reason for any special preference being given as between Marine Lines and Colaba. Mr. Davidge's preliminary lay-out plan has, however, now been accepted in the main, and it is evident, looking at the reclamation as a commercial proposition, that this portion of the reclamation from Colaba northwards as far as Mayo Road is of the first importance, a view which receives further support from the agreement we have come to to sell 265 acres at the southern extremity of the reclamation to the Military Department. It is in fact now apparent that in order to begin to realise money by sales to the Military and public as soon as possible we must concentrate on Colaba and reclaim from the South by sections, the sections being conveniently formed by bunds following the main roads running at right angles to the sea wall."

Q.—Apart from the agreement with the Military, there was another reason why Colaba should have been reclaimed first, was there not? The fact that the land at the Colaba end is far more valuable than the Marine Lines?

A.—Yes.

Q.—Therefore, as it was part of the scheme to get a return on the money as soon as they could, obviously it was better to begin at the Colaba end, and carry the reclamation along the part which would sell at a higher rate than the Marine Lines?

A.—Yes. From the engineering point of view it was very much cheaper to begin at the Marine Lines end, because to take one point, the railway from Marine Lines to Colaba cost, I think, 7 lakhs of rupees.

Q.—Your view was to have the " Kalu " pumping into what is marked on the map as Block No. 1; is that right? The " Kalu " was to pump at the Marine Lines?

A.—No. My view was that the " Sir George Lloyd " would pump into the Marine Lines, and the " Kalu," working close to the shore with a convenient pipe line, would pump into the small piece at the Colaba end.

Q.—Could the " Sir George Lloyd " ever pump into Block No. 1 at the Marine Lines end?

A.—That was always an open point, and we had it always under consideration, whether we should not have to put a land booster for the last piece.

Q.—I am very puzzled by an answer of that kind. In 1919 Bombay was just as it is there on the map?

A.—Yes.

Q.—There had been no increase of land anywhere?

A.—No.

Q.—If you now know in 1926 that you cannot do it, why did not you know that you could not do it in November, 1919; there has been no physical difference of any kind?

A.—I do not quite follow you.

Q.—You say it has always been an open point. You mean owing to the length of pipe line, do you not?

A.—Yes.

Q.—The length of pipe line to-day is the same as the length of pipe line was in 1919?

A.—Yes.

Q.—There is no difference. Why did not you ascertain that in 1919?

A.—We did not want to go to the expense of ordering a land station at that time. It is really a question of cost. You can pump through a very much longer pipe line than the maximum given, say 5,000 yards, or 10,000 yards. You can pump through a very much longer pipe line, but you do not get it at the full bore.

Q.—You get a reduced output?

A.—Yes. It was a matter for consideration whether for that small piece up at the top end you would do it with the longer pipe line—there was not much in that piece—or whether you would have an additional land booster.

Q.—There is also Block 2. Have you worked out the distances?

A.—We worked out all distances.

Q.—You have?

A.—Yes.

Q.—Then you are able to tell me, are you not, that to pump from the Harbour across that bit of the Peninsula into Blocks 1 and 2 could not possibly have been done with the plant estimated for in your Report?

A.—We did not think so at that time.

Q.—It is not a question of thinking. It is a question of arithmetic, is it not? The answer is that it cannot be done, is it not?

A.—I have a plan which I can produce.

Q.—Will you, on Monday, endeavour to show us how, with the plant available as mentioned in your Report, you could pump into Block No. 1 and Block No. 2?

A.—Yes, I will do that.*

Sir Harry Courthope-Munroe.—I did not quite follow, Sir, what was your inquiry. I want to see that Sir George Buchanan thoroughly understands it?

Witness.—You want me to produce on Monday a plan showing how, in 1919, we proposed to deal with the Marine Lines?

Chairman.—No, not a plan at all. I do not want a plan necessarily. Here is one of these little measuring instruments and you can do it on the map. You can measure it off on the map, and show us how it could be done.

A.—We worked it all out with models. I think we have got a plan.

Q.—If you have not got a plan, will you take it off the map, and show us how it can be done?

A.—Yes.

Q.—You will remember that you have got 10,000 feet of pipe line only to deal with in regard to this question?

A.—Yes.

Q.—The suggestion about building the wall at both ends came from non-technical people, the Governor of Bombay and his advisers?

A.—Yes.

Q.—Was not it your duty, as their technical adviser, to tell them that it was an expensive scheme; that it was not, as you have told me to-day, a business proposition?

A.—No, I do not think so. They gave their reasons why they wanted it started at both ends.

Q.—They have given the reasons, but you told me five minutes ago that it was not a business proposition, and I have given you a few figures about it?

A.—Yes.

Q.—The figures include £500,000 spent on extra rolling stock. Do not you think that you ought to have telegraphed back to the Governor of Bombay and said: "This will cost £500,000 in rolling stock alone. It will mean the employment of two dredgers, two boosters, and additional pipe line, and it will be a most costly undertaking"?

A.—I was asked if it were practicable, and I replied that is was practicable.

Q.—Practicable, of course, meant not merely possible from an engineering point of view, but practicable from a business point of view, did it not?

A.—There was no question of cost in those days.

Q.—You come back to the point that money was no object?

A.—I come back to the point that in those days money was no object.

Q.—It is being looked at very carefully to-day, is it not?

A.—Yes.

Mr. Billimoria.—Whose funds were these?

A.—Whose funds?

Q.—These were public funds, ratepayers' moneys. There was no consideration paid to ratepayers' money; is that what you suggest?

A.—I am not in a position to deal with the higher points of finance.

Chairman.—I think you put it in this way, that at that moment the authorities were of opinion that this would yield so much profit any way that a million or two really did not matter; that is it, is it not?

A.—Yes, that is it.

Mr. Billimoria.—If it was a business corporation would it have mattered to them? If it was not the Government, but a public corporation, or a private individual, would it not have affected their purse?

A.—I do not know. I think that even a public corporation, if they had such sanguine ideas as to the profits they were going to make might have said: "Carry on."

Chairman.—Continuing with page 42 of your statement, I am still reading the letter that you wrote to Mr. Montagu's private secretary. You say: "In this connection, a tender for the dredging plant, in accordance with the general specifications drawn up by my firm, was received from Messrs. Wm. Simons & Co., Ltd., and, acting on Sir George Lloyd's personal instructions, my firm took in tenders from other builders, the result of which was communicated to the Governor in Council, when I recommended Messrs. Simons' tender be accepted, subject to my firm's approval of the detailed plans and specifications, and to certain important modifications which appeared necessary to me after further consideration on the spot of the best means of carrying out the works?

A.—Yes.

* See Appendix IX.

Q.—When you recommended the Government to accept Messrs. Simons' tender you had not seen the elaborate tender of Messrs. Lobnitz, had you?

A.—I could not tell you whether I had seen it.

Q.—Let me recall the dates to you. All that you had seen then was the telegram which your firm sent to you saying that Messrs. Lobnitz were offering two dredgers, and such and such material at such and such a price?

A.—Yes.

Q.—But you had not seen Messrs. Lobnitz's detailed specification of what they offered?

A.—No, I had not seen Messrs. Lobnitz's detailed specification.

Q.—Of course, you have the original of Messrs. Lobnitz's specification?

A.—I have that, yes.

Q.—You might look at it before Monday, because we have also a copy of it, and we should like to ask you some questions about it.

A.—Yes.

Q.—Your letter says: "—— and to certain important modifications which appeared necessary to me after further consideration on the spot of the best means of carrying out the works." What were the important modifications in the specification?

A.—Really, at this date I cannot recall them to memory.

Q.—I have looked rather carefully at the specification. Do you see any modifications after the 12th September? I cannot find any modifications.

Sir Frederick Hopkinson.—The only modifications have been modifications by which the work has been cheapened.

Chairman.—Yes. You say: "—— and to certain important modifications which appeared necessary to me after further consideration on the spot of the best means of carrying out the works." "On the spot" meant after further consideration at Bombay, did it not?

A.—Presumably.

Q.—The contract was given to Messrs. Simons in May, 1920?

A.—In May, 1920, yes.

Q.—You left Bombay at some date early in 1920, did you not? You handed in a list of the dates when you were at Bombay? *

Sir Harry Courthope-Munroe.—The earliest date mentioned there is the 15th of November, at the top of the page.

Chairman.—It is a pity that we have not got the 1919 dates, but we can put them in?

A.—I can get them.

Q.—What I suggest to you really is that you recommended Messrs. Simons' tender to be accepted some time in 1920, or very early in 1921?

A.—Yes.

Q.—That must be so, I think. You cannot tell us what were the important modifications which you made in the specification?

A.—No, I cannot at this date recall them.

Q.—So be it. In paragraph 55 of your statement you say: "I received a letter from Mr. Brown, the private secretary to the Secretary of State, on the 23rd of March, 1920, saying that the Secretary of State was at present away from the office on account of ill-health, but that Sir John Steevens, Acting Director-General of Stores at the India Office, would be pleased to see me and discuss the Back Bay Reclamation Scheme; that he had been anxious to have an opportunity of going through the matter with me on my arrival from India, and would be glad to make an appointment with me if I would suggest a time. Accordingly I met Sir John Steevens on the 25th March, 1920?"

A.—Yes.

Q.—Then you say that on the same day you wrote to Sir George Lloyd?

A.—Yes.

Q.—At page 44 of your Statement you say: "In the first place I may say that the India Office asked Messrs. Simons & Co. to extend the time of their tender for the dredger, and they agreed to do so provided there is another material increase in their prices, and I was not far out when I told you that if the order was not placed before the 12th March it would cost your Government another £100,000."

A.—Yes.

Q.—Was that the 12th March, 1920?

A.—The 12th March, 1920, it must be.

* See Appendix X.

Q.—" After discussing the dredger proposition generally Sir John Steevens informed me that the India Office had passed orders to the effect that no order for the dredger was to be placed until the whole scheme had been sanctioned, but that he, along with his experts, was to go into the question of the dredger and decide if Messrs. Simons & Co.'s offer was desirable both from the practical and financial points of view." Was the tender of Messrs. Lobnitz ever submitted to Sir John Steevens?

A.—Not to my knowledge.

Q.—Or to Sir John Biles?

A.—Not to my knowledge.

Q.—You know as a fact that it was not?

A.—I do know that it was not; it was not submitted by my office, at all events.

Q.—" I also explained to Sir John Steevens that as we have been appointed the Engineers to the Back Bay scheme we wished to get on with the working drawings of the wall and generally proceed with the arrangements for carrying out the work as soon as possible; he made a note of this and promised to let me know when anything was settled." This is to Lord Lloyd?

A.—Yes.

Q.—" Meanwhile, time is passing and I am afraid you will be very disappointed at the continued delay in getting the Secretary of State's sanction to the entire scheme, and at this rate it will be almost impossible to have the dredger ready for work by the end of the 1921 Monsoon."

A.—Yes.

Q.—That meant October, 1921?

A.—October, 1921.

Q.—It was a real blessing that she was not ready; was it not?

A.—As it happens it was a blessing.

Q.—It was a real blessing?

A.—But you must remember that Lord Lloyd had been pressing to begin the work in October, 1920.

Q.—Yes, you have explained that. The dredger arrived in March, 1922?

A.—Yes.

Q.—" The Colaba," the booster, arrived a little later in April?

A.—Yes.

Q.—The pipe line was delivered round about the same time?

A.—Yes.

Q.—The total was about £650,000?

A.—Something like that, yes.

Q.—The " Sir George Lloyd " remained idle, so did the " Colaba " and so did the pipe line for 21 months, did they not?

A.—For 21 months I think, yes.

Q.—There not being for 21 months any single one of those little lagoons ready to receive reclaimed material?

A.—That is so.

Q.—Did that circumstances alone involve a loss taken at 6 per cent. of some £68,000?

A.—I suppose it did, yes.

Q.—And also depreciation as well?

A.—Yes.

Q.—The " Colaba," the " Sir George Lloyd," and especially the pipe lines, had to go through two monsoons doing nothing?

A.—Yes.

Q.—Does the absence of a lagoon for the dredger to do her work in appear to you to to be a lack of co-ordination?

A.—The absence of the lagoon to do the work?

Q.—Does the absence of any lagoon for the dredger to pump material into for 21 months seem to you to be a lack of co-ordination?

A.—It seems to me a lack of organisation and co-ordination, yes.

Q.—So be it. Do you attribute it mainly to the fact that the building of the sea wall was postponed until October 1921.

A.—I attribute it partly to that, and I attribute it to the delay in proceeding expeditiously with the wall at Colaba. In our judgment the dredging should have started in December 1922. In our judgment there was no reason why the dredging should not have started in December 1922 or January 1923. If the work had been pushed with more energy the dredging would have begun in December 1922.

Q.—Did not you at one time expect the first section of the wall to be ready by October 1921?

A.—That was an old arrangement which was cancelled by the Governor in Council. That was on the supposition that a contract was going to be let to a construction company in Bombay to begin the work. The whole year was lost by the work not being begun as Lord Lloyd wished in October 1920.

Q.—That still would not have accounted for it, would it, because no pumping began until the 8th December 1923?

A.—Yes, but in our judgment there was no reason at all why the pumping should not have begun in 1922.

Q.—For six months at all events, prior to October 1922, you would have been in England, I suppose?

A.—Yes.

Q.—Can you point to any letters in which you are censuring them or criticising them for not being ready to do the pumping in 1922? *

A.—Yes, I certainly can. I think I can give you one almost at once. Will you kindly turn to page 88 of my Statement. It is with reference to the Chief Engineer's breakdown in health. In paragraph 114 I say: "That Sir Lawless Hepper was aware of the way in which work was suffering is clear from the correspondence. For instance, in a letter dated 12th May, 1922, he said, 'After endless delays the railway to Colaba has been begun and I hope that under a different regime it may be possible to get it finished by October,' and on the 8th of June, 1922, I replied:—'I am very disappointed to hear from you that the railway to Colaba is just begun because so far as I am aware there was nothing to prevent it being by this time very nearly finished.'" That is just one example of the delays that occurred, and I was always urging that this railway to Colaba should be pushed on with in order that the wall should be pressed ahead at the Colaba end.

Q.—Are there any other letters?

A.—I have other letters which I will look up.

Q.—Yes. When did you consider that Mr. Lewis had become thoroughly unsatisfactory.

Sir Harry Courthope-Munroe.—That is dealt with at the bottom of page 87 of the Statement.

A.—In paragraph 104 I say: "Some time in 1921 the health of Mr. Lewis showed signs of giving way." I have dealt with that in paragraph 104.

Chairman.—Yes, you have. I will deal with that in detail later. All I want to know for the moment is, about what date did you become thoroughly dissatisfied with Mr. Lewis?

A.—It is very difficult to give an exact answer to that question because I might say that the dissatisfaction was progressive from 1921, when Mr. Lewis's health showed signs of giving way. He was laid up for three weeks in June, 1921. We got progressively anxious from that date, and on the 11th April, 1922 (page 83 of my Statement) I wrote to Sir Lawless Hepper and said: "I wonder if you are taking any action on the lines I suggested to His Excellency and to yourself."

Q.—"I wonder if you are taking any action on the lines I suggested to His Excellency and to yourself"?

A.—Yes.

Q.—Was that to get rid of Mr. Lewis?

A.—Well, it was.

Q.—Why not?

A.—Yes.

Q.—If the man could not do his work, whether from ill-health or anything else, the man ought to go?

A.—Yes, that was the suggestion that I made. It is not in writing. It was a suggestion that I made on the 11th April, 1922.†

Q.—That he should go?

A.—Yes.

Q.—That is all right. Have you seen Mr. Lewis during the last two or three weeks?

A.—I have not seen him for some years.

Q.—I was wondering if you had seen him because Mr. Lewis came and gave evidence before us, and his health must be very, very bad. Was he, even in 1919, a man of drive and energy?

A.—He was. I would like to make it quite plain that I do not want to make any reflections on Mr. Lewis's ability. I consider that Mr. Lewis is a very capable, brainy engineer, full of energy, and he was full of energy when he was engaged by us at the

* See Appendix XI. † See Appendix XXI.

beginning of the work, but he was subject to gout, and as time went on his whole physical and mental nature changed.

Q.—In 1921 you noticed a considerable change in him, did you?

A.—In 1921 I noticed a considerable change, and I never saw Sir Lawless Hepper without discussing the matter with him. Naturally I was very anxious and, as I say, on the 11th April, 1922, I said that I wondered if he was taking any action on the lines I suggested.

Q.—That is right?

A.—We said: " We feel very strongly that in the interests of the work there should be no chance of the repetition of this disastrous year of sickness."

Q.—I think on the 20th April, 1920, you had an interview with Mr. Montagu?

A.—Yes, that is correct.

Q.—And you presented a Memorandum stating the position of the Back Bay up to date?

A.—Yes. I said that Sir George Lloyd was particularly insistent——

Q.—I think this is important enough to read in its entirety. It is on page 46. You presented a Memorandum of which the following are extracts :—

" The position when I left Bombay was as follows :—

" The scheme as prepared by myself had received the approval of both the Government of Bombay and the Government of India, and the Governor (Sir George Lloyd) had discussed with me the best methods of executing the work, and had also explained his proposed organisation for carrying out not only the Back Bay Reclamation Scheme, but the whole of the housing and improvement schemes. I was informed that a despatch had been issued by the Government of India to the Secretary of State asking sanction to the entire project, and that it was tolerably certain sanction would have been received by the time I got to London.

" Sir George Lloyd was particularly insistent that the Back Bay Reclamation work must be started at the end of the monsoon, say about the month of October, 1920, and I left with the Governor a note explaining how this was to be done. I also recommended the appointment of a resident engineer, and time being an object I proposed that a contract for the first section of the wall should be given to Colonel Grisewood's Syndicate, who were in a position to make a start with the preliminaries, and begin the permanent work directly after the monsoon.

" My instructions were to proceed home with all possible speed, and, on the assumption that the Secretary of State would have sanctioned the scheme by the time I got home, I was—

" (*a*) To make arrangements for the construction of the dredger, and

(*b*) To put in hand the necessary drawings and estimates for the construction of the wall

and I was given a letter to the Private Secretary to the Secretary of State saying that his Excellency was anxious that I should be given an opportunity of discussing any details of the scheme which appeared to require explanation, with the Secretary of State."

Q.—Then I will turn to page 48. This is still the narration, is it not?

A.—Yes.

Q.—" On the 16th April I had a meeting at the India Office with Sir John Steevens and Sir John Biles, and came to a satisfactory understanding as to the relative responsibility of Sir John Biles and myself. I then informed Sir John Steevens of the letter I had received stating that a firm of contractors had been given the contract for the first section of the wall, and I remarked that the most vital matter in connection with the whole scheme was to place the order for the dredger, as if this was not done promptly a whole year's time would be lost, all our plans being made on the assumption that the dredger (which would take a year to build) would arrive in Bombay in time to start operations at the end of the 1921 monsoon." By " in time to start operations " you mean to find a lagoon ready constructed?

A.—Yes.

Q.—Then you say at page 49 : " It is perhaps a pity that the Back Bay scheme is involved with so many other projects because, taken by itself, it must be exceedingly profitable to the Government."

A.—Yes, that was the current opinion.

Q.—When the matter was put before the Legislative Council on 3rd August, are you aware of there being any dissentient to the scheme?

A.—I do not know. I have no knowledge of that.

Q.—We have the debates here. Then " The following is an extract from the memorandum of my interview written on the 21st April." This is a record of your interview with Mr. Montagu, is it?

A.—Yes. I wrote it the day after I had seen him.

Q.—You handed him the memorandum from which I have read extracts?

A.—I did, yes.

Q.—And he wrote upon it " Sir George has given me a characteristically strongly worded memo. which was for my private information and to which under the circumstances I take no exception. Sir George Buchanan explained that the project was being held up on account of the order not being placed for the dredger and I direct that the papers be circulated and the case be brought up in Council for final decision on Tuesday next."?

A.—That was my recollection.

Q.—Your recollection 24 hours after the interview?

A.—Less than that.

Q.—" Mr. Montagu then talked to me rather freely. He said that he had discussed the Back Bay scheme with Sir George Lloyd, who was sitting in the Chair I was then occupying." You mean " who had been sitting in the chair you were then occupying "?

A.—Yes.

Q.—" Who had been sitting in the chair I was then occupying, and he had impressed upon him the necessity of the work and the importance of its being done by Government.

Mr. Montagu said he was whole-heartedly in favour of the project, which had always been most attractive to him.

I then explained to him my position, viz., that after my scheme had been approved, Sir George Lloyd had asked me whether my firm would be the Engineers as he did not wish the Bombay Public Works Department to have anything to do with the work. I had agreed on behalf of my firm and had promised to make the carrying out of the work my principal object, if necessary declining works elsewhere, and I had agreed to go out and spend several months every winter in Bombay."

Then you discuss the matter of the Grisewood contract, and I think on the 5th May you learned that approval had been given to proceed with the purchase of the dredger?

A.—Yes.

Q.—We know that on the same day that approval was given for the purchase of the dredger, administrative sanction was also given for the scheme itself?

A.—Yes.

Q.—Then you continue: " On the 14th June, 1920, I had a meeting with Sir John Biles and Mr. West from the India Office, and discussed with them the Back Bay dredger and plant. Together we went over the tender and specification for the dredger, discussed the question of the supply of electric current for the relay station, the manner in which the dredger was to be delivered at Bombay and the erection of the pontoons and pipe line at Bombay."

Then you say, " In concluding this summary of the history of the scheme from its inception I wish to record the opinion that there was no undue haste shewn by anyone in proceeding with the work. For many years the project had been discussed and re-discussed and pending its disposal one way or the other it was blocking the development of Bombay. Once the scheme was sanctioned obviously the correct procedure was to get to work as soon as possible and Sir George Lloyd's (now Lord Lloyd) anxiety to see a beginning made at the end of the 1920 monsoon instead of losing another whole year was reasonable. Although not being an engineer he did not realise the amount of preliminary work necessary in all large schemes before operations can actually be begun. Had the work been entrusted to the Bombay Public Works Department it would, I judge, have taken at least three years before anything was done, not on account of the unwillingness or inability of the Engineers belonging to the department, but in order strictly to conform to procedure."

Then you say how they acquired the town planner's lay-out and a complete working project estimate, and you continue, " Our plan of operations was to prepare a general scheme and estimate and the detailed plans and estimates step by step as the work proceeded, a by no means unusual procedure. I said, and it has been proved correct, that the way prices of labour and materials were fluctuating in 1920 made the preparation of a complete project estimate a useless waste of time, unless indeed prices were included which could hardly under any circumstances be exceeded." Prices were fluctuating, were they, in 1920, very much?

A.—Yes.

Q.—And in 1919?

A.—No. The great fluctuation did not begin in 1919.

Q.—Had there been, between 1912 and 1919, a rise in materials, plant and labour, taken collectively, of at least two-and-three-quarter times?

A.—No. I should say that machinery, and so on, rose about two-and-a-half times.

Q.—We have had rather elaborate figures given us in evidence about it from the Director of Stores. I should like you to come up to my figure of two-and-three-quarter times—that, taken collectively, between 1912 and 1919 the price of steel plates, coal, fuel, wages, rolling stock, cement, and all those things had gone up, taken together, two-and-three quarter times over that of 1912?

A.—No, I should not say that.

Q.—Well, two-and-a-half times?

A.—I say two-and-a-half times, generally speaking.

Q.—Two-and-a-half will do for the moment.

A.—Naturally I went into the question.

Q.—In 1919-20 were prices higher than in 1919?

A.—About 1920 undoubtedly prices began to soar.

Q.—In 1919 you were able to give an estimate correct to two points of decimals, were you not—367·61?

A.—Yes.

Q.—If you could do that in 1919, why could not a contractor have given an equally close estimate in 1920?

A.—No, I do not agree.

Q.—Have you taken out a schedule of figures from 1912 to 1922 just to see what was happening all the way through?

A.—I have some general figures.

Q.—There is no difficulty about getting a list of that character, is there?

A.—I suppose not.

Q.—Because we shall have to examine, you know, the rise in prices between 1912 and 1919, to understand if Mr. Kidd's estimate of 325 lakhs was a correct figure, how in 1919 you could do the work for 367. We will have to look into that?

A.—Yes, I shall be delighted to.

Q.—Then we ought also to consider whether there was such a rise in material between 1919 to 1921 as to justify the price of 702 lakhs as the revised estimate?

A.—Yes.

Chairman.—Take your own figure of 668; that will do just as well—in 1921. We might just discuss that a little on Monday.

Sir H. Courthorpe Munroe.—The witness can deal with it now, Sir. He has his notes before him which he can go into, if you care to.

Witness.—I would rather do it on Monday, I think.

Chairman.—I feel I am a little behindhand on this report, and I would rather pass through a few more pages. Now I come to page 53, to your agreement. We have all read what you have said with regard to that. The agreement may have very little practical bearing on the matters we have to decide, and on one important matter it has no bearing at all; but you emphasize, quite rightly, that your position under that agreement was that of engineers and that you were not in the position of contractors. That is the first broad matter, is it not?

A.—Yes.

Q.—After the recitals it begins: "Now it is hereby agreed, the Firm agree to act as engineers to the Secretary of State in carrying out the said scheme and in the construction and execution of all works connected therewith until the final completion thereof; shall at all times assist and advise the Government of Bombay in all matters relating to the execution of the works, and shall supervise the same and undertake and perform all work and duties devolving upon engineers of large works."

A.—Yes.

Q.—"And in particular the following duties." Then it gives a schedule of duties in England and duties in India?

A.—Yes.

Q.—Then there is this very curious passage in the second paragraph of Clause 2: "The resident engineer will be nominated by the firm and will carry out the details of the work in accordance with the firm's instructions." Do you understand what that means?

A.—In the light of events, I must say that I do not understand it.

Q.—Suppose that clause stood by itself, would not it imply that you were to appoint a resident engineer, that you were to tell him what were the details of the work to be done, and that he was to carry out those details in accordance with your instructions?
A.—Yes, if it stood by itself.

Q.—I do not understand it. I do not know whether you can help me about it. It does not seem to me to be *in pari materia* with the rest of the agreement?
A.—No.

Q.—At all events you are emphasising that your position was that of an engineer and not that of contractor?
A.—Yes.

Q.—So be it.
A.—Then, as you are aware, Mr. Chairman, there was an amended agreement later on.

Q.—Yes. I will come to that in a few moments. On the 4th January, 1923, Sir Chimanlal Setalvad had raised the question as to how it happened that the Development Directorate were employing surveyors and draughtsmen, did he not?
A.—Yes.

Q.—And you had a meeting to discuss the responsibility which you were under with regard to the preparation of plans, estimates and so on?
A.—For temporary works.

Q.—You took the point that you could not be called upon to do temporary work for the reason that you were established in England and the work was going on in India, and that you were responsible for the general plans and specifications relating to permanent work?
A.—Yes.

Q.—On page 61 there is the record of what had been arrived at : " After discussion the Hon. Member agreed to the following recommendations which it was understood Sir George Buchanan was prepared to accept "?
A.—Yes.

Q.—(*b*) is the one. " Messrs. Meik & Buchanan are the engineers for the reclamation and connected works only, and not for roads, drains, lighting and other things necessary for the development of the reclaimed area, but the cost of so much of the storm water drainage system as has to be constructed during the progress of the reclamation is to be included in the amount on which the percentage for the purposes of the firm's remuneration is calculated." Then " The obligation which Clause 1 (*a*) of the agreement lays on the engineers to carry out certain work in London may, with a view to securing a workable arrangement, be held to be confined to the permanent works only of the reclamation, including storm water drains referred to in (*b*). And in order to ensure better co-ordination, all correspondence between the engineers and the chief engineer, Reclamation Branch, should in future be addressed through the Director of Development, a copy of each document being forwarded at the same time for record in the Director's Office." I see there a reference to storm water drains. They were a very important item, were they not?
A.—Are we coming to storm water drains now? They were an important item, yes.

Q.—Yes, I will come to them. Page 29 of your report gives certain figures, " Roads, drains, lighting as per Government Public Works Department estimates, lump sum, 75 lakhs "?
A.—Yes.

Q.—Have you got that estimate here?
A.—I have never seen it.

Q.—Then where did you get the figures?
A.—It was for roads, lights and storm water drains.

Q.—How did you get the figure? Who gave it to you?
A.—I took Mr. Kidd's figure of 50 lakhs.

Q.—I see; now I understand. If you turn to page 13 you will find Mr. Kidd's item No. 5 : " Roads, lighting and drains, Public Works Department, 59.45 lakhs "?
A.—Yes.

Q.—Then all you did was to take that statement and add to it 15·55 lakhs?
A.—That was so, yes.

Q.—What was in that you have no idea?
A.—I have no idea at all.

Q.—We have got the documents, and if you would care to have them I think one can assert with safety that there were no storm water drains in them?
A.—I can assure you that I never saw any document.

Q.—So be it.

A.—As there were no other drains, naturally I took it as storm water drains.

Q.—But the storm water drains themselves cost 64 lakhs, did they not—nine storm water drains, 64 lakhs?

A.—The Development Directorate have spent 64 lakhs, yes.

Q.—That would only leave 11 lakhs for the roads and lights and other drains, which would be a wholly insufficient amount, would it not?

A.—A wholly insufficient amount. There was never any intention to include other drains or to include the layout.

Q.—But how do you know, Sir George? If you had never seen the estimate, how do you know what was included in roads, lighting and drains? You say you have never seen it?

A.—No. I always understood that the sewerage was going to be done by the Municipality. It was nothing to do with us at all. We were not dealing with anything except the reclamation. Therefore in my estimate I dealt with one or two main roads and the storm water drains—well, I took Mr. Kidd's estimate.

Q.—You took that; very well.

A.—But storm water drains had never been forgotten. We had never forgotten storm water drains.

Q.—What did you say?

A.—We never, as is suggested, forgot that there would have to be storm water drains. It was not possible at that time to come to any details about storm water drains.

Q.—We must look into this. Did the Development Directorate people, Mr. Lewis or Mr. O'Rorke, write you a letter saying in terms that the storm water drains had been overlooked?

A.—I do not remember what they wrote on the subject.

Q.—The witnesses have been called and they have all asserted in Bombay with the utmost distinctness that the storm water drains were overlooked. That is the way in which they put it, and they point to one or two letters, and they also point to the fact that the storm water drains come to £482,000?

A.—Yes, which is less than 75 lakhs.

Q.—But leaves, as you have said a minute ago, a wholly insufficient provision for roads and lighting and drains. Would it be right, do you think, to attribute to the 75 lakhs about 55 lakhs for roads?

A.—I would not like to say what estimate is attributable to roads, but on the 14th February, 1921, I wrote to Sir Lawless Hepper " A work which is not urgent but must be arranged for is the prolonging of the storm water drains ".

Q.—Where is that letter?

A.—It is a letter dated 14th February, 1921—" A work which is not urgent but must be arranged for is the prolonging of the storm water drains from the present sea front to outside the new wall ".

Q.—Our correspondence begins on the 14th April, 1921.

A.—I daresay I can get you that; I will find out.

Q.—Did you have any answer from Sir Lawless Hepper?

A.—I do not think so. I said " A work which is not urgent but must be arranged for ".

Q.—Is that a letter to him?

A.—It is a letter to him dated 14th February, 1921.

Q.—Have you got a copy of it?

A.—I have only got a cutting. Here it is (*Handing same to Chairman*).*

Q.—I think, Sir George, we must cable to Sir Lawless Hepper about this letter. Could you let Mr. Ewbank have a copy of the complete letter?

A.—I will look up my files and get the complete letter if I can.

Q.—The object of a storm water drain was to carry off, as the word implies, storm water?

A.—Yes.

Q.—Before there was any shutting in of the Bay there were old existing storm water drains?

A.—Yes.

Q.—What had to be done was to prolong them and carry them out to sea until they discharged on the seaward side of the sea wall?

A.—That is right, yes.

* See Appendix XI.

Q.—Therefore had not they to be constructed practically at the same time as the sea wall?

A.—Not necessarily.

Q.—You could not begin any pumping until you had your storm water drains in, could you?

A.—No.

Q.—So that the sea wall, cross bunds and storm water drains were all essential before any reclamation could begin?

A.—Not the storm water drains, because in certain cases, I remember (it is on the records) I proposed a method of pumping into an area before the storm water drain was made.

Q.—Did you propose to block up any of the existing storm water drains?

A.—Naturally you could not block up a storm water drain.

Q.—I do not quite follow, because, you see, if you enclosed any area in which there was a storm water drain you would have to prolong that storm water drain before you had any reclamation, would you not?

A.—You could reclaim an area where there was not a storm water drain, or you could divert a storm water drain.

Q.—There is a storm water drain in the military area, Block 8, is there not?

A.—Yes.

Q.—And a storm water drain in Block 1?

A.—Yes.

Q.—And Block 2?

A.—Yes.

Q.—Obviously you are going to begin either at one end or the other?

A.—Yes.

Q.—In either case you have a storm water drain?

A.—Yes. There are methods of diverting storm water outside a particular area.

Q.—But surely instead of diverting a storm water drain the logical thing was to prolong the storm water drain through the sea wall, was it not?

A.—That is what was done.

Q.—But there has never been any suggestion in any of the correspondence that you should temporarily divert a storm water drain, has there?

A.—No, but I should like to refer to Paragraph 123 of my statement.

Q.—Certainly. Will you do so?

A.—" It should be borne in mind that it was not possible to design the drains, cross bunds or locate main roads until more was known about the lay-out of the reclaimed area and the preliminary scheme of Mr. Davidge, the expert town planner was not received by me until March, 1922. After the lay-out had been received and approved by the Development Directorate we wrote to the Chief Engineer and asked for certain sections and levels in order that we could take up the question of the storm water drains and on the 14th September, 1922, the Acting Chief Engineer wrote that he hoped to send us the plans and sections of the storm water drainage area in about a fortnight's time, but in a subsequent letter said that he had been instructed by the Director of Development not to send the plans, as the work was not within the scope of our duties. This seemed to us rather extraordinary as on the 4th July, 1922, Sir Lawless Hepper had written to me as follows : ' Questions of storm water drainage, sewage, lighting and roads in the reclaimed area itself are likely to be more important and to involve much more expenditure than was anticipated, and the proposals and plans connected with these services will be submitted to you '." Meanwhile the Chief Engineer took in hand the designs on his own account. On the 5th January, 1923, I wrote to Sir Lawless Hepper and referred him to the previous correspondence, and said we would like to go into the matter of the storm water drains. " On the 8th January, 1923, the Chief Engineer wrote : ' An inspection of Mr. Davidge's plan indicates the position of the storm water drains for the area of the reclamation. The drains have obviously to discharge under the sea wall and will naturally be placed on the axes of the main avenues running east and west across the area.' And on the 26th January, 1923, he wrote saying that he had prepared a design of the drains after having been told by Sir Lawless Hepper that they would not be included in the work carried out by our firm."

Q.—On the 11th August, 1922, did Mr. O'Rorke write to you : " In the office here I am getting on with the storm water drains lay-out so as to be able to fix the levels of the various outfalls which will have to be made through the wall, and will be sending plans for your approval shortly."?

A.—Yes. That was after the expert town planner had made his lay-out.

Q.—I am suggesting to you that all that it was necessary to do was to carry forward the existing storm water drains through your sea wall, and that the plans for the storm water drains ought to have come out with the plans for the sea wall and the cross bunds, unless they were overlooked. What do you say, Sir George?

A.—I disagree, Mr. Chairman. I have not got a plan of the storm water drains handy, but it was not practicable. It was quite impracticable to take every one of those drains and put it through the wall.

Q.—Mr. O'Rorke, who was then acting chief engineer—Mr. Lewis having fallen ill—writes on the 25th August, 1922: "I am getting out the Budget for next year, and will send you a copy when it is ready. In this connection one very important point appears to have been overlooked"—that is, in the Budget?

A.—Yes.

Q.—"That is, that all the main storm water drains will have to be built simultaneously with the cross walls, because provision has to be made for existing storm water drains discharging into Back Bay before the dredging reclamation commences. Otherwise, these drains will be choked up. I am accordingly allowing for the construction of two southern storm water drains in 1923-24, one through the middle of the military area, which besides draining these, collects two existing storm water drains in the neighbourhood of Roberts Road, and the other one along the district north of the military area." Is not that the clearest indication possible that in Mr. O'Rorke's mind there had been no provision in any estimate, or in any Budget whatsoever for storm water drains?

A.—What date was that?

Q.—The 25th August, 1922.

A.—Surely that was when the detailed project estimate was under consideration? He refers to the Budget.

Q.—The Budget for 1923-24.

A.—He refers to the Budget, but he does not refer to the estimate.

Q.—That is right. The suggestion is that financial provision was not made by Mr. Kidd, was not made by you, or was not made by anybody, until the estimate of 668 lakhs by yourself in February, 1922, and by Mr. Lewis's letter in that year, in his 702 estimate. If you look up your report you will see there is a revised estimate—the report of 1922?

A.—Yes.

Chairman.—It is at about page 13 in that report.

Q.—Have you noticed at page 14 Mr. Kidd says: "Roads, lights, drains, 58 lakhs" in 1912, and yours in 1919, 75 lakhs, following Mr. Kidd without any knowledge of the details on which Mr. Kidd worked?

A.—Yes.

Q.—Then on the 11th February, 1922, you put: "Roads, lights, storm water drains and sewerage, 135 lakhs."

A.—Yes.

Q.—That, you notice, is an increase of 63 lakhs over your 75 lakhs?

A.—Yes.

Q.—And the storm water drains in fact came to 62 lakhs?

A.—Yes.

Q.—Is not that some indication that in your report of 1919 you have, as Mr. O'Rorke says, omitted the storm water drains?

A.—No; I will not admit that. At all events, you have this letter, which I will produce, in 1921 in which I talk about storm water drains.

Q.—When you got Mr. O'Rorke's letter of the 25th August, if that was true it was a very serious reflection upon you, was not it?

A.—He said it was not in the budget.

Q.—"In this connection one very important point seems to have been overlooked, that no provision has been made by anybody for storm water drains." That is the essence of the thing?

A.—Does not he say in the budget?

Q.—"All the main storm water drains will have to be dealt with simultaneously because provision has to be made for the existing storm water drains before reclaiming," and so on. "I am accordingly allowing for them." Put in that way I see what you mean; but what he says is this: "It has been entirely overlooked. Nobody up till now has ever considered the necessity for storm water drains, and therefore nobody up till now has estimated any amount for them." The evidence that was given was that Mr. Lewis did discuss with you in the very early part of 1922 the question of storm water drains, and that it was, apparently, admitted that they had been overlooked, and that you revised your estimate from 75 lakhs to 135 lakhs, subsequently adding the words: "storm water drains" to "roads, lights and sewerage." That is how it is put.

A.—That is how it is put, yes.

Q.—I want you to see the point.

A.—I see the point.

Q.—In Mr. Kidd's estimate for "roads, lights and drains" there is 59 lakhs. In Sir George Buchanan's estimate "roads, lights and drains" there is 75 lakhs. In 1922 Mr. Lewis said: "We called Sir George Buchanan's attention to this. He in his revised estimate put 'roads, lights, storm water drains and sewerage'", and it was not until your attention was called to it that you realised that that would have to be a very considerable item of expenditure. That is how it is put.

A.—That is how it was put, but if I may say so, it has not been put correctly.

Q.—When you got this letter from Mr. O'Rorke on the 25th August—you would get it in the middle of September, 1922—saying that one very important point, namely, the storm water drains, appear to have been overlooked——

A.—Overlooked in the budget, I think he said.

Q.—No; I will get it clearer for you if you want it: "In this connection one very important point seems to have been overlooked: that is that all the main storm water drains will have to be built simultaneously with the cross walls." That is what had been overlooked.

A.—That is when he is discussing the budget, I think?

Q.—Yes.

A.—Overlooked in the budget.

Chairman.—No; that is not it. I will give you the evidence in detail.

Mr. Billimoria.—The plans for the storm water drains were not prepared till 1922 or 1923. There are letters written by Mr. Lewis on that subject. In your letter of the 18th April, 1923, you examine the plans for the first time.

Chairman.—It is page 104, dated the 10th December, 1923, in the large bundle of correspondence. Mr. Lewis says: "I notice that Messrs. Meik & Buchanan in their letter make no mention of storm water drains. As they are an exceedingly important item of the work the omission detracts from the value of the proposal." You put forward a certain alternative proposal, and Mr. Lewis makes that comment. When Mr. O'Rorke had stated that the item appeared to have been overlooked, namely, the storm water drains, which was an important point, did you challenge that in any correspondence?

A.—I do not know whether we challenged it in any correspondence, but if we wrote to Sir Lawless Happer in 1921 and reminded him that the storm water drains were a matter for consideration it shows that at all events we had the storm water drains in our minds.

Q.—It does, undoubtedly. That is a matter we will have to ask Sir Lawless Hepper about.

A.—It would be impossible to overlook the storm water drains, because I used to walk there every day and see the water coming out. I have also got a letter to the Director of Development, in which I pointed out that no allowance had been made for sewering the reclaimed area, because it was to be done by the municipality. I still adhere to-day to the statement that the storm water drains were not overlooked. We are rather out of the order of things now, but I made a revised estimate in 1922.

Q.—On the 11th February?

A.—Amounting to 686 lakhs.

Q.—That is right.

A.—Sir Lawless Hepper in his evidence said that I had asked for the estimate back, and added 100 lakhs to it.

Q.—Sir Lawless Hepper put it that your estimate was 568 lakhs?

A.—Yes.

Q.—He thought that you added 100 lakhs to it as a lump sum, and looked at the estimate, and then came to the conclusion that you had spread it over the whole lot. It is obvious that you could not have added 100 lakhs. The point about that estimate, and the only point I am on for the moment now, is this. That is the first time, as far as we know, and as far as we have known up to now, that you had ever mentioned the storm water drains in writing. You gave no plan of them appended to your report.

A.—No; it was impossible to make a plan of them. It would be very interesting if you were to have a plan showing all the outlets that the storm water was coming from, and how they have been collected and put into the storm water drains. You would not find that every outlet has a storm water drain. They were collected together and put into a certain number of storm water drains, the situation of which could not be settled until we had the town planners' lay-out.

Q.—Did you communicate with the town planner and ask him to send you the lay-out?

A.—Well, we got the lay-out as soon as he had got it finished. As to my estimate of the 11th February, 1922, here is the one which I took in to Sir Lawless Hepper, and which at his instigation I altered. (*Document produced.*)

Q.—That is the one that has the words, " storm water drains "?

A.—Yes.

Q.—That is the point that has been made against you so much in Bombay, that the 11th February, 1922, was the first time that you had ever put on paper a single syllable about storm water drains; and that when the matter was mentioned in 1921 you were making no bones about it at all that it had been overlooked by you. That is how it is put?

A.—That is how it has been put.

Sir H. Courthope-Munroe.—May I respectfully call your attention to the terms of the estimate on page 29? The figure of 75 lakhs is given, but against it is the note: " As per Government Public Works Department estimate." Therefore, in strict legal phraseology that is not his estimate at all; but he puts in a figure. He does not purport to estimate anything. He says: " As per Government Public Works Department estimate." I only want to draw your attention to that.

Chairman.—Did you notice the history that Sir George has given of it? He says: " I never had any Public Works Department estimate at all." He has just said so. He said: " I never saw any document."

Sir H. Courthope-Munroe.—Quite so; but what struck me was that speaking of the estimate which he gives of 135 lakhs as being the revised estimate, it would appear to be the first time that he really in fact estimated anything.

Chairman.—It may be so.

Sir H Courthope-Munroe.—That is the only point I want to make.

A.—In 1921 there is a letter on record showing that I had not overlooked the storm water drains. There is a letter to Sir Lawless Hepper in which I said: " The matter of the storm water drains must not be overlooked." On the 11th February, 1922, here is my estimate: " Roads, lights and drains."

Q.—Surely not. Just read it again?

A.—Yes. " Roads, lights and drains, 75 lakhs." Acting under Sir Lawless Hepper's instructions really I put on sewerage in order to differentiate on making the plans that " drains " meant storm water drains; here is the writing exactly as I did it on the 11th February, 1922: " Roads, lights, storm water drains with sewerage." I have altered " drains " to " storm water drains " to differentiate it from sewerage; but " drains " was always meant to be storm water drains.

Q.—That is how it has been put in Bombay. What they say is, as a result of conversations you agreed that you had omitted storm water drains, and you specifically include them in your revised estimate, and add a sum of 62 lakhs, which is within a few pence, as it were, of the actual cost?

A.—No.

Q.—That is what is said.

A.—I have not got Sir Lawless Hepper's evidence, but Sir Lawless Hepper said that I produced an estimate and took it away and put 100 lakhs on it.

Q.—May I see that document? (*Same handed to the Chairman*).

A.—May I continue with my explanation?

Q.—Please do?

A.—What happened was that this estimate of mine, the original estimate, was for 499 lakhs of rupees. That had in it " Roads, lights and drains 75 lakhs." I maintain that was roads, lights, and storm water drains. I had an interview with Sir Lawless Hepper on the 14th February. I had a long talk with him, and the note in my private diary is: " At office and saw Hepper and had a long talk about my report." What Sir Lawless Hepper said was that he did not want to have the estimates constantly being increased, that he knew from conversation that I had not included sewerage. He was then aware that Mr. Lewis was preparing an independent report; and he asked me to put on my report—he mentioned the figure—about 100 lakhs of rupees. Sir Lawless Hepper and myself discussed how it should be put on, and we put on so many lakhs for moorum topping, and we put on so many lakhs for sewerage, not for storm water drains. In order to make it quite clear I at the time, that is on this date in February 1922, put the words " storm water drains " above " drains " and added " sewerage," so as to show quite plainly that roads, lights, storm water drains and sewerage were included.

Q.—" Sewerage " means drains, does it not?

A.—" Sewerage " means sewerage—sewerage drains, not storm water drains.

Q.—You get on the one hand " storm water drains "—that is one thing?
A.—Yes.

Q.—And drains as the other?
A.—Sewerage.

Sir Frederick Hopkinson.—And surface drains from the roads, as in London?
A.—I would rather like to emphasise this point.

Chairman.—I want you to do so.

A.—My estimate was " Roads, lights and drains," which mean storm water drains. I will show you a letter in 1921 in which I had said that we must not overlook the storm water drains. Then Sir Lawless Hepper said : " You must put on something for sewerage. We do not want to have the estimates constantly increased " ; and he suggested the sum that I should put on. I have got in the entry of the 23rd February : " Long talk with Hepper, took back my estimate and put a crore on to it." It was done by Sir Lawless Hepper's instructions. He was the head of the Development Department, and he knew that Mr. Lewis was presumably making up this independent estimate, and he did not want there to be a great difference. He said : " You have not put in anything for sewerage. You must put in something for sewerage." Presumably he knew what Mr. Lewis had estimated for sewerage. Mr. Lewis was not in good health and he asked me to put it on, and here it is : " Roads, lights and storm water drains."

Q.—Was it proper for you in your opinion to put it on or not?
A.—Well, under the circumstances I thought he had already discussed it with the Governor.

Q.—That is not an answer. You were a professional man in Bombay, and adviser to the Bombay Government?
A.—Yes.

Q.—In adding those amounts to your estimate, were you in your opinion acting professionally and correctly?
A.—Yes.

Q.—You were?
A.—Yes.

Q.—That could only be because in your opinion the work would cost that amount?
A.—The sewerage, yes.

Q.—Every addition that you made by which the amount would be brought up to 668 lakhs must in your opinion have been a proper and honest addition to make?
A.—Yes.

Q.—Therefore we can leave it, can we not, that whether Sir Lawless Hepper told you to do anything of the kind, if he told you to do anything improper, you would not have done it?

A.—I should not have done it if it was improper; but sewerage was not within our contract. We were not advising for sewerage. Presumably Sir Lawless Hepper had gone into this matter. He said " Sewerage will cost so much, and I want you to put in so much for sewerage." We were not doing the sewerage; but he did not want to have a number of estimates.

Q.—You notice that in the project estimate of 702 lakhs sewerage is not mentioned at all. Item 14 is : " Equipment of area with roads and lights 49 lakhs. Equipment of area with drains, 27 lakhs. Equipment of area with storm water drains, 64 lakhs "?
A.—Yes.

Q.—There is nothing about sewerage. That is under the item drains?
A.—But that is sewerage.

Q.—It is only 27 lakhs for the whole of those. Will you produce if you can any letter in reply to Mr. O'Rorke's statement that the storm water drains were overlooked, that is that they would have to be built simultaneously with the crosswalls. In fact did they send you their proposed arrangement of storm water drains?
A.—They did.

Q.—That would be permanent work, would it not?
A.—The storm water drains—yes.

Q.—Ought not you to have got out the plans for it?
A.—Certainly we should have got out the plans for it, but apparently Sir Lawless Hepper said we were not to get out the plans for it.

Q.—Why did you not get out the plans for them before 1923?
A.—Because we had not got the town planner's lay-out until March, 1922.

Q.—Then let us get the facts. The plans for this permanent work came from Bombay, and on the 18th April, 1923, you wrote a letter saying : " We have examined the

proposed arrangement of storm water drains as shown on the plans handed to Mr. Halcrow," and then you have a discussion about the design and method of construction.

A.—Is that correspondence in Bombay or London?

Q.—It is in London, April 18th, 1923, Messrs. Meik & Buchanan, 16 Victoria Street, sending to the Chief Engineer suggestions which have arisen after the examination of your suggestions as regards the storm water drains.

A.—Might I ask the date of that letter?

Q.—18th April, 1923.

A.—Might I point out that in January 1923, or before that date, Sir Lawless had said we had nothing to do with the storm water drains: and he is the Director of Development.

Q.—That is true, but my point is this, and I want an explanation of it because it is a point which has been made so much of in Bombay. It is pointed out that you got into the year 1922 even without yourselves having put forward the plans for the storm water drains. It has been said all the way through one of the first things Sir George Buchanan ought to have sent out were plans for the storm water drains. He has never sent them out because he overlooked them.

A.—Well, I disagree. There is sufficient proof in the letter in 1921 that I did not forget them.

Q.—We must telegraph to Sir Lawless Hepper and ask him to look up his files, because that is a letter we ought to be supplied with. I think we can pass on now to your statement: "I will now summarise briefly the work performed by my firm and myself. The dredger was a joint responsibility between Sir John Biles and my firm, otherwise we prepared the plans and specifications for the whole of the permanent works except in cases where the work was prepared by the Chief Engineer without our knowledge or consent. We also prepared a design for the gantry along the line of the sea wall." There has been a certain amount of discussion about that gantry. It has been pointed out that it cost some £90,000, that it was a convenient thing but not essential, and the non-essentiality of it is suggested to be proved by the fact that you did not require a gantry at the other end. What do you say about that?

A.—Well, I say that is matter of professional opinion. The question of the gantry was very carefully discussed with the late Mr. C. S. Meik and myself, and we decided that the gantry was suitable, and we adhere to that opinion.

Q.—It is suitable at the price of £90,000?

A.—It is suitable at the price of £90,000.

Q.—That is the point

A.—That is a matter of professional opinion, and we beg to adhere to our opinion.

Q.—Then on page 63 you point out: "We employed and paid Inspectors, and we furnished the India Stores Department with certificates on which the various contractors were paid." Then you say: "We employed a permanent staff in our office whose time was chiefly devoted to the Back Bay reclamation scheme. The Principals of the firm, and I in particular, devoted a great deal of our time to the work, and other remunerative work was refused or curtailed because of my obligations to visit Bombay. For the purchase of machinery and stores in this country the usual charge in fees is 2½ per cent. on the cost. We agreed to perform the work for 2 per cent. and we have only been paid 1½ per cent, which in many cases has not paid our expenses." Is it by virtue of a clause in the agreement that there was to be a postponement?

A.—Yes.

Q.—"For the dredger we were to receive 1 per cent, and have only been paid ¾ per cent." That is up to this date?

A.—Yes.

Q.—"I give these facts and figures because statements have been made as to the remuneration of my firm on the supposition that it was all profit and that we had no expenses." Running an engineers' office in Victoria Street, going out to India and sending other people out to India cannot be done without a very considerable expenditure of money?

A.—No.

Q.—"I visited Bombay once each year and twice in 1923, and if my visits were not as profitable to Government as they might have been, it was certainly not my fault, as will be seen later on in this statement." Then: "A partner (Mr. W. T. Halcrow) who is specially qualified to criticise the execution of works, visited Bombay in 1922, and made a thorough inspection of the works, and in 1925 we sent our chief assistant, Mr. Settle, an engineer of great experience, to report on the dredging. These visits were outside the terms of our agreement, and at the firm's expense." Did Mr. Settle make a report in writing?

A.—He did; it is going to be given you with his evidence.

Q.—As an appendix to his statement?
A.—Yes.

Q.—Thank you very much. " I visited Bombay last on the 24th October, 1924, and I left Bombay on the 7th January, 1925, for Australia, with the full knowledge of His Excellency the Governor (who discussed Australia with me), Mr. Cowesjie Jehangir the Member of Council in charge of development, and Sir Lawless Hepper. I intended returning to Bombay the following October, but was overtaken with an illness so severe that I was ordered by my medical adviser to go direct to England, as, if I broke my journey at Colombo and went to Bombay, he considered my life would be endangered. I arrived in London in a state of collapse, and sent a medical certificate to Bombay. The Bombay Government thereupon purported to cancel my agreement with the Secretary of State. My medical adviser is prepared to give evidence before the Committee on this point." We do not want any evidence of that character, because any question between you and the Secretary of State as to the purported cancellation of the agreement has nothing whatever to do with us in any shape or form, and is not within the terms of our reference. Now you come to the estimate of September, 1919, and I will read on page 65 : " This estimate was for lakhs 367.61, increased by Government to 400. It was at the time a fair and reliable estimate, and was accepted as such by the Government of India who examined the figures in the P.W.D. secretariat, and also by the Secretary of State who sanctioned the project." The question that occurs to me is whether there was anybody in the P.W.D. secretariat of the Government of India who was capable of following the figures of this work of a highly specialised character. By that I mean Sir Sydney Crookshank and his assistants. Those are the people, are they not?

A.—Those are the people.

Q.—Did you meet anybody there, either Sir Sydney Crookshank or his assistants, who were capable of having any opinion of the value of such a thing as the cost of the sea wall, or the cost of dredging the material?

A.—You must bear in mind that it is usual that they refer these matters very often to the Inspector-General of Irrigation, who is supposed to have knowledge of these matters. Whether they did so or not in this case I do not know. I did not meet the Inspector-General of Irrigation, but it is a very frequent occurrence, or used to be. I do not know whether there is an Inspector of Irrigation to-day, but a few years ago all marine projects would go to the Chief Engineer of Public Works, and if he was not an irrigation man, if he did not know anything about it, he would refer it to the Irrigation Branch.

Q.—You have no knowledge that Sir Sydney Crookshank or anybody in his office ever referred?

A.—I have no knowledge of that.

Q.—Was not the conversation between yourself and Sir Sydney Crookshank really the most perfunctory conversation on his part?

A.—It was not extensive ; it was not an extensive conversation, no.

Q.—I use the word " perfunctory " of a man who would not have and could not be expected to have a grasp of the details of this highly technical subject. He was not an expert in it?

A.—No, I do not think Sir Sydney Crookshank was an expert in it, but, as I say, I have no information as to whether he did or did not consult anybody else.

Q.—Then you say : " The estimate was most carefully prepared from data obtained from the P.W.D., the Port Trust." What information had you obtained from the Public Works Department which was built into your report?

A.—Well, I am prepared to give details about that.

Q.—We know, of course, item No. 5, 59 lakhs.
A.—Yes.

Q.—You did not get any assistance from the Public Works Department on that head, because you never consulted them?

A.—No.

Q.—Earlier in the day I did ask you whether you went to the Port Trust people, and you said no?

A.—I beg your pardon ; I think I said I went repeatedly to Mr. Messent.

Q.—" The estimate was most carefully prepared from data obtained from the P.W.D." Let us take that first. Who in the P.W.D. gave you any data from which you prepared your estimate? What is the name of the gentleman?

A.—Perhaps you would like me to read out what I did in Bombay?

Q.—Do you mean between the 19th May and the 31st May?
A.—Yes.

Q.—I should be glad to have that. Will you give me the dates, please?
A.—I arrived in Bombay on the 19th May, 1919, and I left on the 31st May, 1919.

Q.—This is not in your statement?

A.—No, not in that statement.

Q.—This is a new statement which we have not got?

A.—It is a supplementary statement.

Sir Frederick Hopkinson.—This is the one we were promised but which we do not seem to get.

A.—I thought you said you were getting on to this on Monday.

Chairman.—We will follow it.

A.—It is not very much.

Chairman.—We had thought that the statement which was delivered to us would be complete.

Sir H. Courthope-Munroe.—It would have been, but in an inquiry of this kind so much crops up from time to time that Sir George has made some additional notes. These additional notes were made in rather a long form as notes, and I thought it was better to put them under a heading, so that you might have the various headings, and I have had them broken up under the headings.

A.—These are my private notes.

Chairman.—Never mind; will you read it in your own way? We will follow it as closely as we can, and you can give us a copy as soon as it is available.

A.—I arrived in Bombay on the 19th May, 1919, and I left on the 31st May. I spent the greater part of the time in the Public Works Department secretariat, discussing Mr. Kidd's scheme in detail with the Public Works Department officials.

Q.—Who were they?

A.—Particularly Mr. Kent and Mr. Trench. I was there every day, or practically every day, while I was in Bombay. I inspected the site of the works on several occasions. I examined the works in progress in connection with the Kennedy sea face wall, which forms the beginning of the present scheme. I saw Mr. Messent, the chief engineer of the Port Trust, upon several occasions, and got a great deal of information from him.

Q.—When did he die?

A.—He was not dead then. I cannot give you the exact date of his death, but he certainly was not dead then. I obtained prices of stone and other material both from the Public Works Department and Mr. Messent of the Port Trust. The following is a list of the principal questions I asked these officials. I have one of the original lists that I sent out there: Price of coal in Bombay to-day and pre-war. Price of Portland cement in Bombay to-day and pre-war. Price of sand in Bombay to-day and pre-war.

Chairman.—Have you got their answers?

A.—I have got their answers to some of them. Price of broken stone in Bombay to-day and pre-war. Present cost of concrete in mass 1 to 6. Present cost of concrete in blocks. Present cost of basalt masonry facing in quay wall per cubic foot. Present cost of granite coping in quay wall per cubic foot. Present cost of moorum filling per brass at Sewri. Cost per lineal foot of the Sewri retaining wall, with cross-section of same. Fair percentage to add to pre-war dredging costs to bring them to date. Price of basalt rubble in revetment or quay wall work. Whether the steam navvy brought by the Port Trust from the G.I.P. Railway for working at Trombay is a success, and are there any details of the cost? Have the Port Trust any comparison of cost of moorum filling by rail and by water, respectively, from Trombay? Also obtain prices of moorum filling from Improvement Trust. I discussed many of these matters with the officials in question, and I got to know all this information.

Q.—Have you any document from Mr. Trench or Mr. Kent answering those questions?

A.—I do not think I have anything from Mr. Trench or Mr. Kent, but I have from Mr. Johnson, who was in charge of the Kennedy sea face wall. When I got together all the information I could I left for England, and I took in hand the preparation of my report and estimate. In this I was greatly assisted by my late partner, the late C. S. Meik, and by records in our office of the cost of work of all kinds for the last 40 or 50 years. Finally we decided on the prices for construction work at about two and a-half times above 1912 prices. Let me give a few examples to compare Mr. Kidd's estimate with mine. In 1912 Mr. Kidd estimated the cost of the sea wall at 288.15, or 289 rupees a lineal foot. We considered that price high, distinctly high, for 1912; but our price for 1919 for a much cheaper wall was 531.4 rupees, which was undoubtedly ample at that time. In the matter of dredging, the chief engineer of the Bombay Port Trust informed me that the working costs had only increased in Bombay approximately 25 per cent. between 1914 and 1919. Mr. Kidd's estimate for pumped filling, mud and clay, was 9 annas 3 pies per cubic yard. In his evidence he gave the estimated cost of his plant in 1912 at £287,625, which, converted into rupees

at 15 to the £ and divided by 25 millions, comes to 2.7 annas a cubic yard. My 1919 estimate was for a dredger and other plant to cost £451,500. That was the firm offer we had at the time. To reduce that to the 1912 price, that is two and a-half times in excess, and you have £180,600, or exactly £100,000 less than Mr. Kidd's estimate. Let us put on £20,000 for contingencies, boats and barges, and say that the dredger and plant would cost £200,000. That is 30 lakhs divided by 25 million cubic yards, giving 1.90 per cubic yard for plant. Accordingly, the late Mr. Russell, then Secretary to the Government of India's Public Works Department, agreed the figure of 2.16 annas per cubic yard was a fair price for the work and the pipe-lines and dredgers, which he quoted from actual experience. Taking 1.90 plus 2.16, it equals 4.06 per cubic yard against Mr. Kidd's estimate of 9 annas 3 pies. In my revision of Mr. Kidd's estimate, as I tell you, I was assisted by Mr. Meik, who had very great experience. I allowed 5 annas, and we considered that was generous. We considered that on the item of dredging Mr. Kidd had over-estimated by 64.19 lakhs of rupees. In my detailed estimate plant amounts to 3.24 annas, and working expenses 2.66, totalling 5.91; but I add for contingencies 2.09, which should be ample. My point is that we went into the matter as carefully as we could and we came to the conclusion at that time—and we were justified in doing so—that Mr. Kidd's estimate was very gravely over-estimated. As regards the wall, we increased the wall from 288, or whatever it was, to 500; but we considered that he had over-estimated for his dredgers and working costs.

Q.—In fact, did the cost of the " Colaba," the " Sir George Lloyd," the " Kalu," the " Jinga," the pipe-lines and pontoons themselves exhaust the 8 annas?

A.—I am referring to my 1919 estimate, not to what happened subsequently. At my 1919 estimate we did have a firm offer for the dredger at a certain price.

Q.—But in 1919 you estimated that 30 million cubic yards could be dredged for 8 annas a yard?

A.—Yes.

Q.—In fact, did it cost the whole of the 30 million 8 annas to provide the dredging plant, as it turned out?

A.—I can give the reasons for that.

Q.—I am only asking you the question.

A.—Certainly it did, but I do not think that proves my estimate in 1919 at that time was incorrect.

Q.—You estimate that you will provide 30 million cubic yards of material dredged from the harbour transported across the peninsular and put on the reclamation?

A.—Yes.

Q.—That can only be done by the provision of adequate dredging plant, by the provision of crews, by the paying of five seasons' cost of wages, reconditioning of vessels, and so on. Did not the first item of all, the provision of the " Sir George Lloyd," the " Colaba," the " Kalu," the " Jinga," the pontoons and pipe-lines, exhaust the whole of the 8 annas before a single ounce of material had been dredged?

A.—I am not disputing that, but we are discussing now how I got at my 367 lakhs' estimate.

Q.—Would you continue? Would it be possible for us to have a copy of that statement to-morrow?

A.—Yes.

Sir Frederick Hopkinson.—I should like to see all the details.

Sir H. Courthope-Munroe.—I will try and see that you have these figures. I got them out for the very purpose that you should have them. It is almost impossible to follow it unless you have them in front of you.

Chairman.—It is quite impossible.

Witness.—We thought that this part was coming on on Monday.

Chairman.—But we must have a little time to study it. I am going to leave some of these matters to Sir Frederick Hopkinson, and he would like to see the details and have time to study them. Will you bring all the original documents on which you have made the calculations?

A.—I will bring certain documents. With all deference I am not going to lay bare the details of my office working for Sir Frederick Hopkinson.

Chairman.—You must do as you like, but it has been definitely stated by Mr. Lewis and Mr. Elgee that they never saw and they never knew of the existence of any document showing how 367.61 lakhs was arrived at. They were asked over and over again in various forms : " When you were in Sir George Buchanan's office were you ever shown any documents saying how 367.61 lakhs was arrived at? "

A.—There was no particular reason why they should have been told. They joined the work long after that time. There is no particular reason why they should have been informed how the estimate was arrived at.

Q.—Mr. Lewis came over in 1920, you remember?
A.—Yes, I remember.

Q.—Mr. Lewis helped Mr. Meik in the preparation of the plans and the plant, and everything to be ordered?
A.—Yes.

Q.—You went off, I think, to South Africa on the 25th August of that year?
A.—Yes.

Q.—Mr. Lewis says: "I cannot tell you in the least how the 367.61 lakhs as set out in the report was arrived at, because never during the whole period that I was in the office did I ever see any figures."
A.—No; I do not think it was discussed with him.

Mr. Billimoria.—I submit as a Committee we are perfectly entitled to ask Sir George Buchanan to produce these estimates, because the whole scheme was based on the original figure of 367 lakhs. If Sir George Buchanan declines to do that we shall draw our own conclusions.

Chairman.—It is perfectly evident if Sir George Buchanan has got the original figures on which he arrived at the estimate of 367·61 lakhs, he will produce them as a matter of prudence, as a matter of the proper and right thing to do. There cannot be any question about that: there will be no question about it.

Sir Visvesvaraya.—How were the officers to carry on the work if the details were not given to them?

Chairman.—We will follow that out. For the moment the question is that Mr. Lewis said he never saw how this amount was arrived at. If there are figures in existence between May, 1919, and September, 1919, Sir George Buchanan undoubtedly by Monday will produce this original document. Will you continue those figures?

A.—I think that is the end of those figures at present.

Q.—Very well. That is the P.W.D. Have you got any letters from Mr. Kent or Mr. Messent or Mr. Trench dealing with any of these matters?
A.—No, I have not.

Q.—As regards the Port Trust, what were the data which you obtained from them?

A.—I have read out that—data on prices.

Q.—From the Port Trust what did you get? I have not followed that part of it was from the Port Trust.

A.—I practically got all this information from the Port Trust; I got all this information from miscellaneous sources in Bombay, and it was quite sufficient; and with our information at home we got out our figures. As I have said before, Mr. Meik is dead and one cannot call him, and I am not going to produce the records of my office for years and years past or give details more than I have done.

Q.—You must decide; but let there be no misunderstanding about this. You must decide yes or no whether when you are asked on Monday to produce the original figures you will do so. I hope, Sir Harry Courthope-Munroe, that you are listening to this?

Sir H. Courthope-Munroe.—I am listening attentively.

Chairman.—You must decide by Monday, yes or no, whether you are going to produce the details by which you arrived at 367·61 lakhs as set out on page 29 of your report.

A.—Yes.

Chairman.—If you say you will not produce them, well and good.

Mr. Billimoria.—I might point out that he has been paid for it, and we are entitled to these documents.

Chairman.—Do not let us carry it any further than I have carried it; we will wait till Monday.

Mr. Billimoria.—It is only to be perfectly frank that I am saying this.

Chairman.—Mr. Billimoria only wants to put the point to you. I see the point now, that at that time you were being paid to get out this document.

Mr. Billimoria.—It is our property therefore.

Chairman.—It is a good point, and I am sorry I stopped you.

Sir Frederick Hopkinson.—Under his agreement with the Secretary of State, all the documents are the property of the Indian Government.

Chairman.—You will consider it, and Sir Harry will advise you.

Sir H. Courthope-Munroe.—I will think of that. I understand the Committee would like the information he has stated there as to the price of coal pre-war, and the price of stone and cement.

Chairman.—In addition to that, on page 29 of the report you will see there is a revised estimate, and it shows that in Sir George's opinion the work can be done for 367·61 lakhs. Mr. Lewis has said this is a mere skeleton estimate, and, if you look at it, it is.

Sir H. Courthope-Munroe.—It speaks for itself.

Witness.—Will you let us know what you want?

Sir H. Courthope-Munroe.—I want you to follow the Chairman.

Chairman.—What we want is to have the details by which the sums were worked out.

Sir H. Courthope-Munroe.—You would like to have reasonable details of the statement on page 29?

Chairman.—Not reasonable; but the actual original documents of 1919 by which Sir George Buchanan arrived at the figure of 367·61 lakhs.

Sir H. Courthope-Munroe.—What you want to get at is the document showing, to take the first item, that in point of fact the quantity was 79,831, and not some other figure?

Chairman.—Yes; and how he got at that.

Sir H. Courthope-Munroe.—That is what you want to know.

Witness.—How we got at the quantities?

Chairman.—Treat it as a summons for particulars—you know exactly what I mean.

Sir H. Courthope-Munroe.—That is what I was endeavouring to do.

Chairman.—Treat it in that way, I should say: "Particulars of the quantity of 79,831, stating how, and in what manner the same is arrived at, and identifying the document."

Sir H. Courthope-Munroe.—I appreciate that.

Chairman.—Very well.

Sir H. Courthope-Munroe.—I take it what you really want is particulars of that column; there is nothing else?

Sir Frederick Hopkinson.—The prices.

Chairman.—The prices are of some importance.

Sir H. Courthope-Munroe.—Where are the prices?

Chairman.—In the next column.

Sir H. Courthope-Munroe.—Except that item No. 12, which is a lump sum—that I follow, and I will endeavour to get the best information I can about that. But in all these things there is a limit. One does not bring into a public court the whole of one's business. These matters I can deal with I have not the least doubt.

Chairman.—Nobody wants that done, but as Mr. Billimoria has pointed out, Sir George Buchanan was at this time the paid expert of the Government, and he brought these figures into existence by virtue of the relationship between himself and the Government, and they have the right to know how this was arrived at.

Sir H. Courthope-Munroe.—I am not disputing that. You must be satisfied that these are not guesses, but these are figures actually got out in a proper way.

Witness.—I would like to point out that there are no details of prices. Prices are discussed verbally. Perhaps Sir Frederick Hopkinson is under the impression that there was any detail of this estimate, and that it was got out by means of contractors' estimates; but it was not.

Chairman.—That is what we want to know.

Sir H. Courthope-Munroe.—If you have not got any documents, obviously you cannot produce them, and you will tell the Committee so. If you have any documents, it is quite fair that the Committee should see them.

Chairman.—All we want is the documents which form the groundwork from which page 29 was worked out—the calculations. When Mr. Kidd was in the witness-box the same question arose about his prices. He said: "Here is my estimate book; here are all the details"; and he then began to give us all the details, showing how he had

got out his estimate of 325 lakhs. We want a corresponding document to that, if you have it?

A.—Yes.

Sir Frederick Hopkinson.—You may have only one price in that book; but it may be built up of a dozen different things.

Sir H. Courthope-Munroe.—I quite understand.

Witness.—That is from your point of view, but not from our point of view. We do not do things in that way.

Sir H. Courthope-Munroe.—I quite follow what you are asking. You could not put it better than requiring better and further particulars. I quite agree they ought to be given, and I will do my best to get them.

Chairman.—Yes. If your client feels he does not wish to supply them we will leave it at that. At page 66 you state: " Prices were fluctuating, but nobody could see the rise of prices all over the world which would take place the following year."

A.—Yes.

Q.—You will look into that matter and before Monday be prepared to show how the prices went from 1912-1919, and how they went from 1919 to 1921 and 1922, if you like.

A.—Yes.

Q.—You say: " To give one instance, when the dredger was ordered the firm offer of £451,000 had been withdrawn by the lapse of time, and other circumstances combined to raise the contract price to over £650,000."

Sir Frederick Hopkinson.—The price actually was £773,500.

Chairman.—" To over £650,000, payable at Rs. 15 to the £ instead of 12. The Government were aware of this state of affairs and could have called a halt and asked for a re-examination of the estimate before the dredger was ordered had they wished to do so." What did your amount of £773,500 include, Sir Frederick?

Sir Frederick Hopkinson.—That is the " Sir George Lloyd," the " Colaba," the shore lines, and the floating part lines.

Witness.—Does that include freights?

Sir Frederick Hopkinson.—Yes; delivered in Bombay.

A.—I am talking of the £650,000. I will look into that.

Chairman.—I have talked of it as £650,000 because it has been mentioned as that; but Sir Frederick Hopkinson is speaking of the dredgers " Sir George Lloyd " and " Colaba," the shore lines, the floating pipe lines, the pontoons, the anchors, and everything delivered at Bombay.

Sir Frederick Hopkinson.—That is the figure from the Director-General of Stores.

Chairman.—" The Government were aware of this state of affairs, and could have called a halt and asked for a re-examination of the estimate before the dredger was ordered had they wished to do so." As the expert technical adviser to the Government it was also open to you to have pointed out to them the great difference in the few months between October, 1919 and May, 1920.

A.—As a matter of fact, I do not think I knew what the dredger was going to cost until after the order had been placed.

Q.—You knew, at all events, that prices were going up very much?

A.—Yes; and I knew that in Bombay the prices of land were also going up. We come back to the old story—the reclamation had to be done at any price. It was going to be a very remunerative undertaking.

Q.—Although you say the Gevernment themselves could have called a halt you did not indicate that in May, 1920, it might be prudent for them not to go on with this scheme?

A.—I did not.

Q.—I appreciate the reason. It was believed it was going to be lucrative. I think I had better stop there because we get on to the revised estimate of 1921 for 701 lakhs.

A.—Yes.

Chairman.—About the statement that Sir George Buchanan has been reading from, have you got a copy for us?

Sir H. Courthope-Munroe.—I will see that you have that. I want to be perfectly candid with the Committee. It formed part of my brief, and after giving particulars of how the thing is built up, my client has made certain observations to me.

Chairman.—Of course we do not want those.

Sir H. Courthope-Munroe.—Obviously you will appreciate why it was not handed in. It can easily be got by tearing off part which is my instructions and giving you the figures. I will see that that is done. I have got them out now; but that is the sole

reason why they were not handed over the table. There were certain personal notes to me as Counsel and naturally I did not want to hand those over.

Chairman.—That is quite right.

Sir H. Courthope-Munroe.—If we deliver them to-morrow morning will that do?

Chairman.—I think so.

Sir H. Courthope-Munroe.—I will try and get out for you the further and better particulars as far as possible, but of course, it is seven years ago.

Chairman.—We do not want a new mass of particulars. We want the document and for Sir George Buchanan to say it was from this document that it was made up.

Sir H. Courthope-Munroe.—You want to test the *bona fides* of the estimate that was given. That is quite right, and I do not want to complain of it.

Chairman.—That is the point.

(Adjourned to Monday, 1st November, at 11 a.m.).

The Committee Assembled at 11 a.m. on the 1st November 1926, all Members being present.

The examination of Sir George Buchanan was continued.

Sir George Buchanan; re-called and further examined.

Chairman.—When the question arose, Sir George, of taking a shorthand note, we were under the impression that, as you had your Counsel here, you probably would not require it; and it had to be done in a very great hurry. If, however, the absence of a transcript of the shorthand notes of your evidence has put you to the slightest inconvenience, you must withhold any answers to any questions which you like, until you have seen the transcript of the shorthand note. I am very happy to hand to you now if you care to have them, my own copy, with your evidence marked at certain passages, which will give you some indication of what I, at all events, regard as of some importance. Will you just keep these copies, (handing same to Sir George Buchanan). You can return them at your leisure. As I say, if at any time you would rather defer your reply until you have had an opportunity of studying the shorthand note, by all means take that opportunity.

Sir H. Courthope-Munroe.—May I just say a word before you start, Sir?

Chairman.—Certainly.

Sir H. Courthope-Munroe.—On the last occasion when we met, you desired that Sir George Buchanan should give you further information with reference to some particulars that were stated in his report of 1919.

Chairman.—Yes—page 29.

Sir H. Courthope-Munroe.—The estimate which resulted in a figure of 367 lakhs was made up of various items, and I gathered on the last occasion that you wanted to know how the quantities were arrived at. Taking the first instance of concrete, No. 1, you wanted to know how 79,831 yards was arrived at, carrying it through in detail. Then, secondly, you desired to know how Sir George Buchanan came to fix a price, as regards concrete, of Rs. 32. You wanted those details.

Chairman.—I will tell you what we wanted. We wanted the original documents from which he worked out those figures.

Sir H. Courthope-Munroe.—I want to see if I followed you rightly. The position is this. Sir George Buchanan is an engineer, as we all know, of great eminence. He has devoted several months to the preparation of the statement which has been handed in to you, which runs, I think, to something like 117 pages. For that, so far as we know, he receives no remuneration whatever. He is here simply as a voluntary witness to afford information to the Committee. As I say, he has been several months in preparing this statement, and he has tendered himself here as a witness for the last two days. He is perfectly willing to answer any question you may put to him in fairness, but there is a limit. He is not paid to attend here. He is in no sense upon his trial. If you are to go into all these details, he may very well be required to be here for another week or fortnight; and to have all these details gone into, not, with very great respect to yourselves, by a committee of experts in the engineering world, but by your Tribunal——

Chairman.—Sir Harry, would it meet that objection if we said we would limit the examination of page 29 to one-and-a-half hours? That would meet that objection, would it not? That is one objection disposed of, then.

Sir H. Courthope-Munroe.—Sir George Buchanan has not the smallest objection to any document which he has got being seen by the Committee, but he has the strongest objection to parting with, and declines to part with, any original document. He has found a bundle in his office which came into being upwards of seven years ago. He is quite prepared to allow copies of those documents to be taken and for them to be handed to you. He is not disposed to part with the originals. You will see, Sir, that to ask a gentleman, seven years afterwards, to go into all this mass of detail may involve his attendance here at very considerable expense.

Chairman.—If we limit it to an hour-and-a-half, that point goes. All we are asking for is not that he should part with any document at all; we are asking him to hand to this Committee the original documents which he prepared, and so got out this estimate at page 29. Having handed them to us, they will remain in this room for an hour-and-a-half during which his examination is held on those documents, and they will then be handed back to him. There are two questions. Has Sir George Buchanan got those documents: are the original documents in existence? If they are, what reason does he put forward for not producing them?

Sir H. Courthope-Munroe.—May I talk to Sir George for a moment?

Chairman.—Yes. He may decline to produce them if he likes.

Sir H. Courthope-Munroe.—I am not taking up that attitude at all. You will appreciate my point. Sir George cannot hand in every document prepared seven years ago, and come before this Committee and undergo an examination that might easily last into a month. He has other things to do.

Chairman.—I said we would limit it to one-and-a-half hours. Sir George, will you turn to Sir Harry and take his advice about the matter? (Sir George Buchanan consulted with his counsel.)

Sir H. Courthope-Munroe.—I have spoken to Sir George, Sir, and upon the understanding which you have been good enough to suggest, namely, that we should hand the documents to you——

Chairman.—No, hand the documents in to whichever member of the Committee wishes to ask questions, and that the examination on page 29, as regards what you and I understand as particulars, and how they are made up, shall not exceed one-and-ahalf hours.

Sir H. Courthope-Munroe.—And that the documents will not leave the room, but will be returned after the close of the day?

Chairman.—They will be returned to Sir George Buchanan at the close of every day.

Sir H. Courthope-Munroe.—If you please. I want further to point out, as I have already pointed out, that Sir George Buchanan is unable to attend here indefinitely.

Chairman.—We are unable to sit indefinitely also. We have to be considered.

Sir H. Courthorpe-Munroe.—What I want to point out is this. Sir George Buchanan is attending here, and has drawn up this statement in the public interest, and to give the information for which you are asking. He cannot undertake, as a professional man, to attend here indefinitely at his own expense so long as this enquiry may last, and he is desirous if possible, that his examination should close to-day.

Chairman.—You may take it that that is impossible, but I hope I can get on myself to-day in a few minutes and finish by 1 o'clock. I will try to. (*To the Witness.*) I have not been unduly long with you, have I, Sir George Buchanan?

A.—I do not know, Mr. Chairman. What I would like to say is this. I am not prepared to go into the details of all that has taken place in the last seven years by question and answer. You want to have a Board of experts. I have given you all the assistance I can. I have written this statement. I have attended here for two days, but there is a limit to the time which I can spare, and I think that limit has nearly been reached. You have this statement which embodies all my views. I have given you my considered opinion to the best of my ability; and, as I say, if you wish to go into questions affecting professional skill, you require a Board of experts—a Board of Civil Engineers of the same standing as myself.

Chairman.—Have you finished, Sir Harry, or is there anything else you wish to say?

Sir H. Courthorpe-Munroe.—If you will allow me, Sir, I will take a list of the documents so that we may be sure to have them back. I think Sir George has prepared a short statement, have you not, Sir George, showing how the figures are arrived at?

Sir George Buchanan.—Yes.*

* See Appendix XII.

Sir H. Courthorpe-Munroe.—Will you give the Chairman and myself a copy of it? This, Sir, is the original bundle which has remained untouched since 1919 (*handing same in*). Before I sit down I desire to say this, Sir. The following account has been published in some of the Press reports of this case, in particular the Manchester Guardian: " (*The Chairman*). You must decide before Monday Yes or No, whether you are going to produce the details on which the estimate was based. If you say you will not produce them, well and good." I do not complain of that, but now, Sir, Mr. Billimoria is reported to have said this—I did not quite catch it myself—" He has been paid for it. It is our property, and should be produced." Now, Sir, that is an entirely wrong position. Sir George, as an eminent professional man, was called upon in 1919 to make a report. For the purposes of that report he went into considerable detail in various matters and made a considerable number of notes, as I have said, as any gentleman would do. He made his report in 1919, and was paid for that report, and there is an end of it. In 1921, two years afterwards, the contract was entered into; and how it can be suggested that any professional man can be called upon to produce his own private notes, or rather that they belong to the Government, I entirely fail to see. However, I do not want to pursue that. I think the statement was made by Mr. Billimoria in error.

Mr. Billimoria.—I am quite prepared to argue that point, if you want it to be argued.

Sir H. Courthope-Munroe.—However, that being so, Sir George rather resents that suggestion. On the question of the shorthand notes, Sir, I understand you have handed to Sir George the shorthand notes, but we on the other side of the table have rather a grievance. When Sir George agreed to enter into this enquiry he understood that he would be in the future, as in the past, supplied with the shorthand notes, at your orders. Observations are made from time to time which one fails to catch, and one wants to verify them on the following day. We have no shorthand writer here. If this were an ordinary Private Bill Committee before which matters were in contest, we should have a shorthand note taken at our own expense, but inasmuch as in this case we are attending here in the public interest, entirely unpaid, and entirely with a view to clearing up matters to your satisfaction and to the satisfaction of the authorities, we do expect that the shorthand note will be given to us day by day. It may have been by an unintentional error, but we did make application for the notes, and we were refused them.

Chairman.—I have given them to Sir George, and I have helped to clear up the matter as far as possible. If he is in the slightest degree embarrassed by not having had the shorthand notes, he is at liberty to ask to be allowed to reserve any questions till to-morrow morning, by which time he will have had an opportunity of studying the shorthand notes.

Sir H. Courthope-Munroe.—I am very much obliged to you, Sir.

Mr. Billimoria.—Before you begin, Sir, may I point out, with regard to the matter raised by Sir George Buchanan that he does not want to be here indefinitely, that this Committee was held up for a period of more than 12 days for the convenience of Sir George Buchanan. During all that time the Committee were doing nothing. We had come here all the way from India to expedite our work, and we were held up for a number of days for no fault of our own. It is no good alleging now that we are putting Sir George to any inconvenience. On the contrary, we have tried to consult his convenience to the best of our ability.

Sir H. Courthope-Munroe.—On the question of the shorthand note, Sir, I refer you to a letter of the 17th August 1926 sent to us from the India Office. The last paragraph runs in this way: " The Committee state that they have already sent to your firm a transcript of the proceedings up to date, and also a copy of Sir William Hepper's statement, and will continue to keep you so informed." That is what I was complaining of. We have not been so kept informed. I understand you have now very kindly handed copies to Sir George, and that we shall now have the notes.

Chairman.—As a matter of practice, Sir George, the Committee have sent you from India mail by mail all the evidence that has been taken, have they not?

Sir George Buchanan.—That is right.

Q.—That was done with the object of assisting you, and I hope it has been of assistance to you?

A.—It has been of the greatest assistance.

Q.—I am very glad to hear that.

A.—Would you like me to read my statement accompanying the production of the detailed estimate?

Q.—Relating to Page 29?

A.—Page 29 of what?

Q.—Of your report—not of your statement.

A.—May I give you a copy of this for reference? (*Handing document to Chairman*). " My estimate dated 1919 contains all the necessary information to enable any responsible person to form an opinion as to its reliability. It contains very much more detail than Mr. Kidd's estimate, although Mr. Kidd's was supposed to be a working estimate whilst mine was in point of fact the usual preliminary engineering estimate which an engineer makes to his client. It was accompanied by no working drawings and was not supposed to contain details. Mr. Kidd, on the other hand, is supposed to have prepared and submitted a complete detailed working project, which was accompanied by ten sheets of drawings. It was handed to me as such for examination and report. The Government of Bombay, in sending this scheme to the Government of India, had observed the drawings might be considered as complete working drawings which would give sufficient information for examination of the design and for the immediate commencement of the work. All doubtful points had been settled, and the revised estimate might be accepted as completely trustworthy and ample. I repeat that Mr. Kidd's estimate was devoid of detail, whilst mine was full of detail in comparison with the estimate of Mr. Kidd. It is not usual for an engineer to explain in any greater detail than I have done how my estimate was prepared. It contained at Page 13 a comparison of Mr. Kidd's estimate of cost with my estimate of cost for 1912, and under Table B. my estimate of cost in 1919. It also contained at Page 29 the detailed estimate of the cost of the scheme on my lines; that is the number of cubic yards of concrete rubble, concrete blocks, murum filling, etc., with prices affixed against each. I will now describe how I arrived at my estimate to Mr. Kidd's scheme, 1912 ". It really means the comparison of the estimate. " In the first place it was necessary to take out a complete schedule of quantities for Mr. Kidd's scheme, and although Mr. Kidd had given no such schedule in his report, we were enabled to do so by taking Mr. Kidd's drawings, and from them get out *de novo* the whole of the quantities contained therein. This we did, and after putting our rates under each item we arrived at a total of 170·94 lakhs. To this we added Mr. Kidd's item of 59·45 lakhs for roads, lights and drains, and engineers' and contractors' commission, 11·51 lakhs—total 241·90 lakhs against Mr. Kidd's 325·23 lakhs, and we came to the conclusion that Mr. Kidd had over-estimated the work to the extent of 83·33 lakhs. We then went on to our own estimate and dealt with it in a similar way. We took out the whole of the quantities, and from information in our office, affixed what we considered were the correct rates.

Sir Frederick Hopkinson.—This document does not say " and ". It says " We took out the whole of the quantities from information in our office "?

A.—Well, put in the word " and ".

Sir Frederick Hopkinson.—It makes a difference, does it not?

Mr. Billimoria.—I cannot understand the plural number that is used there. This report is signed " Sir George Buchanan " and not by the firm.

Witness.—" and from information in our office affixed what we considered were the correct rates, and we arrived at a total of 367·71 lakhs. Our estimate was based on an increase of two and a half times over 1912. Information I obtained from Bombay, and brought home with me, is as follows: List of prices of work done on the Kennedy sea face in 1912 and 1913 and 1919 and 1920 obtained from Mr. Johnson, Executive Engineer, Presidency, in charge of the Kennedy sea face works; letter from Mr. Messent, Chief Engineer of the Port Trust, dated 30th May, 1919, with a list of prices in Bombay for various classes of work in 1914 and 1919; rate for murum filling, Improvement Trust Scheme, 1919; letter from Mr. Trench, Assistant Secretary to Government P.W.D., Bombay, containing cost of rubble and cost of stone at Port Trust quarries; note by Mr. Trench, Assistant Secretary, P.W.D., concerning cost of Kennedy sea face wall; note giving price of timber by Mr. Pearson; cross-section of the Mazagon Sewri reclamation wall supplied by Mr. Messent, with note of the cost of concrete blocks 1917 and 1919. Above information along with the records in our office of the cost of works of all kinds, enabled us to put prices to our schedule of quantities."

Chairman.—Then you have got here, in this room, Sir George, the original figures by which you worked out this column of quantities?

A.—I have, yes.

Q.—May I have it?

A.—Here is the document (*Handing in same*).

Sir H. Courthope-Munroe.—I think that contains 45 documents, if somebody would check it. I have not numbered them.

Chairman.—Would you like that numbered, Sir Harry?

Sir H. Courthope-Munroe.—I think it would be convenient.

Chairman.—Mr. Ewbank, will you number this document and then hand the file to me?

Sir H. Courthope-Munroe.—Those are original documents.

Chairman.—Thank you. (*To the Witness*). Have you by any chance the ten sheets of Mr. Kidd?

A.—No, I have not. They were returned to Bombay and are not in my possession. They are the property of the Government of Bombay.

Q.—I am not touching on Page 29, Sir George. Your figure was 367·61, was it not?

A.—Yes.

Q.—And Mr. Kidd's was 325·43?

A.—I suppose it was that.

Q.—Say 325. When you went to Delhi did anyone at Delhi ask you how it happened that if Mr. Kidd's estimate of 325 in 1912 was a fair estimate, you were able to do the work in 1919 for 367?

A.—I do not remember at this period of time. It has not impressed itself on my memory.

Q.—The position is rather curious?

A.—Yes.

Q.—The Government of India had rather pledged themselves to the excellence of Mr. Kidd's estimate?

A.—Yes.

Q.—Mr. Russell had spoken in high terms of it. Everybody in the Government of India must have known that between 1912 and 1919 the prices of everything had gone up at least twice?

A.—Yes.

Q.—But they never mentioned it, as far as you can remember?

A.—As far as I can remember they never mentioned it at all. I put two and a half times on to the price. May I look at that book for a moment? (Document handed to witness). *There* is the original document, dated 18th October, 1919.

(*Original document*, 1919, *No.* 1).

Q.—Now, Sir George, if you could have done the work for 367 lakhs in 1919, working back on the basis of prices having risen two and a half times, Mr. Kidd ought to have been able to do it for 146 lakhs, ought he not?

A.—I am not prepared to discuss it in that way.

Q.—I wish to know your view about it. Is not that the fact? If you could have done it for 367 lakhs in 1919, and your own was a fair and proper price, it follows as a matter of arithmetic, does it not, that Mr. Kidd ought to have been able to do it for 146 lakhs?

A.—I do not care to answer the question in that way. I got out a separate estimate on Mr. Kidd's scheme, and I am not prepared to answer the question in that way. You can take my estimate by Mr. Kidd's scheme, and you can take my earlier scheme, but I do not care to make any comparison in that way.

Q.—Are you not prepared to answer it because you realise that 146 lakhs in 1912 would have been an impossibly low figure?

A.—I did not go at it from that basis at all. I took it on Mr. Kidd's quantities and I put my prices to them, and it never occurred to me to work it out that way.

Q.—I am sorry; I may not have made my question clear. What I asked you was, are you not prepared to answer that question because you realise that the work could not possibly have been done for 146 lakhs in 1912? Is that the reason why you do not wish to answer it?

A.—I am prepared to say it could not have been done for less than my estimate on Mr. Kidd's work.

Q.—I will leave it if you say you prefer not to answer the question, and I will put it again so that there may be no doubt about it. If your estimate of 367 lakhs in 1919 was a feasible estimate, and the right and correct figure, that means, does it not, that Mr. Kidd's estimate in 1912 ought to have been 146 lakhs. Do you prefer not to answer that question.

A.—I prefer not to answer that question.

Q.—If the shorthand writer takes that down——

A.—I have already said that my estimate upon Mr. Kidd's scheme was 241·90 lakhs.

Q.—We will have it any way you like. Let us say that 242 lakhs was the rock bed figure of Mr. Kidd's scheme?

A.—That is it, yes.

Q.—Multiply 242 by 2½ and you get 606. Ought not your estimate to have come out to over 600 lakhs?

A.—No.

Q.—Why not—two and a half times 242 is 605?

A.—Well, there are the figures, and you can make anything you like of them.

Sir H. Courthope-Munroe.—Have you put to the witness, Sir, whether he accepts the two and a half times rise in the period?

Chairman.—He says in his own statement two to two and a half, and we have got evidence, Sir Harry, which shows two and three-quarters. Two and a half will do. Yes, he does accept that. (*To the Witness.*) Now I want to come on to a completely fresh point. Will you turn to your report which you have in your hand, at Page 6, lines 10 to 13. If you turn to the previous page you will see that it is a letter from the Government of Bombay to the Government of India of the 6th December, 1911. It is one of the letters which I might describe as letters pressing on the urgency and financial success of the reclamation?

A.—Yes.

Q.—Apparently the letter of the Government of India had been written by Mr. Porter?

A.—Yes.

Q.—Because at Page 6 it says " In Mr. Porter's letter under reply it is stated that experience of reclamation by suction dredging is limited in Bombay " (the word " limited " is in inverted commas). " I am therefore to point out that the large reclamations being carried out by the Port Trust afford exceptionally complete data for estimating work of this kind "?

A.—Yes.

Q.—We must assume, of course, that the writer was honest when he made that statement, must we not?

A.—Yes, it was a Government letter.

Q.—We must also assume, must we not, that he was very ignorant of the performances of the " Jinga " and " Kalu "?

A.—Presumably he was. He was not an engineer.

Q.—But it does not require an engineer to know that if a vessel is guaranteed to do 2,000 cubic yards an hour and does 555, you are getting something less than what you bargained for?

A.—Yes.

Q.—Have you seen the 1915 publication of the working of the " Kalu " and " Jinga "—the official publication?

A.—No.

Q.—There was an official publication said to have been written by Mr. Messent, in which he set out the whole record of these two vessels. We have a copy of it here. The " Kalu," guaranteed to do 2,000 cubic yards an hour, did from 1,196 to 1,426. Mr. Kidd, if you remember, had given the figure of 1,480, and you have referred to that once or twice. Mr. Messent's figure is 1,426. The " Jinga " did from 555 to 1,276, and that was not over a period of a month or two but over a period of nearly five years. Their average output was 1,126, just about 50 per cent. of their guaranteed output?

A.—But yet to-day the Sewri reclamation is looked upon as a great success, and I have never heard the Port Trust complain about the finished work.

Q.—It does not alter the fact that when we are discussing the performances of the dredgers the figures are those which I have given you. Now suppose you had been in command, Sir George, of this particular work—the Sewri work—and you had found that the " Kalu " was giving 1,196 to 1,426 and the " Jinga " 555 to 1,276, and the two together were averaging 1,159, would you have been satisfied with that work?

A.—I should have said just the same as I say about this work. It is the human element. We have Mr. Kidd's evidence when he had a Port Trust dredger; he talks about the wonderful effect of a little encouragement. When he had a Port Trust dredger she did far more work and gave a better output than she had done compared with the very best output of the Port Trust. We have the evidence of one of the dredger masters. When he was asked about the " Sir George Lloyd " and about dredging elsewhere, he said, " Well, elsewhere they are out for blood: they are out for their pound of flesh, and if you do not get the percentage you get the sack." My opinion about the Port Trust dredgers is the same as about this dredger. Work done by Government, with Government control, is a very different proposition to work done by a contractor or a private company who have a free hand with their men. I do not attribute any importance to these figures.

Q.—Very well. You are satisfied with them as the performances of the " Kalu " and " Jinga," are you?

A.—I am not satisfied with them, but I say you have to take everything into consideration. I say that the human element has not been given the proper consideration.

Q.—Did you know of these figures when you wrote your report in 1919?
A.—No, I did not.

Q.—But why not?
A.—I have often discussed generally the dredging with Mr. Messent.

Q.—But it was in a public document?
A.—It was not put before me. I never saw it.

Q.—You were in Bombay—true for a fortnight only—but you were in Bombay making enquiries about the feasibility of this scheme. You were aware that there had been very extensive dredging operations carried out by the Port Trust—by the "Kalu" and "Jinga" in fact—and even if you did not see the document did you make any enquiries of anybody as to the figures of output of those two vessels?
A.—No, I did not. I had frequent conversations with Mr. Messent. Mr. Messent certainly never once gave me to understand that he was dissatisfied with the Sewri reclamation. I always understood it was a great success.

Q.—Your conversations, I suppose, consisted of questions and answers?
A.—Well, the usual conversations which people have, yes.

Q.—Was not the first question that you should have put to him in any conversation "What have your dredgers done"?
A.—I cannot remember all that I did say to him.

Q.—If you had asked him what his dredgers had done he, having written the official account, would have given you these unhappy figures?
A.—Mr. Messent never gave me a single indication that he was dissatisfied with the "Jinga" and the "Kalu." Possibly he was aware of the failing of the human element.

Q.—Returning to the passage I read—"I am therefore to point out that the large reclamations being carried out by the Port Trust afford exceptionally complete data for estimating work of this kind," that is a commendatory statement, is it not?
A.—Yes.

Q.—Would you have included that in the Report if you had known that the "Kalu" and "Jinga" had done this poor output?
A.—I merely included all this in the Report as a record.

Q.—Yes, but would you have thought it fair to include that commendatory statement in the record if you had known of the poor figures of output of the "Kalu" and "Jinga"?
A.—I should have put it in the record, certainly. This was merely an historical record.

Q.—But if in your own mind you knew that it was a mis-statement, would you have put it in your report?
A.—I did not put it in my report. I merely quoted a document.

Q.—I am trying to make it clear. Somebody makes a commendatory statement?
A.—Yes.

Q.—If you had had full knowledge of the facts you would have known that that commendation was misplaced. If you had known of the figures of the "Kalu" and "Jinga," would you have put that commendatory statement in without some remark that it was over sanguine, or something of that sort?
A.—If I had taken any notice of it at all I should have analysed it and have gone into the question of labour, machinery and material.

Q.—The human element?
A.—The human element.

Q.—I suppose whenever you did any dredging operations you were always up against the human element?
A.—I have been rather fortunate in the human element.

Q.—Were you aware that, generally, people doing dredging operations were up against the human element?
A.—Yes.

Q.—And that it was always rather a serious problem?
A.—Always rather a serious problem.

Q.—Why did not you mention that in the report?
A.—We are sanguine. We think we can get beyond the human element. When I was in Mesopotamia we did enormous dredging operations but we did not have any trouble with the human element there. Perhaps you would like to know why, Mr. Chairman,

Q.—If you wish to tell us by all means do so, Sir George, certainly.

A.—In Mesopotamia we were under military control and military law. On one occasion we did have trouble with a dredger. The whole of the crew said they would not coal the ship, and they were all sent to the Provost Marshal and suitably dealt with. We had no more trouble in Mesopotamia.

Q.—There, I suppose, the men considered that an inhuman element, did they not?

A.—In Rangoon, where I was carrying out the river training works, I was fortunately in the dual position of Sir Lawless Hepper and Mr. Lewis. I was Chairman of the Port Authority and I was also the Chief Engineer. It was a one-man show, and a one-man show you are perfectly aware, Mr. Chairman, is very different from divided authority.

Q.—Did you ever work out the cost of the dredging at Rangoon?

A.—I cannot remember.

Q.—I am told it cost 1s. 6d. a cubic yard. That was pretty high, was it not?

A.—I do not think it is fair to take any figures by themselves. You could take figures from anywhere, Mr. Chairman, and say, "Look at this and look at that." It is not fair to take any figure unless you know the whole of the circumstances.

Q.—So be it. Did Mr. Messent ever tell you about any difficulties which had arisen with the port dredger?

A.—I can assure you that he never did I was taken to the Sewri reclamation and shown the results as a great success.

Q.—In the same letter it is said, "Further, the Government are well aware that economy in this class of work can only be secured if the suction dredgers and other plant required shall be of the best design. The difficulties which have arisen with the Port Trust dredgers serve as a warning on this point." When you saw that passage in the letter, did it never occur to you to inquire from Mr. Messent what were the difficulties which had arisen with the Port Trust dredgers?

A.—Mr. Messent was a very old friend of mine, and I was in Bombay when the works were going on. He never told me there was any difficulty at all with the Port Trust dredgers.

Q.—I have not interrupted you, Sir George, but that does not really meet the point of my question. The point of my question is, when you saw in this Government letter, "The difficulties which have arisen with the Port Trust dredgers serve as a warning on this point"—that is, "The suction dredgers and other plant must be of the best design"—did not you ask Mr. Messent, "What does that mean; what difficulties have you had with your dredgers"?

A.—No, I did not.

Q.—Look at it from another point of view, "The suction dredgers and other plant required shall be of the best design. The difficulties which have arisen with the Port Trust dredgers serve as a warning on this point." Those Port Trust dredgers you knew to be the "Kalu" and "Jinga"?

A.—Yes.

Q.—You knew them to have been built by Messrs. Simons?

A.—Yes.

Q.—You saw that this was some criticism of these dredgers?

A.—Yes.

Q.—Did you enquire of anybody what the trouble was about the dredgers built by Messrs. Simons?

A.—No.

Q.—I will now turn to your statement, page 66. You are dealing with the engineer's revised estimate of 1921. He brought his out at 702, did he not?

A.—He did, yes.

Q.—And you, a few months later, in February, 1922, brought yours out at 668?

A.—I think it was the other way about.

Q.—So be it; I do not mind which way you put it?

A.—As a matter of fact, my estimate was never considered by Government at all.

Q.—That, again, is not quite my question. I am asking you, did you not in February, 1922, say that the work ought to cost and would cost 668 lakhs?

A.—I did, yes.

Q.—In point of fact, it was before that date that you were told that the project estimate of Mr. Lewis's would be 702 lakhs?

A.—No, I do not think it was before that.

Q.—Look at your own statement: " In August, 1921, we were astonished to receive from the Chief Engineer revised estimates for the Back Bay scheme amounting to seven crores." That is on page 66, at the very bottom?

A.—Quite right.

Q.—Therefore, in August, 1921, you were aware that the engineer thought the scheme would cost 702 lakhs?

A.—Yes.

Q.—In February, 1922, you, yourself, said 668?

A.—Yes.

Q.—It is only a difference of 5 per cent., is it not?

A.—Yes.

Q.—Had you really, or have you even to-day, any great objection to the 702 lakhs? You have said somewhere in one of your documents that you agree generally with Mr. Lewis's figure?

A.—I go so far as to say that I think, under better executive control, that the work should not have cost that.

Q.—It might have been brought down to 668?

A.—It might have been brought down considerably.

Q.—It might have been brought down to your figure of 668?

A.—My figure of 668 was on actuals supplied by Mr. Lewis.

Q.—You signed your name to it?

A.—Yes, I did.

Q.—You accepted it?

A.—I accepted it, yes, but I accepted it on the work that was done. That Mr. Lewis, or that the Executive, had been extravagant was not my concern.

Q.—Did you, at that date, ever put into writing any allegation that there had been extravagance—at that date?

A.—I protested against the 702 estimate

Q.—Did you say it was extravagant?

A.—I think I used those very words.

Q.—Will you let us see it?

A.—There is a long letter which we wrote complaining about that estimate. I have not got it beside me.

Q.—Do you know the date of it?

A.—The 26th July, 1922.

Q.—Are you referring to the report dated 26th July, 1923?

A.—No.

Q.—I have not got that letter?

A.—I am referring to an official letter that we wrote on the 26th July, 1922, in which we went into some details, and we refused to accept the estimate. I can obtain the letter for you.*

Q.—Thank you, very much. Were you of the opinion that the 702 figures were, more or less, all right?

A.—The 702 figures were, more or less, all right? Well, we considered that the work——

Q.—No, no, I mean the price. Were you of opinion that Mr. Lewis's figure of 702 lakhs was more or less correct?

A.—How could we, when we said it was excessive?

Q.—I am asking you, because you said in your report on the revised project estimate, " So far as I can see, Mr. Lewis's figures are generally acceptable "?

A.—Yes. That is after the work was nearly finished. That was the revised estimate. That did not imply any criticism of what he had done in the past.

Q.—It implies acquiescence in his figures, does it not?

A.—What date was that?

Q.—1924—the last report we have. It is dated the 15th December, 1924. I will read the whole passage. " A revised project estimate for the whole work was submitted by Mr. Lewis, the then chief engineer, in July last, and was sent to us for our remarks, when we replied that the matter would be taken up by me on my return to Bombay. The sanction project estimate amounted to Rs.7,02,43,321, and the revised estimate Rs.7,26,54,401, an excess of Rs.24,11,080. There had been material savings in several directions . . . . I have gone into the matter very carefully with the chief engineer and understand he wishes to submit his revised estimate after the receipt of the actuals at the end of the financial year. So far as I can see, Mr. Lewis's figures are generally acceptable, except that the cost of dredging and filling must be an uncertain quantity

* See Appendix XIII.

until we have had the experience of this season's work, and that, in any case, there must be added the sum of 3½ lakhs for removal of cables in Back Bay, and to dredging plant 5 lakhs for the intermediate pumping station to work the "Kalu" if that is approved, Mr. Lewis having already allowed 5 lakhs." There is no criticism there of extravagance or inefficiency, is there?

A.—There could not be. It was not possible. Allow me just to explain for one moment. The 702 lakhs estimate had been accepted by Government. That was done. It was accepted by Government. Very well. Let bygones be bygones. What we were referring to were the differences between 702 lakhs and the 700 and whatever it was.

Q.—726?

A.—The 702 lakhs estimate had been accepted by Government. No one had objected. That estimate was accepted by Government. Naturally our acquiescence was in the difference between 702 and 724.

Q.—We will pass away from it with this question—that your objection to the 702 could not have been of a very serious character, because you yourself at the same time were estimating 702 less 5 per cent.—668?

A.—Yes, but on Mr. Lewis's figures. May I read a little memorandum on the subject?

Q.—Please do. We have not got it, have we?

A.—I will give you a copy of this, Mr. Chairman. The 700 lakh estimate was not our estimate and was sanctioned without our being consulted. However, it was an estimate for work sanctioned by the Government of Bombay with full knowledge of all the facts before them, and of the prices that they expected to get from land sales. However, the responsibility for sanctioning that estimate must rest with the Government of Bombay. You are probably aware that even on that 700-lakh estimate an enormous profit was expected from land sales. It was common knowledge that the 367-lakh estimate, which had been increased by the Government with my consent to 400 lakhs, would have to be further increased. Prices of labour and materials had soared upwards in the years between 1919 and 1922, and the cost of dredging plant alone had increased by something like 100 per cent. for various reasons. Even the special Sub-committee appointed by the Government of Bombay to report on the scheme remarked in their report dated November, 1925, with reference to the 702-lakh estimate: "The excess was due to the fact that since Sir George Buchanan prepared his estimate the prices of work and of materials, fuel and labour had risen considerably. Also Sir George Buchanan's estimate had been based on exchange at 12 rupees to the £; whereas, when the plant was imported in 1921 the rate was in the neighbourhood of 15 rupees to the £. However, let us go over a few main items. Sea wall: my estimate for the wall was 118 lakhs of rupees. The chief engineer's estimate was 238 lakhs, which is above 100 per cent. increase. I have always considered the wall cost considerably more than it need have done, but the chief engineer's point of view was: "I have got that estimate sanctioned by the Government, and so long as that estimate is not materially exceeded it is justified." That is the common view in India. The fact that by economising and keeping cost accounts he could have saved on the estimate did not interest him; but my revised estimate based on the chief engineer's figures was 200 lakhs, a difference at 15 rupees to the £ of £250,000. It should, however, be borne in mind that these figures are gross. No allowance is made for the recoveries and sale of plant, or for the use of the Kandivli quarry for many works outside the Back Bay reclamation, or its sale as a going concern. The quarry was particularly well equipped for that reason. It was never intended that the quarry should be debited *en bloc* to Back Bay scheme. The Director of Development had great ideas as to its use, and a geologist reported upon the value of the stone for building purposes. I wanted a suspense account opened for the quarry and the stone sold to the Back Bay scheme on a proper basis, or rather, I suggested it, but this was not done. Beginning the wall at both ends certainly added materially to the cost. On the other hand, I consider that even with my very limited powers I saved a great deal on the wall, and the chief engineer's estimate would have been exceeded but for my advice.

Sir H. Courthope-Munroe.—May I hand you, Sir, a copy of this statement?

Chairman.—Thank you. (*Same handed*).

A.—The equipment of the reclaimed area, the 700-lakh estimate, has 212 lakhs under this head. My original estimate for 367 lakhs has 75 lakhs for roads, drains, and lighting—storm water drains, please note. Nobody in this world could have prepared an even approximate estimate for the whole of this work before the Government had decided what they were going to do with the land reclaimed, and it was not until March, 1922, that the town planner's lay-out was received by us. Mr. Kidd had allowed 50 lakhs for roads, drains and lights, and I increased his estimate.

Q.—59 lakhs?

A.—Was it 59?

Q.—Yes.

A.—I increased his estimate to 75 lakhs. This was for storm water drains and a few necessary roads and lights. Sewerage I always understood would be done by the municipality. Then I go on to what I said the other day, that in my revised estimate I, in the first instance, included 75 lakhs, but Sir Lawless Hepper sent for me and said he did not want always increasing estimates, but asked me to put on 100 lakhs for sewerage and moorum.

Q.—It was on that typewritten document that you put in pencil "Storm water" right over the top?

A.—Yes; the deficiency.

Q.—Sewerage?

A.—Yes.

Q.—In pencil?

A.—Yes.

Q.—You took out the figure "75," and substituted "135"?

A.—Yes.

Mr. Billimoria.—May we have this document as an exhibit?

Chairman.—I will ask that in a moment.

A.—Dredging plant: my original estimate was 58 lakhs for the dredging plant. My revised estimate was 110½, to which was added the "Kalu" and pipe lines 17¾, totalling 128·38 lakhs. The chief engineer's estimate was 142 lakhs. That has since gone up to 162 lakhs, the "Kalu" and pipe lines having cost no less than 31 lakhs. I think the purchase of the "Kalu" was bad business. If she had been properly inspected prior to the purchase she certainly would not have been bought; but I had nothing to do with the inspection or the purchase. The increase in the cost of the "Sir George Lloyd" over and above my original estimate was, as I have explained, unavoidable. Dredging cost: this was originally estimated by me at 3.66 annas per yard, and in my revised estimate I allowed 5 annas per yard. The chief engineer always estimated 5 annas per yard, and I think the work should be done for that amount. To make any sort of comparison between the 367-lakh estimate and the 700-lakh estimate the following deductions should be made: equipment of the reclaimed area, 136 lakhs. That is, equipment of the reclaimed area with sewerage.

Q.—Was that equipment of the reclaimed area included in the 702 lakhs?

A.—It was.

Q.—But not included in the 367?

A.—But not included in the 367. The equipment of the reclaimed area was 136 lakhs, the purchase of the "Kalu" and pipe lines, 20 lakhs, and the additional cost for beginning at both ends was 15 lakhs—these are merely round figures—making 171 lakhs. 700 minus 171 equals 529 lakhs, or a little over 30 per cent. in excess of 367.

Q.—Not 129, surely, but 132, is it not? It is 702 minus 171, making 531?

A.—Yes. The point to which sufficient consideration has not been given is the general condition of world finance and the fluctuations in exchange between 1919 and 1922. In January, 1913, the rupee was 1*s.* 4*d.* and three thirty-seconds. In June, 1919, it was 1*s.* and thirty-one seventy-thirds. In February, 1920, it was 2*s.* 9*d.* In December, 1920, it was 1*s.* 5*d.*, then falling to below 1*s.* 4*d.* In London the bank rate was 5 per cent. in November, 1919, and rose to 6 per cent. in April, 1920, and was 7 per cent. from 15th April to 28th April. In June it was 6½ per cent., and the end of July it was 6 per cent. The dredger was ordered in June, 1920, and most of the other plant in 1920, in fact, at the very top of the temporary trade boom; but I do not believe they were paid for in India until the rupee had fallen to something like 1*s.* 3*d.** These great fluctuations necessarily increased any estimate, and I hope that my other witnesses will bring examples of the increases of estimate in the case of independent estimating.

Q.—Are those statements ready?

A.—They are ready. I am just waiting to deliver them. Mr. Mattingly shakes his head, but so far as I am concerned they are ready.

Q.—May we have them by to-morrow morning at half-past 10? We are not making any complaint at all, but you gave us a statement which was extraordinarily full. Sir Harry will bear me out when I say that you have been putting in statements each day which have come rather as a surprise to us. I have no doubt they will help us, but we have not had time to fully consider them. That is the only difficulty.

A.—Yes.

Sir H. Courthope-Munroe.—I quite appreciate that.

* See Appendix XXII.

Chairman.—If Mr. Halcrow and Mr. Settle come, as we hope they will immediately on the conclusion of your evidence, we want to have had sufficient time to read their statements and appreciate them

A.—They are not long statements, I may tell you.

Q.—If you say they are ready, and Mr. Mattingly says they are not, for the moment we prefer you to Mr. Mattingly, and we should be glad to have them?

A.—I think we can promise them, so far as I am concerned, at the very latest by to-morrow morning.

Q.—That will do for us.

A.—These great fluctuations necessarily increased any estimate, and although machinery and plant only accounted for a certain proportion of the expenditure on the Back Bay Scheme, the following figures are of interest. Now this is a table which I have prepared, showing from January, 1913, and various dates to October, 1926, how much 400 lakhs of rupees would be in sterling and dollars. Briefly, the difference in sterling was this: 400 lakhs in 1919 in sterling came to £3,328,125; but 700 lakhs in 1922 only came to £4,648,000. Assuming that the expenditure was in sterling or dollars, that was only £1,320,000 difference between 400 lakhs in 1919 and 700 lakhs in 1922.

Q.—Through the appreciation of the rupee?

A.—The appreciation or the depreciation of the rupee.

Mr. Billimoria: May I point out that those figures do not throw any light at all on it, because the 400 estimate contained only a very small proportion for plant. This is in sterling and the rest is all in rupees, so that is no comparison at all.

Chairman.—We must remember that.

A.—If you will allow me to say so, I have said that. I have said: "These great fluctuations necessarily increased any estimate, and although machinery and plant only accounted for a certain proportion of the expenditure on the Back Bay Scheme, the following figures are of interest." These figures are produced in my attempt to assist you.

Q.—Will you continue?

A.—I apologise for these notes not all being included in the statement.

Q.—I understand it.

A.—As a matter of fact you said you must have the settlement by a certain time, and I have been working overtime getting out supplementary notes.

Q.—The case shifts from day to day?

A.—Yes. That is all I have to say.

Q.—Have you a complete copy of that which you have been referring to for us?

A.—Yes. (*Document handed in.*)

Chairman.—You were telling us, as one of the incidents of the building of the sea wall from both ends, it was necessary to have 2,000 tons of stone brought down from the Kandivli quarries, with the consequent increase of the plant at Kandivli. You remember that?

A.—I remember that; but Mr. Halcrow is going to give further evidence on that point.

Q.—May I take it very shortly from you? Did the Development Directorate put forward in a letter of the 17th March, 1922, a list of additional plant required for the Back Bay Reclamation Scheme? It is page 40 of the large bundle of correspondence?

A.—Yes.

Q.—You see there four-wheel locomotive, six-wheel locomotive, Ruston No. 20 crane navvy, and so on—a whole lot of things?

A.—Yes.

Q.—Did you come to the conclusion that many of these things were not necessary at that moment, and that some of them were not even necessary at all?

A.—Yes.

Q.—Will you look at your letter of the 11th April, 1922?

A.—Yes.

Q.—That is the letter in which you are asking them to hold their hand about incurring expense. You asked Mr. Lewis to discuss this letter with the Director. That is your cablegram?

A.—Yes.

Q.—That was with the object that if possible the Director should realise that not all of this plant need be ordered?

A.—Yes.

Q.—"We fully understand that as the work is being done without a contractor, great weight must be attached to the wishes of the Engineer on the spot in the matter of

plant and plans for execution, and we have no desire in any way to hamper you. On the other hand, it must be remembered that in addition to the actual capital cost of the plant, interest for maintaining it has to be paid, and it is desirable to economise wherever it is possible to do so without interfering with the efficiency or speedy execution of the work "?

A.—That is right.

Q.—You wrote a letter on the next day wishing them to choose a cheaper and less powerful type of engine?

A.—Yes.

Q.—Eventually there came a telegram of the 3rd May, 1922, in which they pressed for everything that they had put in their previous letter of the 17th March, excepting one crane, I think?

A.—That is correct.

Q.—There you were clearly holding a restraining hand over them, were you not?

A.—I hope so.

Q.—It is obvious, is it not?

A.—Yes.

Q.—In this particular instance they thought, being on the spot, that they really wanted all that machinery?

A.—I would also like to point out that the letter begins: " I enclose a list of plant required, with the request that you ' take tenders for the various items and arrange for shipment.' " We are not asked our opinion.

Q.—That is true.

A.—We gave it voluntarily.

Q.—You gave your opinion, and told them that they must be economical; and you gave reasons as to why at the moment some of these things were not necessary?

A.—Yes.

Q.—Do you remember any other letter of that kind where you were advising them not to spend unnecessary money?

A.—I could not say without consideration, but probably there is.

Q.—If you can find any other letter, I wish you would let us have it. I will tell you why. You remember that you wrote a letter to the Press, did you not, in which you said: " For years I have been struggling against extravagance and inefficiency "?

A.—Yes.

Q.—There may be other letters, but this is the only letter that I know of in which you are suggesting to them that they are spending much more money than is necessary. If there is any other letter, I would like to have it?

A.—I state very plainly that I was never in Bombay without remonstrating to Sir Lawless Hepper. If Sir Lawless Hepper was here, I should be very glad to examine him on that.

Q.—What effect did that have upon him?

A.—It did not have any effect.

Q.—Then would you have had any difficulty in getting an interview with the Member in Charge?

A.—Sir Lawless Hepper did not like me seeing the Member in Charge.

Q.—What did it matter?

A.—He was the head.

Q.—You were the Technical Adviser to the Indian Government. You were the great expert there. You advised Sir Lawless Hepper to do something and he did not do it. Was not it your duty to go and see the Member in Charge? There would have been no difficulty in seeing him?

A.—Well, I did not. You may take that as you like.

Q.—Equally there would have been no difficulty in seeing Lord Lloyd while he was Governor. You could have gone and got an appointment from his Private Secretary, could you not?

A.—Sir Lawless Hepper always considered he was the king, so far as anything of that kind was concerned. I did not go and remonstrate to the Governor. I admit I did not remonstrate with the Governor.

Q.—I suggest a visit to the Governor would have deposed the king. I want to follow that out. You would have had no difficulty whatever in getting an interview at any time with Sir George Lloyd, nor would you have had, as I suppose you would agree, the slightest difficulty in getting an interview with Sir Leslie Wilson? They must give you one. If you had gone there and told them what you now say was

happening, you would have to put to them the alternative: " Either Sir Lawless Hepper or Mr. Lewis goes, or I shall go." You never pressed matters to that extent?
A.—I never pressed matters to that extent.

Q.—In that letter also you speak of mishandling the dredger. " Mishandling " is the word used?
A.—Yes.

Q.—I dare say you noticed in the evidence in Bombay, when we called Mr. Speirs, and all these dredging-masters and assistant dredging-masters, Mr. Brims and everybody, each was asked the question: " Did Sir George Buchanan ever make any complaint to you that the dredger was being mishandled "? And each and all of them said that it was the other way, and that you were praising them for what they were trying to do. Do you happen to recollect whether you made any specific complaint that the dredger was being mishandled, and if so what and when?
A.—I do not think I ever made any specific complaint. One does not want to go and crab men who appear to be doing their best. My remarks about mishandling were made after a witness who will give evidence had written to us his report, who went out specially to make an examination for us. He will give evidence on the subject.

Q.—Going back to the plant, there were three Ruston steam shovels there?
A.—Yes.

Q.—Have you been to the Kandivli quarry frequently?
A.—Yes.

Q.—Do you remember as you approach the sheds there is the Bucyrus shovel there?
A.—Yes.

Q.—And three Ruston shovels?
A.—Yes, I know—Whitakers they are.

Q.—Did the Bucyrus cost £9,000?
A.—I believe it did.

Q.—Did the other cost £3,000 each?
A.—Something like that, I should think.

Q.—£18,000 in all?
A.—Yes.

Q.—Has any of them ever done a day's work as shovels?
A.—I do not think they have. I should like to point out, there is no reason why the Bucyrus shovel should not have worked.

Q.—The evidence was they did try to get it to work. They got a man who tried to operate it, but they had not got a man who could operate it. Then they came to the conclusion also that the face of the quarry was not wide enough. Here the fact is that neither the Bucyrus shovel nor the rest of the £18,000 worth of plant ever did one day's work as shovels?
A.—You may take it from me that they never tried to work the Bucyrus shovel.

Q.—When you went there, did you tell him to try to get it going?
A.—Frequently I said to Mr. Lewis: " What on earth is the good of all this plant if you do not make use of it? "

Q.—Then why did not you go up one day and say: " I am coming up on Tuesday, and let me see that working here at 12 o'clock when I arrive "?
A.—I was not in executive control of the work, and I had no power to order Mr. Lewis to do anything at all in connection with the carrying out of the work—I had no power whatever.

Q.—I am a little puzzled about it. I know it was somewhat of a difficult situation there, but I should have thought if you had gone to Sir Lawless Hepper and said: " You have got £18,000 worth of plant lying there. There are three steam shovels and they have never done a day's work as steam shovels," and had said: " As the Technical Adviser to the Government, and as the person who is bound to assist the Government, I suggest to you that Lewis starts on Monday morning with these shovels, and you and I will go up and see them being worked——"
A.—But Sir Lawless Hepper had already sanctioned the purchase of shovels against my advice.

Q.—That is not the point. I know the letter says so—but the point is, when you see £18,000 worth of plant lying idle, I fail to understand why you did not say to Hepper: " Look here, that plant has got to get working "; and I do not know how he could have met it except to say: " Certainly, come along, we will go up on Monday." He must have. He could not have defied you?

A.—It would not interest him. As a matter of fact, Mr. Halcrow will give evidence. He went out with me, and we went specially into the question of plant and we discussed it.

Q.—Then I will not bother you about it. As to machines which have been lying out in the sun and wet all this time, there is no market for them, I suppose?

A.—I do not know what condition they have been kept in.

Q.—Even so, what would you think you would get for £18,000 worth of shovels which have been lying idle for four to five years out in the open?

A.—I believe they have been kept in fairly good order as cranes.

Q.—You would not expect very much for them?

A.—No; Mr. Halcrow, when he comes, will be able to tell you how he went round and looked carefully at all the plant.

Q.—Did he see £21,000 worth of cement blocks, some of which had been lying there since 1923 for the storm water drains?

A.—I should think he did; but I would emphasise the point that I was not in control at all. I had no control at all. I had no power to order anyone to do anything.

Q.—But I cannot understand how you allowed yourself to remain in association with all these people whom you are condemning, and who, apparently, worked to some extent at times. I cannot understand how you remained as expert adviser to the Government of Bombay when all this sort of thing was going on year after year?

A.—Well, there is an old adage: " Never do what you know the enemy wants you to do."

Q.—When the " Kalu " was dodging in and out of Back Bay, by running in on the tide when she got enough water under her keel, and running out just before she grounded, were you ever aboard of her then?

A.—Never.

Q.—You have told us in your statement that your view is that it is possible that the Back Bay scheme can be carried to a successful conclusion. You say: " I emphatically assert that the Back Bay reclamation scheme inaugurated by Lord Lloyd is not a failure, and there is no reason why it should not be brought to a triumphant conclusion "?

A.—That is my personal opinion.

Chairman.—I think the people of Bombay would be happy even if it were brought to a conclusion that left them even money.

Mr. Billimoria.—That is quite right.

Chairman.—Your suggestion is this. I would rather like to follow it up. Would you like me to read the whole of paragraph 7 on page 116 of your statement?

A.—Please.

Q.—" Regarding the Back Bay scheme, the position at present is that the constructional words as designed have proved an unqualified success. Grave doubts were expressed in Bombay as to the possibility of building at reasonable cost a wall strong enough to resist the force of the sea, and I was brought out to Bombay one year especially to observe the force of the waves, but the sea wall, as built, has resisted successive monsoon storms, and will, when the works are completed, provide a handsome sea promenade. The filling in of the reclaimed area by the dredgers has certainly not come up to expectations. A great deal has been said about the quality and quantity of material in the harbour and the efficiency of the dredger, but very little consideration has been given to the human element in the working of the dredgers." I need not emphasise that, but you have said that is a matter that one has to beware of, and the point is whether it is not a matter that should have been brought to the attention of the Bombay Government. " My view is that there is an ample supply of suitable material in the harbour, and that the dredger can perform all that it was required to do under its contract and specification, but that the human element has failed completely, and under existing conditions I do not see how it can possibly do otherwise. My advice is to free the work from the incubus of Government control, get rid of the whole staff before next working season, and invite tenders from contractors for the completion of the entire work." I would like to elaborate that a little bit—" invite tenders from contractors for the completion of the entire work." Would you hand over to them the " Sir George Lloyd "?

A.—Yes; I would hand over the whole of the plant.

Q.—You would hand over the whole of the plant?

A.—Yes.

Q.—That is part of the offer?

A.—That is part of the offer.

Q.—When you say hand over the whole of the plant, that includes the quarry at Kandivli, and everything?

A.—Hand over everything.

Q.—Do you happen to know any contractor in the world who would be likely to make an offer that the Government of Bombay could consider?

A.—I have not taken tenders, and I have no idea.

Q.—There are several ways of looking at it. One view undoubtedly is that the people of Bombay do not want to spend another penny on this matter. Of course if they handed over the plant to a contractor, the contractor has to be paid for his work, because he has to go and finish the reclamation, does he not? That is what he offers for the money?

A.—Yes.

Q.—I do not know whether it is conceivable that there might be another method by which the contractor might stipulate to hand over to the Government of Bombay the 250 acres of works and roads and things of that sort, and be given in exchange 300 or 400 acres of reclamation?

A.—I quite agree. There are various ways of approaching the subject.

Q.—If a contractor would come forward and put a proposal which did not involve any extra expense by the people of Bombay, there might be some means of managing this matter?

A.—I am confident that one way or other it could be done. People are just as keen to speculate in land to-day as they were in 1865, on the knowledge that in the future the land will be worth money.

Q.—You are of opinion that the reclamation should be finished in its entirety?

A.—I am absolutely of that opinion. Might I draw your attention to page 117 where I speak about the Manchester Ship Canal?

Q.—I will read on. " Mr. Merritt, the Assistant Dredging Master of the dredger ' Sir George Lloyd,' in the course of his evidence summed up the situation admirably. When asked in what respects the dredging in Bombay differed from work done elsewhere he replied ' One is run by a private company and they want their pound of flesh; if you do not turn over the percentage you have to make room for someone else.' " I gather from an earlier passage in your statement that your view is that there was no driving force behind everybody there: is that right?

A.—That is absolutely correct.

Q.—" Lastly, there has been a disposition in Bombay to treat this large work (probably as large a dredging proposition as the world has seen) on a par with the building of a house or other cut and dried operation, and the moment anything went wrong there was condemnation of all sorts and an outcry to stop work." When you say " anything went wrong " do you put your case that nothing has gone wrong except that the dredging operations have given an output less than was expected?

A.—You can put it that way.

Q.—Is not that the way Mr. Cowasjee Jehangir put it?

A.—Yes, it is notorious that long before anything went wrong at all there was difficulty. What was the reason for the hurried revised estimate of Mr. Lewis which was wanted at 24 hours' notice—it was got out on account of political agitation. He says in his letter: " Owing to political outcry I am made to do this estimate in 24 hours."

Q.—We have not in fact got that letter. I see you refer to it. Have you a copy of it? I suppose you have the original?

A.—I have got the original.

Q.—I would rather like to see it. You say that even before anything went wrong there was hostility?

A.—I do, before anything went wrong at all in 1919.

Q.—Are you looking for the passage when you say every season that you went out Sir Lawless Hepper told you of the political and personal agitation which was being carried on?

A.—Yes.

Q.—I think you have made that statement here.

A.—What I was looking for was the statement that when I went out and was staying with Sir George Lloyd he told me—nothing had gone wrong with the works at that time—that there had been four resolutions tabled in the Legislative Council to deal with my firm in one way or other.

Mr. Billimoria.—I cannot understand why you attribute the failure to political agitation, because the revised estimate of Mr. Lewis was far nearer the mark than your estimate of 367 lakhs before the works had actually commenced.

A.—I do not quite follow that?

Chairman.—I do not think he attributes the failure of the work to anything political.

Mr. Billimoria.—He said if anything went wrong it was due to political agitation.

Chairman.—No; he said when anything went wrong, then a political agitation arose. It is not *if* anything went wrong—it is *when* anything went wrong. I see you are quite right, and in your statement you do say you were told that four resolutions had been tabled: "The moment anything went wrong there was condemnation of all sorts and an outcry to stop work. That, if I may say so, is a most narrow and parochial view. The work might be regarded for India as a national undertaking, and should be completed. In this particular case there have been overwhelming reasons connected with the state of the world for the original estimate being increased. All estimates for works were similarly increased, and it would be of interest to know what increase has taken place in the estimates for the building of New Delhi. But to take one example out of many of works carried out long before the war, the original estimate for the Manchester Ship Canal was in the neighbourhood of £5,000,000, whereas the actual cost was nearer £15,000,000. Now that the work is completed you hear no complaints from the City of Manchester—which is every day reaping the benefit of this great undertaking. I emphatically assert that the Back Bay reclamation scheme inaugurated by Lord Lloyd is not a failure, and there is no reason why it should not be brought to a triumphant conclusion. The slump in land values which at present obtains is not going to last for ever, and the day will yet come when Lord Lloyd's foresight and energy in the interest of Bombay will be recognised and gratefully appreciated." That is your view?

A.—That is my view.

Q.—I have concluded my examination, and I am much obliged to you.

A.—Thank you very much—I thank you for your great courtesy.

Sir M. Visvesvaraya.—I have been asking Sir Lawless Hepper in Bombay as to who was really responsible for the works. He said responsibility chiefly lay with the engineers. Then you have been telling us, both in your statement here and in your other statement, that you had no control over the works, and that you could not be responsible. I want to ask you a question about responsibility. On the 22nd July, 1922, you wrote: "We are the actual responsible engineers."

A.—Yes.

Q.—Then in the early reports on page 12 of the pamphlet: "The firm was at all times ready to assist and advise . . . in all matters relating to the execution of the works." That is in your report?

A.—Yes.

Q.—On the 3rd June, 1922, you stated: "We are the engineers responsible to the Government of Bombay and the Secretary of State."

A.—Yes.

Q.—On the 22nd June, 1921, in a letter to Mr. Lewis you say: "We are not only the engineers for the machinery, but for the execution of the entire work."

A.—Yes.

Q.—If these repeated statements have any meaning, do not they show you are really responsible for the execution of the entire work, and you have frequently insisted upon being so recognised?

A.—No; we were responsible for seeing that the permanent works were properly done. We had no responsibility or control whatever over the execution of the works.

Q.—But you are supposed to co-operate and help in the execution?

A.—We advise.

Q.—Do you not call that being responsible?

A.—We were advisers, and God knows we gave advice until we were tired of giving advice; but we had no control over the expenditure of the money. We had no control over the workmen or over the engineers; we were advisers without control.

Q.—Was that stipulated in your contract? What was the understanding in the contract?

A.—Whatever the contract was, we can only deal with the facts, and the contract, as you know, was modified: you are aware of that.

Q.—It was slightly modified; we accept the modification to that extent. You say: "The firm was at all times ready to assist and advise in all matters relating to the execution of the works." Again you say: "We are not only the engineers for the machinery but for the execution of the entire work." On page 57 of your statement which you have now put in you say: "I wish to make it clear that we never had any direct responsibility for the actual execution of the work."

A.—No; we did not have any direct responsibility.

Q.—You did not have any direct responsibility for the actual execution of the work?

A.—Not for the actual execution of the work. May I point out that these letters to Mr. Lewis were written to wake things up. We were getting no correspondence

at all. There were no reports. There was nothing happening. A veil dropped between us and Bombay.

Q.—You have said that. Whatever the reason for that may be, you intended, or did intend, that you should be responsible for the execution of the entire works?

A.—We never intended that we should be responsible for the execution of the works.

Q.—But you say : " We are not only the engineers for the machinery, but for the execution of the entire works."

A.—The execution of the entire works is the carrying out of building the retaining walls in accordance with our specification. We had nothing to do with the employing of coolies or the subletting of contracts to sub-contractors.

Q.—You said : " We are the engineers responsible to the Government of Bombay."

A.—We are responsible to the Government of Bombay.

Q.—Now you say in this statment : " I had no intention of being anything but an adviser."

A.—I had no intention of being anything but an adviser. When the Development Directorate was created Sir Lawless Hepper was not my servant. How could I be, with all deference, anything but an advising officer?

Q.—You objected to the words " consulting engineer," but if an engineer is appointed to carry on the work by the principal, in this case the Government, and if the principal appoints an executive officer to carry on the work in consultation with you, it is not necessary that you should have control over that officer, is it? In no contract is that necessarily made a condition.

A.—You cannot control anyone when another person pays him his wages.

Q.—That is true; but the engineers have to prepare detailed plans and estimates, and to advise on every difficulty that arises. Sometimes they measure the works and prepare the bills of costs. All that is done by the engineers; but you did not perform several of those duties.

A.—The resident engineer was supposed to perform all those duties.

Q.—He afterwards became the chief engineer?

A.—Yes.

Q.—You say he was not your servant?

A.—I think his position was unfortunate on account of dual control.

Q.—He said so the other day.

A.—On the subject of our control, there was an interesting question put by Mr. Billimoria to Mr. Lewis, and I think it would be interesting if I read it. He said to Mr. Lewis : "You have had wide experience of public works in India. In your experience do you know of any instance in which the engineers or the consulting engineers remained in England, and the work was carried on in India?—(A.) No. All work done with the Public Works Department is done inside the offices on the spot. The only case analogous to that was Delhi, where the architects were in London. (Q.) They were not engineers?—(A.) No; they were architects, and their position would be the same as engineers. (Q.) They prepared the designs and inspected the works?—(A.) But they had their offices on the spot. (Q.) And their representatives on the spot?—(A.) Yes. (Q.) Here they had no representatives?—(A.) No. (Q.) Unless he regarded you as his representative? You were not paid by him?—(A.) No; I was paid by the Government of Bombay. (Q.) So you know of no exactly similar case?—(A.) No." I notice that in Mr. Lewis' evidence, and I would like to explain this to Mr. Billimoria.

Q.—These questions were put by me.

A.—I am sorry : they appear in our transcript as having been put by Mr. Billimoria.

Chairman.—Perhaps you would explain now?

A.—Quite apart from the terms of our agreement, which specified that all the staff in India should be paid by Government, the case quoted of the architects at Delhi is not analogous, because the architects at Delhi are paid 5 per cent. I am not at all certain that it has not been increased to 7½ per cent.—on the cost of the works. We were paid 2 per cent. There are cases—in fact we are carrying out large works now—where we provide the whole of the staff; but naturally we get paid a corresponding figure. I just want to make that clear.

Sir M. Visvesvaraya.—That is a separate point. You should have insisted upon an increase in the percentage. You never raised that question?

A.—I never raised the question because it was not necessary. The Government had agreed to pay for the whole of the staff, and the Government had created the Development Directorate on purpose to carry out the work.

Q.—You say if you had had 5 per cent. or so you would have arranged for these things?

A.—Yes.

Q.—You have repeatedly insisted that you are responsible for the execution of the work?

A.—For the ordinary carrying out of our plans—not for the employment of labour.

Q.—By " execution " you mean the results?

A.—The " execution " means the building of permanent works.

Q.—You have some responsibility for the progress of that work?

A.—We cannot have any responsibility for the work because we could not tell what contracts would be let.

Q.—Did you not ask for information, and was any information refused by the resident engineer?

A.—Yes. There are cases on record where we asked and asked, and we got no replies to our letters.

Q.—If that is so, as the Chairman remarked, was not it your obvious duty to bring it to the notice of the Governor, or the Member of Government?

A.—We wrote officially to the Director of Development at once.

Q.—He is like yourself, a servant of the Government; but there are higher people.

A.—He was the head of the whole Development Directorate.

Q.—That may be; but your agreement was not with him, but with the Government of Bombay or the Secretary of State?

A.—He was the representative of the Government.

Q.—But he could not be held responsible in case anything went wrong on your side—in case they did not pay you, or did not carry out their contract. Your contract was with the Government of Bombay?

A.—Yes.

Q.—Have you at any time asked the Government of Bombay why in this respect facilities were not afforded to you so that you might be responsible for the execution of the work?

A.—I considered it was the duty of the Director of Development. I had no official communications with the Hon. Member—I had no official communication at all. I used to go and see him, but I consider that it was the duty of the Director of Development, if necessary, to draw the attention of his chief, the Hon. Member, to anything.

Q.—Could not you have addressed the Secretary to Government, who was also Secretary of the Development Department, who was accessible to you?

A.—I do not quite know who it was, or how it was.

Q.—He was bound to give you a reply to any question you addressed to him?

A.—He would simply have got the reply from Sir Lawless Hepper.

Q.—He was Secretary to Government.

A. It was rather confusing. He was Secretary to Government, and he was also Sir Lawless Hepper's deputy.

Q.—As Secretary to Government he did not take instructions from Sir Lawless Hepper. He went to a member of the Council. As Secretary to Government he was Secretary to the Member of Council of the Government.

A.—I know that Sir Lawless Hepper used to go to the Hon. Member twice a week.

Q.—He was head of the Department?

A.—Yes.

Q.—They had a separate secretary for the Department. All representations to the Government should be addressed to the Secretary to Government, and they did not go to Sir Lawless Hepper unless specially referred to him by Government.

A.—Yes.

Q.—Perhaps you did not bring the position clearly to the notice of the Government in order not to create trouble, and with a view to get on amicably with everybody concerned. May that be the reason?

A.—The case of Mr. Lewis was specifically brought to the notice of the Government.

Q.—In that case they did not act?

A.—In that case they did nothing.

Q.—Did you write to them: " The work is stopped because this man is in charge. Unless you remove him I cannot be responsible "? Did you make any such statement to the Government?

A.—Yes.

Q.—Could you kindly show us that?

A.—I spoke personally to the Governor of Bombay on the matter. It is in the evidence, you will remember that.

Chairman.—I remember it, but actually your answer to Sir M. Visvesvaraya's question should be No, because he said: " Did you write to the Government direct? "

A.—No; I did not write to the Government.

Q.—But you had an interview with Lord Lloyd at which you suggested that Lewis ought to be retired?

A.—Yes.

Sir M. Visvesvaraya.—Does it not look like a contradiction when you say in one statement: " We are not only engineers for the machinery, but for the execution of the entire work," as compared with when you say: " I never had any intention of being anything but an adviser." I am not criticising it, but I want an explanation. We want information on the matter.

A.—The position was this. When this veil dropped we were getting no letters at all from Bombay.

Q.—This was before the veil dropped. I am talking of the 22nd June, 1921. You said this: " We are not only engineers for the machinery, but for the execution of the entire works." The veil came later on.

A.—It was in process then. It was then that we noted a disposition to regard us as agents for the supply of plant, and not supply us with information that we wanted about the work.

Q.—You say: " We never had any direct responsibility for the actual execution of the work. I never had the intention of being anything but an adviser."

A.—I never had any intention of having the executive control. I never intended to have the executive control of the works.

Q.—You need not have executive control, but you may co-operate with a man. You may be part of an agency, like the Directorate of Development, to carry on the work. You are part of the machinery created to carry on the work.

A.—Yes; but we could do nothing but advise. We could not order. We could not have ordered Mr. Lewis to do anything.

Q.—If your advice was not taken could not you have taken steps to bring that to the notice of the Member of Government and say: " Now, they are not carrying out my instructions. How can I be held responsible under the terms of the contract? " Was not that the proper position to take up? I am only asking you for information, and I am not criticising you.

A.—I quite understand. It seems quite reasonable; but the fact remains that we did not go to the Government.

(*Adjourned for a short time.*)

Sir M. Visvesvaraya.—Have you considered the contradiction between those statements that I brought to your notice?

A.—Which were those?

Q.—That you were responsible for the execution of the entire work. You have said that again and again, and now you say that you had no intention of being anything but an adviser, and that you never had any direct responsibility. What is your final answer?

A.—My final answer is that we were responsible for the plans and for the permanent works, but we were not responsible for the execution, the way in which they were carried out departmentally.

Q.—Why did not you bring to the notice of the Bombay Government anything that you found unsatisfactory? The contract was with the Secretary of State. You might have brought it to the notice of the Bombay Government or of the Secretary of State. Will you kindly tell me how that matter can be explained?

A.—We had a discussion about responsibility with Sir Chimanlal Setalvad; otherwise I had nothing to say, except that I did not protest beyond Sir Lawless Hepper. I considered he was the responsible head.

Q.—If the Government say that at the time they depended upon you, and they considered you responsible for the work, would you say that they are not right?

A.—I would say that you cannot have responsibility without control. They created the Development Directorate.

Q.—The contract did not stipulate that you should have control?

A.—I look at it from the common-sense point of view. No one can have responsibility who has not got control. You cannot make anyone responsible who has not got control. That is a common-sense point of view.

Q.—Are there any duties connected with the co-operation that you have to render as regards the work? You have to co-operate with other officers. Under the Government there was the Development Directorate, yourself, and your firm?

A.—Yes.

Q.—You were both agents working in unison to do Government work. If the Government ask you: " Why have you not fulfilled your responsibility? " you then say

that the Government Director did not give you opportunities. You could have gone over his head?

A.—I should say that I did everything possible. I regarded the Director of Development as practically the final authority.

Q.—The contract does not say so. I do not think the contract even mentions that you have to work under the Director of Development, or anything of that kind?

A.—No, he was the head; that is my answer.

Q.—The dredger has failed to give the promised output. It has given less than half of what was promised. On whom do you place the responsibility for this? Who is responsible for the failure of the dredger?

A.—The Government of Bombay.

Q.—How can they be responsible when they entrusted the works to the engineers? You were the engineers, the responsible engineers?

A.—I had no responsibility for paying the workmen on the dredger.

Q.—No, but you ordered the dredger. You, the responsible engineers, advised about the dredger, and now when things have gone wrong you say: "I am not responsible"?

A.—No. Excuse me, I say that in my judgment there is nothing the matter with the dredger, and there is nothing the matter with the material. The dredger has never had a proper show, and if you were to let a contractor work the dredger you would have a very different result.

Q.—Did you make a statement that the dredger had been dredging for nearly three years, and had failed to give the required output? Why did you not make that statement when you saw that the dredger was not doing its job?

A.—I cannot remember the exact date when we made representations, but that is my considered opinion.

Q.—In a note dated the 16th of April, 1920, you have stated: "We, as the engineers, are therefore better acquainted to express an opinion," etc. You have stated that you were entirely responsible for the working of the dredger. Does not that responsibility mean that you were also responsible for the results?

A.—We cannot be responsible for results when we had no control over the working of the dredger.

Q.—You think that the dredger can do five million cubic yards per annum. Do you still hold that the dredger can give an output of five million cubic yards per annum?

A.—Of course, I cannot guarantee an exact figure of five million cubic yards. I say certainly that she can do enough to justify the guarantee. I would not like to express an opinion until we have had the dredger working under proper conditions.

Q.—Have you yourself stated subsequently that it should be considered satisfactory if it produces two-thirds of the output?

A.—Yes, but we are now of opinion that we can get ample satisfactory material to get the whole output.

Q.—To get the whole output?

A.—Yes.

Q.—Can you give me an instance of any dredger of this size which has given 5 million cubic yards in one year, working for only 170 days? I have been examining the working of other dredgers, and the relation of the yearly output to the hourly output has never been so large as you assume?

A.—I cannot give you any instance.

Q.—You cannot give me an instance?

A.—No.

Q.—So that it is a unique working of the plant?

A.—I cannot give you an instance because I have not looked up all the records. I simply say that I have not got the information

Q.—You recollect that the Government of Bombay telegraphed to the Government of India, and the Government of India cabled the Secretary of State: "As consulting engineers this firm should be held responsible for the construction and design of the dredger as dual responsibility is most undesirable"?

A.—Yes.

Q.—Do you want to refer to that telegram?

A.—No, I think I can remember that.

Q.—You also stated that if the dredger did not do its best you would accept full responsibility?

A.—Yes, that was right.

Q.—Now that the dredger has not done its work do you accept responsibility?

A.—No. We say that we have never had anything to do with the working of the dredger. We repeat that if you take the dredger out of the incubus of Government control and give the men encouragement and encourage them in team work you will get far, far different results.

Q.—That has not been the opinion of many people whom we met in Bombay, the persons engaged on the dredgers. They said: " Of course the machine works all right, but we cannot be sure of the output, and we do not expect an output anything like that "

A.—You have got the evidence of the Dredging Master, Mr. Merritt.

Q.—He is the assistant dredging master. He may have made one sound remark in all his evidence. That does not mean that he understands the larger problems connected with the working of the dredgers. He is the assistant out there.

A.—Yes. He was asked why the results are different here to other places where he has worked, and he said that in other places they are out for their pound of flesh, and if you do not get the results you get the sack.

Q.—It was a very sound remark?

A.—But you cannot sack people in Government service; at least it is very difficult.

Q.—You ordered the dredger before the detailed plans and estimates were prepared?

A.—Yes.

Q.—You were very particular to have your own way in handling the whole of this dredger affair from the commencement. You have stated here in a memorandum in respect of dredgers in Bombay which you supplied to the Director General of Stores, dated the 16th April, 1920, " I replied I had already discussed this part of the project with the Governor of Bombay who, I understood, would be averse to any dual control in connection with this scheme, because if the dredger failed to do its work we, the Engineers, would naturally say that as we had nothing to do with the dredger we could not accept any responsibility." Therefore you insisted on being consulted at every stage in this dredger proposition?

A.—Yes, and we collaborated with Sir John Biles.

Q.—Then again in the last paragraph of the same note you say: " We, as the engineers, are therefore better acquainted than anyone else with the work to be done, and also being entirely responsible for the working of the dredgers should be permitted to express an opinion." You were permitted to express an opinion?

A.—Yes, we worked hand in hand with Sir John Biles.

Q.—You said, " being entirely responsible for the working of the dredgers." Do you now hold yourself responsible for the results?

A.—We claim that the dredger has never been properly worked.

Q.—Why did you not suggest that you should take it over and work it under your own control two or three years ago. You found in two or three months that she did not work well. Could not you have told the Government of Bombay: " The thing has been mishandled, will you allow me to handle it "?

A.—We do not do that. We do not handle dredgers.

Q.—Then you could have placed it in the hands of others in whom you had confidence. You took the responsibility deliberately at the beginning, and made no suggestion in the interval, and now when things go wrong how can you disclaim responsibility?

A.—Long ago I pointed out to the Government of Bombay that they could not get the best work in any department without giving some inducement to men. It is against the rules of Government, as you know very well, to pay any bonuses.

Q.—They could make an exception in such cases by order of Government, or, if necessary, by getting the permission of the Government of India, could they not?

A.—They found it very difficult. To give you one example, when I pointed out that there were no cost accounts of any kind being kept no one seemed to care a straw.

Q.—That is true. You are right in that.

A.—It took a whole year to get a reply to my letter.

Q.—That is true, and that is not your fault. That does not absolve you from responsibility for the working of the dredger. They say that you did not suggest anything to the Secretary of State. " The Engineer now says that he had some disagreement with one of our officers, and he did not bring that to our notice. How can we accept his disclaimer now." What answer have you to give to that?

A.—The answer I think is that just as we were really getting to grips the Government of Bombay in their discretion said that they did not want us any more. There had been only two seasons' dredging.

Q.—There have been three seasons now?

A.—Yes, there had only been two seasons then.

Q.—1924 and 1925?

A.—We sent out an engineer with great experience in 1925. He had great experience, and he could have given some very useful information. He will give evidence on the subject of the dredger but in all his visits all the information was wasted; nobody took any notice of it.

Q.—That is not the point. The Chief Engineer was your own nominee, and there was the Development Director who was co-operating with you; in these circumstances how can the Government accept that as a proper answer.

A.—Do you say we ought to have gone over the Director of Development?

Q.—Most certainly. This thing was going to ruin everything. When things were going adrift was it not necessary to go to the Gevernment?

A.—Perhaps we were wrong but we say that we looked upon the Director of Development as the mouthpiece of Government, the man who had access to the Honourable Member.

Q.—If the Government had not had these assurances from you they would probably have consulted other experts in order to be on the safe side, but they did not do it. They left everything to you, so far as the Government was concerned?

A.—They left everything to the Director of Development.

Q —That is quite true, and they thought that you were getting on quite well with them. No big work is ever carried out without minor differences. They thought the differences were of a minor character, and that you were watching the interests of the Government, according to the Agreement?

A.—I do not think they could have thought that, but that was the position, anyway.

Q.—You now say that you had no personal knowledge of the quality of the material, and that you relied upon a specific statement made by Mr. Kidd. I am not criticising; I want facts. In one place you say that you are better acquainted than anybody else with the work to be done, and then in another place you say that you have no personal knowledge of the quality of the material, but that you relied upon a specific statement made by Mr. Kidd?

A.—Yes, we were quite satisfied.

Q.—There is some contradiction about it.

A.—No, we were quite satisfied with Mr. Kidd.

Q.—You say: "We are better aquainted than anyone else with the work to be done;" you probably also included material?

A.—Yes, we were better aquainted. We knew what was wanted.

Q.—Anyhow, you agree that from a financial point of view the reclamation scheme is a failure so far?

A.—I would not like to say that it was failure. It would not have been a financial failure if there had not been this sudden slump in land prices.

Q.—That is one reason?

A.—Supposing that land prices had been what they were a few years ago, even on a 700 lakhs estimate they expected to make 326 lakhs profit.

Q.—That was the estimate?

A.—That was the estimate.

Q.—I admit that that is one of the reasons. I admit that land values fell very considerably, and that you are justified in putting that forward. Your original estimate for the scheme was 367·61 lakhs, and you described that estimate as reasonable and reliable?

A.—Yes.

Q.—You described it as reasonable and reliable; mark the words?

A.—Yes, reasonable and reliable.

Q.—Now within seventeen months you send up an estimate for 668 lakhs, and then the Government went over your head and sanctioned an estimate for 702 lakhs?

A.—Yes. 702 lakhs.

Q.—Now the Engineers have put forward an estimate which comes to 1,000 lakhs?

A.—Yes.

Q.—An estimate which you prepared for 367 lakhs has gone up to 1,000 lakhs. In February, 1922, it went up to 668 lakhs, which was your own figure, as against 367 lakhs. Is not that an enormous difference all in the course of seventeen months?

A.—I have nothing to add to the statement that I made this morning.

Q.—I put it from an Engineer's point of view?

A.—Yes.

Q.—I want you to give an explanation other than what you gave?

A.—I have really no explanation to make.

Q.—I want you to give an explanation why, within seventeen months, an estimate went from 367 lakhs to 668 lakhs? It is a very considerable increase, is it not?

A.—It is a very considerable increase. I think I pointed out that 136 lakhs of that ought to be deducted on account of the equipment of the lay out, with which we had nothing to do.

Mr. Billimoria.—It was included in the original estimate.

A.—Excuse me, no.

Q.—Roads, lights, and drains?

A.—That was not the equipment of the area.

Q.—Then what is the equipment?

A.—The equipment of the area is the provision of sewerage throughout the area.

Q.—*Sir M. Visvesvaraya.*—Sewers are all included?

A.—Sewers are all included in the 700 lakhs estimate.

Q.—Sewers, storm water drains, and everything is included?

A.—Yes.

Q.—They are all included in the 702 lakhs?

A.—In 1922 the expert town planner produced a plan showing how he was going to lay out the area. Before that, no one had the slightest idea what they were going to do. There were talks of putting a Government House there. There were talks of putting recreation parks. Then they got this expert, Mr. Davidge, and he laid out the area, but before he had laid out the area nobody knew what they were going to do with the ground at all.

Q.—It is not necessary that a lay-out should be of any standard. We may have to assume something. You have assumed figures in your estimate?

A.—We did not assume anything for that.

Q.—Excluding that item, you might have been more correct in the other items?

A.—It was always understood that the sewerage would be done with the Municipal Committee.

Q.—*Mr. Billimoria.*—Roads, drains, and lighting are 75 lakhs. What would these indicate?

A.—A few main roads.

Q.—*Sir M. Visvesvaraya.*—To what do you attribute this considerable increase in the cost in seventeen months?

A.—I attribute it very largely to world conditions.

Q.—Is it not due to the omission of many necessary items in the estimate?

A.—No. I say generally that it was world conditions. I have really nothing to add to the statement that I put in.

Q.—Was Sir George Lloyd keen on the scheme?

A.—Very keen indeed.

Q.—Would you say he was very keen?

A.—Yes.

Q.—Do you recollect having stated at any time that he would like to see the sea wall grow in a night?

A.—I do not remember having made that statement, that he would like to see it grow in a night. I remember once jocosely saying to Sir George Lloyd that he must not think he was like Aladdin with the wonderful lamp, that he could go and rub the lamp and look out of Government House window and see the wall growing.

Q.—You went to the Government of India accompanied by the Secretary to the Government of Bombay in order to get the Government of India to agree to your scheme?

A.—Yes.

Q.—Writing on previous occasions to the Government of India had not helped them to obtain their consent to any reclamation scheme?

A.—No.

Q.—The Secretary of State remarked at one time that he felt embarrassed by the insistence with which questions connected with the reclamation scheme were being addressed to him?

A.—Yes.

Q.—You also now admit that work was done without a reliable estimate?

A.—Without what?

Q.—Without a reliable estimate?

A.—An Engineer's estimate.

Q.—And then the dredger was ordered even before the estimate was sanctioned?

A.—Yes. As I have explained, that was because Sir George Lloyd was so very anxious to begin the work in October, 1920, and he made arrangements for the

Government of Bombay with a firm of Contractors in Bombay, the Indian Construction Company, I think they were called, to begin the work. I do not know what the details are, but they cancelled the Contract, and the work was delayed for a year.

Q.—You say that you also wanted an order for the dredger to be placed before the detailed plans and estimates were prepared and approved?

A.—Yes.

Q.—We have got it here in the same note to which I drew your attention?

A.—Yes.

Q.—" With reference to the preparation of the necessary plans and specifications, the usual custom among Engineers is to accept the Contract, and a general specification, thereafter requiring the builders to submit for approval all detailed plans and specifications, and presumably this will be done in the present case; " you advocated that?

A.—Yes.

Q.—No tenders were in writing on a comparative basis for the dredger?

A.—For the dredger prices were got out; it was not advertised, if that is what you mean.

Q.—That is what I mean?

A.—It was not advertised.

Q.—It was not a competitive basis?

A.—It was not advertised.

Q.—You considered the scheme as being one of the greatest of reclamation schemes?

A.—Yes, I suppose it is.

Q.—Are not all these instances of undue haste in starting the scheme on the part of the Government?

A.—I can hardly call them undue haste. You heard what Lord Lloyd said in his evidence. Once he had got the sanction, his great idea was to get something——

Q.—To push on?

A.—To get something to show as soon as possible.

Q.—I ask this question because you have said in your statement that there was no undue haste?

A.—It is a question of what undue haste means.

Q.—I am mentioning these incidents. Is it not because all these things were done in a hurry that the dredger has not given satisfactory results?

A.—No, I would not say that at all.

Q.—You would not say that?

A.—No.

Q.—There are some other instances that I want to bring to your notice. Did you give the details of the 367 lakhs scheme which you have brought to-day to the Chief Engineer on the works?

A.—No, why should he have them?

Q.—Because without such details how could he lay-out the works, and commence? Did you not give him some details as to how you arrived at this figure of 367 lakhs; otherwise, how was he to proceed with the work?

A.—No, that was an ordinary preliminary Engineer's estimate. Then the Chief Engineer was appointed, and then he started preparing his working estimates which were sanctioned from time to time by the Director.

Q.—By the Development Director?.

A.—For instance, he started working the Khandivli Quarries, and he sent in a working estimate to the Director of Development, and that went up to the Government and was sanctioned. Then he sent up another estimate. All the estimates were sanctioned piece-meal.

Q.—Then in 1922, they prepared the 702 lakhs estimate, and they sent you a copy, I suppose, after sanction?

A.—They sent me a copy, yes.

Q.—Did your contract require that you were to prepare promptly working drawings, specifications, schedules of quantities and rates, and estimates of cost?

A.—Yes.

Q.—To what extent have you performed this part of your obligations. What working drawings have you prepared? You state that they prepared the 702 lakhs estimate themselves. You protested, of course?

A.—Yes.

Q.—I see that from the correspondence, but had you any occasion to revise that estimate and ask the Government to modify it as incorrect?

A.—No.

Q.—You accepted that estimate?

A.—We were not asked to accept it; we were simply given it.

Q.—You did not bring to the notice of the Government that this was part of your duty to prepare plans and estimates, and that the Director of Development went over your head?

A.—We did prepare a large number of plans, estimates and specifications.

Q.—Can you mention some that you have prepared?

A.—Yes. We prepared a complete detailed set of plans and estimates for the 8,000 feet of the Colaba wall which was going to be let on a contract.

Q.—What else?

A.—We prepared the plans and specifications for the Marine Line section.

Q.—The wall and gantry?

A.—Yes, that is about all the permanent work.

Q.—After all, the sea wall is simply a solid wall. How long would it take you to prepare that?

A.—I would not like to say how long it took to prepare it at all.

Q.—You should have done the detailed plans and estimates for all sorts of work?

A.—You mean, for instance, that we should have prepared the plans for the Khandivli Quarry?

Q.—Yes.

A.—That is an example.

Q.—You should have prepared plans. Plans and estimates have been prepared by the Engineers on the spot and sent to you for scrutiny and remark?

A.—The preparation of all those plans was particularly excluded from our agreement by the Honourable Member Sir Chimanlal Setalvad under an auxiliary contract.

Q.—You want stone for the permanent works. The sea wall is a permanent work, and all the stone for it has to come from this quarry?

A.—No.

Q.—How can you construct a sea wall without stone? The stone has to come from this quarry? The main purpose of this particular quarry was to supply stone for the sea wall.

A.—Supposing the wall had been let by contract? We should have prepared the plans of the permanent works, but we should not have dictated to the contractor the way in which he had to get his stone; neither should we have prepared any plans for the quarry.

Q.—But it was not a contract work. It was Departmental work, and everything connected with the sea wall should have been taken into consideration if you were responsible for the wall?

A.—No, because it was specifically stated under our agreement that we were not to be responsible for any of these works.

Q.—Mr. Lewis said there was very little done by you in respect of detailed plans and estimates?

A.—As far as the permanent works were concerned, we did what was necessary.

Q.—But what were the permanent works? They were only one sea wall. It was only a cross section of the wall with a mound; that was all. That would not take an engineer of your eminence more than a week to do. It is not a very difficult work to design a sea wall. You have so many examples before you, and you can take 10 or 20 sections from various other places?

A.—You find very similar works where there is even less to do.

Q.—What are the necessary important plans and specifications? What we noticed, when we inspected the works and also the offices, was the absence of details. The plans and estimates were in a rough state. They had collected a number of figures and called them estimates. There was no specification, no description, no detailed measurements.

A.—For what?

Q.—For any of these works. We did not see any detailed plans in the way that they are usually done by engineers, or by the Public Works Department.

A.—That is a question for the Chief Engineer. He got all his estimates sanctioned. Every estimate he prepared was sanctioned by Government.

Q.—Might it not be due to the fact that you were not supplying them with sufficient details: although you were able to do it, you did not take much interest in the work?

A.—No, because it was not within our province to supply details.

Q.—Your contract is very clear on that point: " Ensure complete and satisfactory supervision of the works "?

A.—Would you kindly refer to the supplemental contract?

Chairman.—You will find it at page 60—Supplemental Agreement of the 4th January, 1923.

Sir M. Visvesvaraya.—" Messrs Meik & Buchanan are the engineers for the reclamation and connected works only, and not for roads, drains, lighting, and other things necessary for the development of the reclaimed area." The development is entirely excluded, " but the cost of so much of the storm water drainage system as has to be constructed during the progress of the reclamation is to be included in the amount on which the percentage for the purposes of the firm's remuneration is calculated. This recommendation applies also to the East Colaba reclamation." That is all you have said, is it not?

A.—Yes.

Q.—That does not exclude anything, except development work. After the whole reclamation is completed then the development work is taken up, and they ask you not to have anything to do with that.

Chairman.—Look at page 62.

Sir M. Visvesvaraya.—I understand that the sea wall had been to a large extent completed by the 4th January, 1923? This agreement began on the 4th January, 1923?

A.—Yes.

Q.—So until then the works were going on smoothly?

A.—We always went on those lines, and that was the result.

Q.—The whole thing centres on this point. The preparation of detailed plans and estimate did not entail much labour on your side. You have given an excellent report at the beginning which, as far as I can see, Government took as being very satisfactory, complete and reliable. After that you have not prepared any estimates or plans worth mentioning? Of course the sea wall may have been an exception. I do not want to criticise you; I just want to get the facts.

A.—If you come into my office I can show you large rolls of papers. We prepared all the specifications for the machinery.

Q.—I hope you will not mind my asking you unpleasant questions, but it is necessary to do so in this case. When you ask for quotations for a plant, do not two or three firms supply you with the specifications themselves, without your asking for them? Is not that the usual practice?

A.—Detailed specifications, yes.

Q.—You scrutinise them and pass them. That is what you do generally.

A.—Yes.

Q.—You state in your report of September, 1919: " I have gone into the matter very thoroughly, and I believe my figures to be reasonable and reliable," and so on. Did your regard your estimate of 1919 at that date as approximate?

A.—It was the usual reliable engineer's estimate

Q.—Can you point out in your report, or in the letters addressed by the Government of Bombay to the Government of India, anything which shows that you regarded the estimate as approximate at that time?

A.—It depends on what you call an approximate estimate.

Q.—You have stated that the usual practice is to prepare an approximate estimate, and get administrative sanction, and then put in hand the preparation of detailed plans and estimates?

A.—Yes. It was not a detailed estimate. It was not an estimate that you would go and put before a contractor and ask him to tender upon.

Sir Frederick Hopkinson.—You do not put estimates before a contractor and ask him to tender on them. You give him quantities, not estimates.

A.—I beg your pardon.

Sir M. Visvesvaraya.—You say: " Under the rules of the Government of India for the carrying out of Public Works, the approval of my report, plans and estimates did not imply more than the accordance of administrative sanction to the scheme, and a detailed project estimate giving the fullest particulars under each head and sub-head should have been submitted before any actual expenditure was incurred." I am not aware that the Government of India do such things in regard to a large estimate like this. When they know that it is only an approximate estimate they do not give administrative sanction usually, do they?

A.—Yes, I think they do.

Q.—I know something of the practice of the Government of India; many years ago I was associated with the Bombay Public Works Secretariat for some time. You say: " As time was of importance it was decided to proceed in antitcipation of sanction, and to prepare the detailed project estimate as soon as reliable data had been collected." If your reliable data had not been collected at the time you submitted your estimate,

how could you call that estimate reasonable and reliable? I am asking you for an explanation?

A.—It was a reasonable and reliable estimate, sufficient to get administrative sanction. The dictionary meaning of the word " estimate " does not imply anything binding, does it?

Q.—No. These were figures deduced from experience of other works. You knew the cost of other works and you deduced from that figures for the new project?

A.—The new estimates for the new Delhi are very different from the old estimates.

Sir M. Visvesvaraya.—Extensions are ofter suggested when a work is in progress; one set wants certain things done and another set wants additions.

Chairman.—And another may want less.

Sir M. Visvesvaraya.—What I ask you is, if you did not think your data were reliable, how could your estimate be so? I am using your own words.

A.—Reliable as an estimate.

Q.—If you thought the estimate was approximate, why did not you give orders for surveys and collection of information and data immediately after the project was started?

A.—That was done by the Development Directorate as soon as they took over the work.

Q.—But you did not even advise them to do that. Have you any statement on record to show that you advised them that detailed plans and specifications should be proceeded with after your scheme was sanctioned?

A.—It was done as a matter of course. I did not think it needed any advice.

Q.—As a responsible engineer, was it not part of your duty to remind them?

A.—It went on as a matter of course.

Q.—They took more than two years to prepare plans and estimates?

A.—But they were preparing, all the time, minor estimates and getting them sanctioned. They were getting sanctioned minor estimates every week.

Q.—Detailed estimates?

A.—Yes, for one item after the other.

Q.—Is it not very necessary, in the case of an important work like this, that some special staff should be employed, and all detailed plans and estimates worked up in three or four months' time? After all, although this reclamation scheme looks very big in money, it consists only of a wall and earth filling—two items. The dredger is a specialist's work, but you had only those two items to prepare estimates for. Why could not a detailed estimate be completed in about three months' time? In another place you mention that the preparation of the estimate would have taken a staff of engineers at least one year, and that it was decided to proceed in anticipation of sanction. Why should it take one year? Could not an engineer, with two or three assistants, have prepared it in about three months' time?

A.—I think you would have found that the staff would have taken about a year.

Q.—You prepared the section of the sea wall. The rest was all earth filling. It seems to be a very simple work. An architect for a building would require so many of these plans, but in this case there are no engineering difficulties of construction or design?

A.—They would have had to have got out all the details of the 700 lakh estimate. That would have taken about a year to do.

Q.—You think it would have taken a year to do it?

A.—I think so, yes.

Sir Frederick Hopkinson.—May I interrupt for a moment? How long would you give a contractor to make up an estimate for that work?

A.—I do not know at all.

Q.—Would it not be more like six weeks?

A.—Not if they are doing it as agents for the Government of India.

Q.—Supposing you had decided to ask for tenders for the work, how long would you have given the contractor to make up the estimate?

A.—I could not make any comparison between a contractor and a Government.

Q.—Supposing you had decided to do work by a contractor, and you asked a contractor to tender for it? You would ask him, say, on the 1st January. When would you tell him by when his tender would have to be in?

A.—I do not know.

Q.—Does not a contractor get about six weeks for a large tender?

A.—Six weeks to three months; but that is not Government doing it. Government would take a great deal longer.

Chairman.—The question was a contractor.

A.—A contractor would take six weeks to three months.

Q.—You must put forward many of these documents, both by advertising to the world at large, and individually to contractors. The question is whether you would not have required the tenders to be in about six weeks' time?

A.—Yes, certainly I should—six weeks to three months.

Sir M. Visvesvaraya.—Why, in this case, would it take a year, particularly as you are taking the risk of proceeding with the work on imperfect data?

A.—Because I think a Government Department, which works quite differently from a contractor, would have taken about a year.

Q.—I am afraid you have a very peculiar idea of Government Departments. It only means bringing a number of people together and asking them to fix a time?

A.—They have no incentive.

Sir M. Visvesvaraya.—But they have a sense of duty. They have to get into the favour of Government and to keep up their reputation. Is not that an incentive?

Sir Frederick Hopkinson.—The real point is that if you ask a man on 1st January to send a tender in on 1st December, he would say: " What month am I to base my prices on? " Prices may vary enormously.

Sir M. Visvesvaraya.—There are people, even in Bombay, who could give you an estimate for work of this kind in about two months' time. Now I come to a very important question. You know that the idea of a suction dredger was introduced for the first time about the year 1905?

A.—I accept that.

Q.—Before that they were thinking of reclaiming by dry filling?

A.—Yes.

Q.—When you prepared your estimate in 1919, did you consider what the alternative cost would be if dry filling were adopted?

A.—No. I never had any doubt as to what was the cheapest method.

Q.—Do you still think that?

A.—I do, and Mr. Kidd says the same in his evidence.

Sir M. Visvesvaraya.—I do not know; he cannot mean exactly what you mean.

Chairman.—He says that reclamation over a large extent is cheaper—he means by a suction dredger—than any other method.

Sir M. Visvesvaraya.—He had in his mind a different kind of dredger to what you have designed.

A.—That is a matter of his opinion.

Q.—There is a total quantity of 28 million cubic yards. What would you put the cost at for a cubic yard by dry filling?

A.—I have not gone into it.

Q.—We have had a cablegram recently from Bombay in which they say it is possible to do it for Rs.1, 8 annas. We consider it might be done for even less, but taking it at Rs. 1, 8 annas, for 28 million cubic yards, the cost would be 420 lakhs, would it not?

A.—Yes.

Q.—If the work is properly organised you may be able to do it for less than that. You have to add to that the sea wall, about 160 lakhs, making 580 lakhs. If the 367 lakhs estimate originally were a satisfactory estimate as compared with moorum filling, you could have done the work by earth filling for less than 702 lakhs?

A.—We never went into the question of dry filling.

Q.—Was not that a serious omission? Nobody would have sanctioned an estimate for 702 lakhs without giving consideration to this aspect of the question? When you prepare an estimate you have to show that your estimate, compared with all other alternative estimates, is the cheapest or most reasonable. If that had been done, Government would have found when they were faced with a 702 lakhs estimate that there was a cheaper method of construction than that designed by you. Is that not so?

A.—They did not do it, and they prepared the 702 lakh estimate.

Q.—But where does your expert advice come in, if you did not advise them that compared with a 702 lakhs estimate dry filling was cheaper? Do you not think that the alternative method should have been put forward to Government when you sent in your proposal?

A.—No. There never was any question about dry filling. Dry filling was always considered as outside the question.

Q.—Why outside? Until 1905 that was the only method of construction contemplated? Why should it be outside your purview or your consideration? Is it not desirable to prepare alternative estimates and select the one most economical and efficient?

A.—Well, it never was considered.

Q.—Turning to your terms of reference you say, " The specific point on which my opinion is required is the suitability of the proposed method of reclamation by means of dredging or alternative proposals for same." That is specifically mentioned on the first page of your report. Why did you not put forward other alternative proposals for the consideration of Government?

A.—I did not think there were any alternatives then.

Q.—There was nothing to think about if you had gone into the terms of reference put forward?

A.—Any estimates at that time would certainly have shown that the cost of dry filling was vastly in excess of wet filling

Q.—As an engineer, do you now recognise that earth filling was a cheaper method than dredging under present conditions? The dredger and the dredging would together cost 460 lakhs. The dredging plant is 162·48 lakhs; laying shore line pipe 1·76 lakhs and dredged filling 310 lakhs, according to the latest estimate. The whole thing comes to 470·47 lakhs, or 4¾ crores. Do you now recognise that dry filling would have been cheaper?

A.—No, I have no information about the price of dry filling.

Q.—It is a very simple problem

A.—How long would it take?

Q.—It would take much quicker than you could do it with the dredger. The dredger would do about 2 million cubic yards per annum, and they will be able to do twelve thousand cubic yards per day, which means about 4½ million cubic yards per annum. If that is so, would you agree that dry filling would be cheaper than the dredging which is now going on?

A.—I would not like to express an opinion. It would take a long time to think it over.

Q.—The figures are very clear.

A.—If you say you can do it cheaper, I accept what you say.

Q.—That is all I want. Several engineers, including Sir Alexander Gibb, Mr. Neilson and others, have said that if you have regard to the character of the material met with in the harbour it is not a dredging proposition at all. As a dredging proposition an estimate of 367 lakhs is quite alright, but when it comes to 702 lakhs, there is a cheaper method than dredging. Some people consider that this is a serious omission in estimating. They also say that you took no active steps to prepare a detailed estimate the moment the work was begun. It was left to chance. The work was begun and it dragged on, and in two years the detailed estimate was prepared. In the meantime work was going on and expenditure being incurred at the will of the subordinate officers which was all wrong.

A.—Estimates were being prepared.

Q.—You also said, in the case of Mr. Kidd's report, " It is usual when preparing estimates for a project of this magnitude, and especially when the estimates are those on which the authorities are asked to sanction the execution of the work, for all details to be furnished, but in this case details are left to imagination." In the case of your estimate also the details were left to the imagination.

A.—Mr. Kidd's was a working estimate and mine was an engineer's estimate. Mr. Kidd's was an estimate accompanied by ten sheets of working drawings, and it was an estimate sent up for final sanction.

Q.—That may be, but you led Government to infer that your estimate was reliable and reasonable, and you did not make any qualification such as you are now putting forward. In the statement you have furnished us with you have stated it is just an engineer's estimate, and you qualify it in a number of ways now; but you have never said a word in your report, nor did Government understand it so. Can you tell us why that is so? You now give an explanation in your statement here. In your report of the 11th February, 1922, to the Development Directorate you say, " Under the rules of the Government of India for the carrying out of public works the approval of my report, plans and estimates did not imply more than the accordance of administrative sanction to the scheme." What are the rules to which you refer? Can you point to any rules of that sort?

A.—No, I cannot.

Q.—There are no rules of that sort. They do not give administrative sanction so easily as you assume. The previous history of these same works shows that they have turned down scheme after scheme and have never sanctioned one, until you induced them to sanction one " and the detailed project estimate giving the fullest particulars under each head and sub-head should have been submitted before any actual expenditure was incurred." The actual expenditure was incurred in your case before any detailed project

was prepared. How, in the face of so many irregularities, do you think a work of this kind could succeed?

A.—I do not admit there were any irregularities.

Q.—Omissions I will put it. Were regular tenders called for the dredgers? If so, can you show us a copy of the notice issued by you?

A.—I have given you all the information I can.

Q.—Were the tenders compared and reported on?

A.—I have nothing to add to what I have already said on the subject.

Q.—Will you answer me yes or no—whichever you think proper. If you refer to some previous explanation, it will not help me. I want to be able to follow you. If you say, "I cannot give you an answer," do so.

A.—What is the question?

Q.—I want to know if you have a copy of the notice issued by you inviting the tenders?

A.—Yes.

Sir M. Visvesvaraya.—Will you kindly show it to me?

Chairman.—We have it. We have all the correspondence.

Sir Frederick Hopkinson.—You mean for the dredgers? They asked the dredger builders to come up to London to see the plans in the London Office and certain information was given to them.

Sir M. Visvesvaraya.—Can you give us a copy of the notice issued by you? You say it is available.

Sir Frederick Hopkinson.—We have it.

Sir M. Visvesvaraya.—Messrs. Lobnitz never got any notice.

Sir Frederick Hopkinson.—They were written to by Messrs. Meik & Buchanan in London, and were asked to come up to London to see the plans.

Sir M. Visvesvaraya.—But that is not a notice.

Chairman.—Sir George Buchanan and you are not quite at one about it. Sir George does not suggest—at least I am sure if he has suggested it he will withdraw it—that his firm ever sent a written notice giving details. What they in fact did was to write a letter saying, "We have been instructed to ask for one or two offers" (&c., reading letter down to the words "when we can explain the matter").

Sir M. Visvesvaraya.—I want to know whether the usual notice was sent inviting tenders. It was not published and issued it is true, but was it issued individually to each contractor?

A.—Yes.

Q.—Will you kindly show it to us?

A.—Notice was sent to each of the firms mentioned.

Chairman.—All the four firms had a letter to that effect—asking them to send a representative. We have three of them here, and I think Mr. McMurray told us he also got a letter.

Sir M. Visvesvaraya: In the case of Mr. McMurray you had had a long correspondence beforehand about the 367 lakh estimate, so it is quite all right so far as they are concerned; they knew all that you wanted. The other dredger builders, however, had no notice, and you asked them to come to your office, without giving them any particulars in writing?

A.—Each firm had sent them a large plan showing every possible particular of the ground and the dredging and everything wanted.

Q.—There is no mention of anything in the correspondence?

A.—I can show you the plan if you like.

Sir Frederick Hopkinson.—I should very much like to see it.

Sir M. Visvesvaraya.—I am sorry to ask you unpleasant questions, but why was it necessary to make a secret thing of it at all?

A.—Because we are not in the habit of disclosing the results of tenders we receive publicly. There is nothing to conceal.

Q.—The whole thing totalled together cost £500,000. Was not publicity necessary? It was Government business. Was not publicity necessary in regard to the conditions on which you invited tenders?

A.—It was the usual method, which we always adopt.

Q.—In your case you were acting for the Government. You were not doing it on your own account?

A.—We followed our usual procedure.

Q.—You did not compare the tenders and discuss them, and report to the Government your recommendation, with reasons for approving Messrs. Simon's tender?
A.—That was done by my office here when I was in India.

Q.—Was a proper memorandum prepared reviewing all the tenders, and stating why you particularly recommended Simons?
A.—Yes.

Q.—Could you kindly show it to us?
A.—I will see if I can find it.

Q.—We have a casual note about your recommending Messrs. Simons' tender for the dredger, and nothing more. It is on a quarter of a sheet of foolscap.
A.—Yes.

Q.—How could you have secured an efficient design without inviting competition? Simons are well-known builders, it is true; but why depend upon one firm only when other firms might put forward proposals and bring you their experience?
A.—We followed our usual procedure that we have adopted for years.

Q.—But this is an unusually big tender; an unusually big proposition.
A.—Well, we did what we always do. We do not advertise everything, and we were not in the habit of doing so.

Q.—Before you recommended one tender did you prepare a properly reasoned memorandum to submit to the Government for their sanction or information; or rather, was it not desirable that you should have prepared a memorandum and placed it before the Government?
A.—I think a complete memorandum was placed before the Government?

Q.—Have you a copy of it?
A.—No; I do not remember it. It is so long ago.

Q.—What we heard in Bombay was that you made a note on the margin of a document indicating your approval of Messrs. Simons' tender, and then the Bombay Government wrote to the Secretary of State and that was approved on your recommendation?
A.—Yes.

Q.—There was no memorandum or complete note dealing with the reasons which induced you to recommend Simons' tender.
A.—Well, there should be. There must be one somewhere.

Q.—If you did not send out full particulars and outline the proposals to the firms, how were they to know what was required? Do you think they will regard you to be serious about it?
A.—Yes; I think so.

Q.—Before you recommended Simons' tender you did not see the other tender of Lobnitz? They had merely telegraphed the cost?
A.—Yes, something of that kind.

Q.—They suggested two dredgers?
A.—Yes.

Q.—Was that sufficient information for you to come to a decision upon?
A.—It was ample information for me because the person in charge was my late partner, Mr. Charles Meik, one of the most capable engineers in Westminster. It was all done by him, and I had perfect confidence when I got the telegram as to what his opinion was.

Q.—You may have had perfect confidence yourself but should you not satisfy the public and the Government, according to the usual standards followed in such cases, when you invited tenders from a number of builders, namely, that they were all examined, costs compared, advantages and disadvantages weighed and efficiency discussed, before you made your recommendation? Nothing of that kind seems to have been done. You got information by cable, and one or two people declined to tender because the information supplied was slender. Then you made up your mind to give the tender to Messrs. Simons & Company.
A.—No, we took what we thought was the best.

Q.—The Chairman has already drawn your attention to paragraph 6 of your report, which runs thus: "The Government are well aware that economy in this class of work can be obtained only by securing that the suction dredgers and other plant required shall be of the best design. The difficulties which have arisen with the Port Trust dredgers serve as a warning on this point." You do not seem to have taken warning yourself?
A.—I have nothing to add to what I have already said.

Q.—I am only quoting your own statement.

A.—If I may say so, I cannot go on repeating myself. I have already explained fully my opinion on this matter, and I cannot say anything more.

Q.—You also admit that you advised the placing of the contract before the details were prepared here.

A.—I advised the placing of which contract? Do you mean before the details of the whole work were prepared?

Q.—You say that the first thing necessary is to place the contract and submit for approval all the details of the plans and specifications afterwards. You say that on page 2 of the note which you gave to the Director General of Stores. Coming to the question of soft clay and hard clay; you have already given an explanation in answer to the questions put by the Chairman. If a dredger could deal successfully with hard clay, it can also deal with soft clay, but not vice versa.

A.—I beg your pardon.

Q.—If a dredger could deal with hard clay, then it can also deal with soft clay?

A.—Yes.

Q.—But not vice versa?

A.—No, certainly it can deal with hard clay, only not in such great quantities.

Q.—You have used the words " hard clay " also in several places. You recognised the existence of hard clay?

A.—Yes.

Q.—But you have not used it in the dredger specification. What is the reason? I am sorry to ask you these questions, but I have to do it.

A.—The specification says soft clay.

Q.—But you have referred to hard clay in several parts of your report. In the 1919 report, and also in your early reports, you mention it in places, which shows you were aware there was hard clay.

A.—I have explained that fully in my evidence. The hard clay refers to the bottom layer.

Chairman.—That is not quite it. Your other explanation is that in speaking of hard clay you meant, not with reference to its position in the harbour, but with reference to it as a substance of reclamation?

A.—Yes; that is so.

Q.—I want you to be correct about it.

A.—Yes. I have said so much about clay that I do not want to repeat it.

Sir M. Visvesvaraya.—What puzzles me is this. You mentioned hard clay in your reports, and you do not bring it forward in the specification.

A.—I think I can only say in my judgment the dredger is correctly designed to work in soft clay.

Q.—You maintain that still?

A.—I maintain that absolutely.

Q.—You are opposed to the use of the term " hard " for the description of the material?

A.—I am.

Q.—Why have you used it yourself on page 9 of your report?

A.—I have explained I have used it in reference to the hardening out.

Q.—Then on page 12 in the printed compilation of correspondence you have stated this, and it is in your own name, not in the name of your firm: " I may say that we do not accept without more information Mr. Mitchell's pessimistic view of the nature of the material we shall get from the harbour, as we hope that there will be a great deal of hard clay which will require very little moorum backing." There you use the words " hard clay."

A.—Yes.

Q.—If hard clay was specified, then it would include soft clay, but not vice versa; so that you have precluded hard clay from the terms of the specification?

A.—I really cannot say anything more than I have said.

Q.—As regards the output of 5,000,000 cubic yards per annum, there are no guarantees from the dredger-builders, and we do not see any description of any other dredgers which have given that output. Did you think that your dredger would give the output that you have specified? What considerations made you think if you ordered the dredger on these lines you would get the output that you specified? Were you not particular about getting output at all?

A.—No.

Q.—You were anxious, or you were fairly sure, that the dredger would give the specified output?

A.—Yes.

Q.—You still think it could do that?

A.—Yes.

Q.—That is your position?

A.—Yes.

Q.—Very few people who have seen the dredger in Bombay agree with you.

A.—I am not surprised at that.

Q.—If hard clay is clay which would dry up hard, would soft clay dry soft? When it dries up will it be soft, and in that case will it be useful for reclamation purposes?

A.—Yes; but it would not dry soft, it would dry hard.

Q.—Soft clay would dry hard?

A.—Yes. Hard and soft are merely to be used in relativity. You can have soft steel.

Q.—That is true. The interpretation you have put is very unusual, I think, from a business point of view. I do not think many people would share with you that interpretation. Why did you not provide for a guarantee in the specification for testing the dredger at the site?

A.—I have never done such a thing in my life, and I do not know any place where it has ever been done.

Q.—If you did not do it in your life, ought not you to take a leaf from the lives of other people and inquire whether other engineers did it?

A.—They do not do it.

Q.—Then people take a very serious risk in entrusting work to you. Do you not take the experience of builders of other dredgers in all parts of the world before you design?

A.—I do not know of any place in the world where they have given a test at the place of delivery. I am not acquainted with any case in the world where a dredger has been sent 8,000 miles and the builders have given a guarantee at the place of delivery, except I am told there was some sort of guarantee for the "Jinga" and "Kalu." There may be cases, but personally I do not know a similar case.

Sir M. Visvesvaraya.—In the case of the "Kalu" there was a specific guarantee, and the dredger was supplied by the same builders.

Chairman.—It is agreed that both were to do either 78 or 80 hours trial, and by some magic both vessels did in fact do over 2,000 cubic yards per hour. After they passed out of the hands of Messrs. Simons they dropped down to 555 and the other figure of 1154.

A.—Exactly.

Chairman.—It is an average of 1126.

Sir Frederick Hopkinson.—The important thing is whether it is a maximum or average output; that is the whole point.

Sir M. Visvesvaraya.—You have to get an average of 2,000 cubic yards an hour to get your 5,000,000 cubic yards per annum?

A.—Yes.

Q.—This did nothing like the average.

A.—You have not started working yet.

Q.—Three years have elapsed. If it has not started working properly, why did not you call the attention of the Government to the delay?

A.—We could not call it three continuous years, but three dredging seasons.

Q.—You have declared that the whole thing should be completed in six years?

A.—Yes.

Q.—By now you ought to have got 15,000,000 cubic yards, but the dredger has not done more than 3,000,000 cubic yards.

A.—I have nothing to add to what I have said.

Q.—15,000,000 cubic yards is what you promised, and till now they have got 3,000,000 cubic yards?

A.—Yes.

Q.—You said for a little higher price it would be safer to get a dredger which would do this job on the site?

A.—I say this dredger will do its job.

Q.—Your mere estimate cannot be satisfactory. What is the guarantee? For three years you have been working it, with this unsatisfactory result. You are the technical adviser; why did not you take charge of it yourself?

A.—I do not handle dredgers.

Q.—Then why did you recommend it? You say you know all about dredgers in this statement. Your statement is very specific on that: "We are better acquainted than anyone else with the work to be done." Therefore if anything goes wrong with the dredger you have designed, you can go to the Simons' people or to the best experts and take their advice and prove that that dredger could do what was promised. The Government of Bombay would even now be prepared to give facilities if you can do it in three months' time. At all events I do not think they would object to such a proposal.

A.—If the Government likes to make a proposal I should be glad to consider it.

Q.—You would consider it?

A.—Yes. If the Government makes a proposal I should be very glad to consider it.

Q.—That is a specific statement, but you must not prolong the work. You must not require three or four years for trials?

A.—No.

Q.—Why did not you keep a representative of your own to watch your interests on the spot, and to keep you informed? The chief engineer was not giving you the information you wanted. As the engineers responsible for the work, why did not you have a man there to report to you and keep you informed of what was going on, so that you could take action according to the terms of your contract if they failed to do what you liked?

A.—We should very much indeed liked to have one there, but the Government of Bombay would not pay for him.

Q.—On the terms of your contract was not that included in the fee paid to you?

A.—No. Under the terms of my contract all the staff in Bombay were to be paid by the Government of Bombay.

Q.—But the expenses of your staff are your own concern?

A.—Yes.

Q.—Then should not you have kept a man there to enable you to carry out the terms of the contract?

A.—The Resident Engineer was supposed to be our representative.

Q.—He was the Chief Engineer?

A.—Yes, he held the dual office of Chief Engineer and Resident Engineer.

Q.—That did not work well?

A.—It was suggested we had better have an independent representative, and we said, "We should like it very much indeed, but you have got to pay him. It is no part of our guarantee to pay him."

Q.—Then about the guarantee at site: I understand that at Aberdeen there are dredgers which have been tested at site. You have no knowledge of that?

A.—I have no knowledge at all.

Q.—Were you aware that in the case of the "Kalu" and the "Jinga" the same firm had given a guarantee for a test at site?

A.—Yes, I understood they had.

Q.—Did you know it when you placed the order?

A.—I think I did, but I did not attach any importance to it.

Q.—Have you got your calculations for the capacity of the dredger, the horse-power to be specified, and all that? Have you got the details?

A.—Sir John Biles has that information; it is in the specification. The specification was drawn up by Sir John Biles.

Q.—Did you satisfy yourself that the horse-power designed was sufficient to enable the dredger to operate properly and give you the promised output?

A.—Yes.

Q.—What are the grounds on which you have come to that conclusion? Have you made any calculations, or have you had before your mind's eye examples of other dredgers which have given a similar output?

A.—I really could not answer that; I do not remember that.

Q.—It is a very big proposition, and you have taken the responsibility for it. Do you not think there must be some reasons in your mind before you recommend with so much confidence that the dredger would do its job?

A.—Well, I cannot say anything more.

Q.—You had the example at Bombay itself of a dredger on which guarantees had been obtained. You did not care to take that in account?

A.—No.

Q.—There were practically no tests under normal working conditions?

A.—Well, the tests were conducted by Sir John Biles.

Q.—When he was asked why the specification was in that particular form, and why guarantees were omitted, he said : " It is not my business, you must ask Sir George Buchanan.

A.—Yes.

Q.—Whom should the Government now hold responsible? The thing has gone wrong; that much is certain. Your present attitude is that you think you could put it right?

A.—I have no suggestion to make, except what I have already said : " Sack the lot."

Q.—You have specified for 5,000,000 cubic yards of output per annum, or something close to that. You should either give proper calculations to prove that or you should say that some other dredgers are doing similar work and this should do the same. Have you either of those methods of proving it?

A.—We went into the matter very carefully in the office. I have nothing more to say about it.

Q.—Then the Government had to take their chance by leaving this matter in your hands?

A.—Yes, they have to take the chance.

Q.—Then Mr. McMurray had stated that he was asked by you to agree to a guaranteed output at site, but he would not consent. Was he stating an untruth when he said that?

A.—No, he was not stating an untruth. I may have just mentioned the matter, but I never pressed it; it was not the sort of question I pressed.

Q.—You did not ask the other tenderers for similar guarantees?

A.—No.

Q.—Did you make any tests on the spot before you came to the conclusion that these specifications were the correct ones? Did you make any test on the spot in Bombay?

A.—No.

Q.—I suppose you made a calculation that the output would be 5,000,000 cubic yards per annum?

A.—Yes; that is what we asked for.

Q.—Having regard to the limited time available, 170 days, I understand you are going to give me to-morrow some instances of other dredgers which have given 2,000 cubic yards per hour?

A.—I have no information on the subject.

Q.—A dredger working for 170 days, which is likely to produce 5,000,000 cubic yards—is there anything near that in the case of any other dredger?

A.—It would take me months to look it up. I have no information on the matter.

Q.—Then must not the inference be that the design has been prepared without giving much thought to all these details, if you have not already got it?

A.—No.

Q.—If you can furnish that information within a few days I should be much obliged. It is difficult, I recognise, but you must have gone on some basis and some past experience, or on some calculation, before you decided that this dredger would do this amount of work : every engineer does that?

A.—We go to the maker, and ask the maker to produce a dredger to do a certain amount, and the maker produces it.

Q.—Then you did not get any guarantee from any particular maker?

A.—No.

Q.—If they had been asked to give a guarantee perhaps they would not have done it?

A.—No.

Q.—What is the good of specifying a capacity if no guarantee is taken for the efficient working of the dredger and if no penalties are enforced in the case of failure? In all contracts there is usually a penalty clause. This is one of the biggest propositions in the world. Should not these ordinary guarantees have been secured?

A.—No.

Q.—Sir John Biles stated he was entirely guided by you. He said the specifications were yours and you have accepted the entire responsibility in various statements. Who prepared the specifications for the dredger : was it the dredger builders?

A.—They prepared the detailed plans of the dredger.

Q.—That is the usual thing?

A.—Yes.

Q.—What part of it was provided by Sir John Biles?

A.—He revised the thing, he practically redrafted the whole specification.

Q.—On the materials supplied by him and by you?

A.—Yes.

Q.—Who is responsible for the output of the dredger at present—the people on the spot?

A.—The people on the spot.

Q.—When the dredger in the first year failed to give the promised output did you call upon the builders in the usual way : " Now why is not the dredger doing its job : what improvements are necessary? Will you put it right? If under the contract you are not bound to put it right you may charge a special fee for doing the work. Can you tell us what is wrong." Did you address a direct letter to that effect?

A.—It was nothing to do with the builders of the dredger; the dredger had been passed. It had passed the guarantees on the Clyde; it was no responsibility of the builders of the dredger.

Q.—If it did not give the output stipulated?

A.—If it does not come to its output.

Q.—But they have a moral responsibility, have they not? It is a huge business. They had accepted a specification for 5,000,000 cubic yards a year output. I suppose they meant to give a serviceable article when they undertook the contract?

A.—Yes.

Q.—Have they not a moral responsibility to put it right? They may charge a fee for it, but they are bound to do that, are they not? Who is responsible? You give the order and hand it over, and it is tested on the Clyde, and the dredger goes out there. You say you are not responsible, and Sir John Biles says : " I simply wrote down the specification on what was required, and handed it over to the builders." You say the builders are not responsible—then who is responsible? Somebody must be responsible. The Government trusted you and trusted Sir John Biles, that you would design and give them a serviceable dredger. But have they not a moral responsibility?

A.—I do not know about a moral responsibility.

Q.—If they disclaim responsibility, does it not show they have no confidence in the design?

A.—No.

Q.—I do not think the Government would refuse to pay a fee to put things right, or make some additional payment if necessary.

A.—Suppose the builders say there is nothing to be put right?

Chairman.—The dredger builders say so; they say : Our dredger will do exactly what it was promised to do.

A.—5,000,000 cubic yards.

Chairman.—In soft clay.

Sir Frederick Hopkinson.—They said at the rate of 2,000 cubic yards an hour.

Chairman.—Yes, in soft clay; and they say " That was the limit of our obligation, and we have done it. If you wanted something else you should have asked for it."

Sir M. Visvesvaraya.—Sir George has, in his description, stated that 5,000,000 cubic yards ought to be the output per annum.

Sir Frederick Hopkinson.—There is a great difference between 2,000 yards in one hour and an average of 2,000 yards through the whole season.

Sir M. Visvesvaraya.—I am asking the same question.

Sir Frederick Hopkinson.—The builders may floor you with a question of one hour's work, but all the calculations out there are based on 2,000 yards an hour average work for the whole season—which is a very different thing.

Sir M. Visvesvaraya.—Are not the persons working the dredger now supplied by the builders themselves?

A.—No.

Q.—Mr. Brims is a builders' man, is he not?

A.—No.

Q.—Mr. Speirs was a builders' man?
A.—Yes.

Chairman.—Mr. Speirs was nominated by the dredger-builders and approved by Sir George.

Sir M. Visvesvaraya.—I understand several of the subordinates were supplied?
A.—They may have worked for them.

Sir Frederick Hopkinson.—They may have worked for them, but they are not actually responsible for them.

Sir M. Visvesvaraya.—Would they be prepared to come forward and prove the working themselves?
A.—If they were paid for it, yes.

Chairman.—Wait a moment. Do you know that they would, or would not they sit on their contract and say: " We have done what we promised to do, and we have got paid for it "? Are you in a position to pledge Messrs. Simons that they will go out to Bombay and make that dredger do 2,000 cubic yards per hour in Bombay Harbour? They have steadily refused to do it, you know.
A.—I do not say they would pledge themselves to any guarantee, but I thought the question was: Would they go out and do something?

Q.—Had not you better leave them to give an answer to that? That is all I mean.
A.—Yes.

Q.—We do not want to create a wrong impression.
A.—Then I had better not answer.

Sir M. Visvesvaraya.—Why was no direct question of that nature put to the builders when the dredger failed to give the required output for two seasons? Why were they not called upon to make good?
A.—Excuse me. You have asked that question before, I think. We are going round and round.

Q.—You have not taken any action on the Government letter?
A.—No.

Q.—You did not call upon them to say why the dredger is not performing properly, according to specification?
A.—No; I have already answered that question.

Q.—I suggest a direct question should have been put by the engineers to the builders. You have already answered that question, you say; but I want to know what is the correct position. Should not the engineers have called upon the builders to explain why it is not giving the required output?
A.—No; I do not think it was any of their duty.

Q.—You now say that you can prove that it will do 5,000,000 cubic yards, but you were there the first season, and the second season, and I think, the third season; but nothing was done. You did not then say that you could put things right if the matter was left in your hands. Did you call upon the builders in a direct manner and say: " Your dredger is not giving the proper output "?
A.—No.

Q.—" Will you put on your own men and prove it, or words to that effect "—did you ask them that or not?
A.—No; with all deference, I have already answered these questions.

Q.—Did you advise the adoption of three shifts on the dredger?
A.—We always expected the dredger to work 24 hours a day. Those were Mr. Brims' instructions.

Q.—I thought your instructions were 15 pumping hours?
A.—That means working 24 hours a day.

Q.—15 hours is the average for pumping?
A.—Yes.

Q.—Your contract says that Sir George Buchanan shall devote the greater part of his time to this particular work. Could you kindly tell us the number of days you spent at Bombay on this work?
A.—I have put in a complete record of it.

Q.—I want to know how many days you spent in Bombay during each of the five years you were responsible for the work?

A.—I have already put in a statement to that effect.

Sir M. Visvesvaraya.—That does not give the number of days.

Mr. Ewbank.—No, it does not; but I can work them out.

Sir M. Visvesvaraya.—I wish you would do that.

Mr. Billimoria.—The witness said several months.

Sir M. Visvesvaraya.—The terms of the contract run thus: During the whole period of the execution of the works, the works shall be closely supervised, and Sir George Buchanan shall devote the greater part of his time to this particular work. Have you devoted the greater part of your time to this particular work?

A.—I suppose I have. I do not think I have ever been accused of doing anything else.

Q.—Then it says: "And shall remain in Bombay during such period during the working season as he or the Government of Bombay think necessary to ensure the complete satisfactory supervision of the works." We have already seen that in the way of detailed plans and estimates little was done. In this matter of devoting time, you spent only a few days in Bombay each season. Did you spend several months in the winter in Bombay, which was the understanding, according to your statement?

A.—No; in my agreement.

Q.—No; what you said to Mr. Montagu.

A.—Would you kindly look at the agreement? I go by the agreement.

Q.—The agreement is: "Shall devote the greater part of his time to this particular work, and shall be present in every year, and shall remain in Bombay during such period during the working season as he or the Government of Bombay think necessary to ensure the complete and satisfactory supervision of the work." Here is the statement you have made yourself: "I had agreed to go out and spend several months every winter in Bombay." How many months have you spent in those five years?

A.—I am prepared to go by the agreement.

Q.—The agreement is based on an understanding.

A.—That is not my agreement.

Q.—"The following is an extract from a memorandum of my interview with Mr. Montagu." When you wanted the contract to be entered into you promised that you proposed to spend several months every winter in Bombay?

A.—Yes.

Q.—You have not fulfilled that promise, have you?

A.—I can only repeat that I go by my agreement.

Q.—Then when you wanted the contract they gave it you on that understanding. You gave a promise on your own statement that you would spend several months in Bombay each winter, and you have not spent anything like that?

A.—I consider I have fulfilled absolutely my agreement. I have remained in Bombay every year as long as ever the Government required. I have never been asked to stay a day longer that I stayed.

Q.—That may be because they thought you did not take sufficient interest in the work, or you did not give them detailed plans and estimates. It may be due to that. The several months that you promised to be there you have not spent there.

A.—I do not agree.

Chairman.—We must make this quite clear. Your view of the agreement is that your obligation was not an obligation that it was necessary to stay for months. It was for you to stay there as long as you thought it was fit for you to do so, and also the Government of India should retain you as long as they wanted?

A.—That is correct.

Q.—When those conditions were fulfilled, that you had been there long enough to have supervised all the work, and when the local Government said: "Everything is all right," you were at liberty to go?

A.—Yes.

Q.—It might have been 170 days, or it might have been 20 days?

A.—Yes. If the Government had ever asked me to stay any longer I should have stayed. When the Government asked me on one occasion to go out specially in the monsoon I obeyed their orders.

Sir Frederick Hopkinson.—You must exclude the year 1925 from that. You could not have returned in the year 1925?

A.—No.

Sir M. Visvesvaraya.—In the contract or in the correspondence the work to be done in England is: "Correspondence with the Government of Bombay or any officer deputed to act on their behalf, including any reports from time to time required by the Government in respect of dredging plant or material, or progress of the works." Have you furnished any reports in respect of the dredger plant to the Government of Bombay. I suppose you take your stand on the point that you think the dredger can be made to work and give the output. What work had you to do in connection with the final inspection and supervision of the tests and trials of the dredger?

A.—I was in India.

Q.—You were in India then?

A.—Yes.

Q.—So the final tests were made without you?

A.—Yes; without me.

Q.—Did you make any tests yourself on its arrival in Bombay?

A.—No.

Q.—What was the work in connection with the design or specifications of the dredgers that you particularly did?

A.—I did not do any at all. It was Sir John Biles who did it all.

Q.—And the dredger-builders supplied the original specifications. You have got them printed in your report.

A.—They supplied those, yes.

Q.—Sir John Biles modified it, and then issued it to the dredger-builders?

A.—Yes.

Q.—What was your share of the work in that connection?

A.—After Sir John Biles had done that?

Q.—In connection with the whole design and specification of the dredgers.

A.—We supplied the general particulars.

Q.—You have not devoted the greater part of your time to this work?

A.—I beg your pardon.

Q.—You have not devoted the greater part of your time to this work?

A.—I should not like to say that at all. I should have to go very carefully into the matter.

Q.—The statement you have prepared of the number of days spent in each of the five years that you were responsible for the work would give us some idea of that. In 1920 you spent 33 days in Bombay; in 1921, 67 days; in 1922, 63 days; in 1923, 7 days; in 1924, 94 days; in 1925, 7 days.

A.—If it is there.

Chairman.—You ought to take out the separate visit during the monsoon.

Sir Frederick Hopkinson.—During the monsoon visit in July there was nothing going on.

Chairman.—That was in July, 1923.

Mr. Ewbank.—He arrived in Bombay on 13th July, 1923, and went to Baroda and came back to Bombay on the 30th July, and left Bombay for London on the 11th August. That only meant 14 days' difference.

Sir M. Visvesvaraya.—The total number of days is 288 spent in six years, including 1920. That is about 40 days a year. You have already explained why the sea wall was begun from both ends. Should not you have advised Government against the beginning of the sea wall from both ends?

A.—No.

Q.—As it would not have been economical to start from both ends should you not have advised the Government not to start that way?

A.—I have already stated that I did not advise the Government.

Q.—Can you tell me from the engineering point of view why it was that you were against the sealing of the foundations of the rubble mound?

A.—I have already explained that fully.

Q.—From an engineering point of view can you give it to me in a sentence?

A.—From an engineering point of view I did not think at that particular time it was necessary.

Q.—But they told you that the silt was escaping?

A.—Yes, in very insignificant quantities.

Q.—They have worked out that it would be 9 lakhs of cubic yards lost in two years.

A.—Yes.

Q.—That means that about 13 lakhs of rupees' worth of silt was lost?
A.—Yes.

Q.—Do you call that insignificant?
A.—No; certainly not.

Q.—Is not that loss due to your omission?
A.—I have already explained this fully in the evidence. I really cannot repeat every statement that I have made.

Q.—You need not repeat it. They drew your attention to the loss, and you did advise them of your own accord to seal the foundation; but when they suggested sealing you were opposed to that, and I suggest some explanation is necessary.
A.—With all deference, this was dealt with very fully, and is in the Shorthand Notes, and I really cannot go on repeating myself.

Sir M. Visvesvaraya.—Are you satisfied on that point, Mr. Chairman.

Chairman.—It is all here.

Sir Frederick Hopkinson.—There are one or two questions I shall ask him about it.

Chairman.—In the Shorthand Note we see that Sir George Buchanan did not think it advisable to seal it at that particular time, because, as he said, the passage to and fro of the sea would carry with it particles of the silt, and gradually the wall itself would seal up. Is that, putting it substantially, your point of view at that time?
A.—At that time.

Q.—That is how it is on the Shorthand Notes?
A.—Yes.

Sir M. Visvesvaraya.—The silt would come from the sea into the lagoon.

Chairman.—That a certain proportion of silt, probably not of any particular value as regards amount, would gradually seal up the wall of itself?
A.—From the engineering point of view I have described it fully, and it is in these Notes.

Sir M. Visvesvaraya.—In your statement.
A.—In the Shorthand Notes. I have already been examined on that very point at length.

Q.—But you were examined from a non-technical point of view, and I am asking you from a technical point of view. From an engineering point of view kindly give us why it was you were against the sealing of the rubble mound. If you do not want to say, say so.
A.—No; I do not mind in the slightest degree.

Chairman.—It is perhaps quicker to say it.
A.—What I said was that when my attention was called to it there was very little material going away at all. I said: "I do not think at the present moment it is necessary, although it may be necessary to do it later on," and I pointed out that there was a good deal going away through the hole in the wall, and then I went away from Bombay. If the people in charge of the work were so stupid as not to take action on their own initiative when they saw it being done, it is their responsibility.

Sir M. Visvesvaraya.—They say they sealed in spite of your disinclination to agree with them?
A.—I do not agree.

Q.—Anyhow, the 13 lakhs of rupees have been wasted.
A.—So they say, but I will not accept any figure.

Q.—You must accept some figures.
A.—No, I do not accept any figures at all.

Q.—It is a Government Department. The Chief Engineer is your own nominee. You cannot treat their figures in such an offhand manner.
A.—I accept them with great reluctance.

Q.—Why did you permit dredging in Back Bay against your better judgment? Why did you not protest against their undertaking that enterprise? It will eventually cost more than dry filling, will it not?
A.—It was not against my better judgment. I was shown borings showing that there was admirable material in Back Bay. If the borings were not properly taken, and proved to be absolutely untrustworthy, that is the business of the Chief Engineer.

Q.—Did you find out, before you approved of it, whether the dredger could pump into blocks 1 and 2? Did you calculate or make sure of that?
A.—That the "Kalu" would?

Q.—Would the "Kalu" pump beyond blocks 1 or 2? Would it be serviceable without capacity; or would you have to spend a lot of money equipping and starting the work, and then it would dredge a few million cubic yards and stop there?

A.—If the material had been suitable she would have done very good work.

Q.—You say it is due to the incorrect representation of the material?

A.—Yes.

Q.—I am sorry I have to ask some unpleasant questions, but what was the cause of your disagreement with Mr. Lewis?

A.—I had no disagreement with Mr. Lewis; his health broke down.

Q.—In the correspondence there has been some sparring, some disagreement; you must have noticed it?

A.—Yes. But if his health completely broke down——

Q.—He was irritable?

A.—I say his health broke down.

Sir Frederick Hopkinson.—We were told in the evidence that they were not on speaking terms.

Sir M. Visvesvaraya.—Is that true or not?

A.—That we were not on speaking terms—well, I would rather not speak about Mr Lewis. I say that his health completely broke down, and that his whole nature, moral, physical and mental, underwent a change owing to his disease.

Q.—It is very good of you to say that. Why was it that the dredger was ordered and brought there so early, involving idle time charges? I hope you will not say you have already given the reply, as I want it from an engineering point of view.

A.—As a matter of fact I have already given the reply, but the reason was that Sir George Lloyd expected to get the wall started in October 1920. In that case we hoped to have enough done by the end of 1921 for the dredger to work; but as the wall did not start until October 1921, every thing was out a year.

Q.—Even without the wall could not you have started pumping by temporary bunds?

A.—No.

Q.—There is plenty of space in the exposed area in block 7?

A.—No; we could not have done it.

Q.—Could not you have put a wall of moorum and pumped into it? They are all shallow—probably about 2 yards deep.

A.—Well, if the Chief Engineer could have done it he probably would have done it, but he did not think it possible.

Q.—You subsequently made the statement that there was no hurry for the plant: "There is no tearing hurry for the plant."

A.—No; there was no hurry when the wall was not started.

Q.—You can construct a wall of about 1,000 feet and then put in a cross wall, and go on filling at once. That could have been done even from 1922, could it not?

A.—If we could have done it we certainly should have done it. It was not done.

Q.—It was not done, but it might have been done?

A.—No; I cannot say it might have been done.

Q.—The interest charges are about £67,000 to £70,000. A wall of about 10 feet would have secured an area for pumping into in blocks 7 and 8?

A.—Well, it was not taken into consideration.

Q.—Were you submitting programmes of operations to the Government from season to season, and insisting upon their working to them?

A.—We advised them as far as we could. It was not a case for insistence, because we had no power to insist.

Q.—You had promised the Government to ensure a complete and satisfactory supervision of the works?

A.—Yes.

Q.—In order to do your share of the work could not you have insisted upon these things being observed?

A.—Insisted upon what?

Q.—Upon no time being lost, and the dredger being used immediately on arrival: to have prepared in good time for the commencement of the dredging, and to have had a programme of operations, and to insist upon the work being done according to that programme, on an understanding with the officers of the Development Directorate?

A.—Well, there was no case of insisting: it was not possible to insist.

Q.—Were you submitting a progress report of the work from half-year to half-year, that is, comparing the quantities, rates, and amount as estimated, with the quantities and amounts as actually executed, side by side?

A.—Do you mean in money?

Q.—In money and quantities?

A.—No; we never knew what the work was costing. We do not know what the work is costing now.

Q.—Could you not have insisted upon receiving that information?

A.—If the Government of India will not take any action what can you do?

Q.—The Government of Bombay?

A.—The Government of India.

Q.—What have the Government of India to do with it?

A.—I pointed out that they were not keeping any costs, and I had not the faintest idea of what the work was costing, and nobody knew what the work was costing.

Q.—You said that.

A.—That is detailing the action which happened. I wrote to the Director of Development, or rather I pointed it out in my report to the Director of Development, and the Secretary to the Government wrote to the Government of Bombay, the Honourable Member, and then it went to the Secretary to the Government of India in the Finance Department. Eight months later, I think it was, the Government of India in the Finance Department wrote and said: "What is all this about; we do not quite understand it." Then I arrived in Bombay.

Q.—After a year had elapsed they began to take some action. They had taken some action, but it is not satisfactory yet.

A.—Obviously, I could not know what the work was costing.

Sir Frederick Hopkinson.—Is not it frequently the case in Government offices that these things go on and on, and the only thing which stops them is that one of them gets lost?

A.—Yes.

Sir M. Visvesvaraya.—How are the Government and the public and yourself to know how the work stood?

A.—We did not.

Q.—Then why did not you tell the Government of Bombay in an official letter: "I will not be able to fulfil the terms of the contract entered into with you unless you provide for the ordinary procedure practised in engineering works"?

A.—Well, I had already told them in half a dozen different ways.

Q.—But those were all addressed to your Chief Engineer?

A.—As I have explained in this case I went up to the Government of India and no action was taken. If you cannot get anything out of the Government of India it is not much good addressing letters to the Government of Bombay.

Q.—But you did not address the Government of India direct?

A.—No.

Q.—Your recommendations went to the Government of India for practical action?

A.—Yes.

Q.—They took some action afterwards. Probably if you had insisted upon further development they would have carried out your wishes on the costing, but it was not insisted upon, or they thought it was an ordinary thing and left it there. Might not that be the case?

A.—I do not think so. I think you take an optimistic view of what my powers of insistence were in Bombay.

Q.—If I may venture to make a suggestion, they thought that you wanted to take your duties lightly, and so it was no use troubling about these matters. That is what I gather from the correspondence.

A.—I do not think that is so.

Q.—Taking the omission of the programme, the omission of the preparation of progress reports showing quantities and rates and amounts, they would say: "These are serious omissions, their preparation was usually the duties of the Engineers."

A.—Yes, they are usually the duties of the Engineers.

Q.—You stated that the Public Works Department had no reclamation experience. It is not everybody that has reclamation experience; but what sort of reclamation experience is to be expected if the designs are prepared by an expert and there is the ordinary enginering work to be carried out? There are no special difficulties of engineering or construction in this case.

A.—Did I say particularly reclamation experience?

Q.—I think so. You said the local Public Works Department officials had no reclamation experience, in your report?

A.—I think I said marine work.

Chairman.—You can take it as marine works.

Sir M. Visvesvaraya.—What is it that you wanted them to know? What did you mean by that reference to lack of experience of the Public Works Department officials?

A.—Well, the construction of marine works like the construction of a marine wall in a heavy sea.

Q.—You know that the Bombay sea wall was being constructed by engineers in Bombay Presidency?

A.—Yes.

Q.—You know that previously the Port Trust Chairmanship and offices had been held by Government engineers?

A.—I know that.

Q.—There are several local engineers there?

A.—I make no reflection whatever on the officers of the Public Works Department.

Q.—You gave that as a reason for appointing people from outside; that is the reason why I am asking you questions.

A.—As a matter of fact, Mr. Lewis was a Public Works man.

Q.—Did the officers whom you appointed as Resident Engineers possess technical experience of this kind?

A.—Yes.

Q.—When a Consulting Engineer like you has prepared the design, the details are all matters of ordinary engineering practice?

A.—Yes.

Q.—The expert advice was all supplied by you?

A.—Yes.

Q.—You think the Public Works Department officers were not competent to carry on the work, and so you wanted special officers appointed from outside?

A.—We did appoint Public Works officers.

Q.—One or two; but the regular Public Works Department was tabooed. You said you did not want them. You have stated that in your statement and in your original report.

A.—I have nothing to add to that. I quite agree that the Public Works Department engineers would have been suitable. We got one.

Q.—Have you any objection to the Public Works Department supervising that work?

A.—I have not the slightest objection to the Public Works Department.

Q.—Except that it is slow?

A.—I have no objection to the Public Works personnel, but I think that the procedure of the Public Works Department is capable of a great deal of improvement.

Q.—You have stated in some place that the new Department had not the experience of the Public Works Department—it was lacking in experience.

A.—I have said that, and I have said that I thought the creation of the Development Directorate was a mistake, and that the Development Directorate degenerated into an ordinary Government Department, slavishly following the other Departments, held down by rules and regulations and restrictions just as if the Public Works Department had been carrying it out. It was on exactly the lines that are adopted by the Public Works Department, and it was subject to the same rules and regulations, but without its experience.

Q.—Did the officers nominated by you possess such experience? Could you name them?

A.—The only officers nominated by me were Mr. Lewis, Mr. Elgee, who certainly had had a great deal of experience of sea work, and Mr. O'Rorke.

Chairman.—Was not there Mr. Brims?

A.—Yes.

Sir Frederick Hopkinson.—And Mr. Thomas?

A.—No; I had nothing to do with Mr. Thomas.

Sir M. Visvesvaraya.—He was appointed from here.

A.—A large number of applications were invited, and he was chosen. Mr. Thomas was a local man appointed in Bombay.

Q.—Who prepared the indents for home purchases?

A.—The indents for home purchases were sent home.

Q.—What was the procedure followed in the case of those indents?

A.—The procedure followed was that the indents were sent to my office, and my office took any tenders. The tenders were sent to the High Commissioner—I think it was the High Commissioner—and we recommended the tender and the High Commissioner accepted our recommendation or not as he thought fit, and he placed the order and we inspected the goods.

Q.—And despatched them?

A.—No; we did not despatch them. They were despatched by the Director-General of Stores.

Q.—Final approval lay with the Director-General of Stores, I take it?

A.—Yes.

Q.—And the indent was submitted by the chief engineer direct to you?

A.—Through the Director of Development.

Q.—With his approval, I take it?

A.—I take it, it was certainly with his approval.

Q.—And the final tender or estimates were not approved by the Development Directorate, but by the Director-General of Stores?

A.—Yes.

Q.—Did any Government officer make any changes in tenders recommended by you, in your whole experience?

A.—I cannot remember at all. I think it is unlikely.

Q.—Were you ever consulted about the indents for local purchases in India?

A.—Never.

Q.—That is a matter on which you were never consulted?

A.—No; I never knew what had been purchased.

Sir M. Visvesvaraya.—When you went to Bombay, what are the points you went over with the engineers? Did you not take stock of the whole position?

Chairman.—As you are coming to a new subject perhaps it would be convenient to break off.

Sir H. Courthope-Munroe.—Before we break off may I just clear up this point? I understand it is agreed now that we should have the Shorthand Notes?

Chairman.—Certainly.

Sir H. Courthope-Munroe.—May we have that document returned?

Chairman.—You may remember that you anticipated that we might be taking weeks over this.

Sir H. Courthope-Munroe.—I did not.

Chairman.—I can assure you it will take less than five minutes. We hand it back to you, but it is an example of the value of producing the document.

Sir H. Courthope-Munroe.—Thank you.

Sir Frederick Hopkinson.—I assume we shall see it to-morrow. I shall have one or two questions to ask.

Sir H. Courthope-Munroe.—I am perfectly willing anything should be got, but these being original documents we did not want to part with them.

Chairman.—They show exactly how the matter was made up.

Sir H. Courthope-Munroe.—Sir George has been in attendance here since Thursday. He is a busy man, whose time is money. He has represented to me (he hoped to finish to-day), that to-morrow will be the very last day he can undertake to be present personally. We have the other witnesses; but to-morrow, as far as Sir George is concerned, I understand it, must be his final attendance here.

Chairman.—We will consider that this time to-morrow.

Sir H. Courthope-Munroe.—You understand the position as he conceives it? He is being paid no fees whatever. He is coming here to assist the Committee to make its report, and he is giving full and frank information.

Chairman.—It is a little broader than that.

Sir H. Courthope-Munroe.—I venture to think that is the effect of it.

Chairman.—It is a little broader than that.

(Adjourned to to-morrow at 11 o'clock.)

The Committee Assembled at 11 a.m. on the 2nd November, 1926, all the Members being present.

The examination of Sir George Buchanan was continued.

Sir H. Courthope-Munroe.—Since the meeting last night, Sir, Sir George Buchanan has turned up a letter which he wrote to H.E. Sir George Lloyd, the Governor of Bombay, making a complaint, and, in view of your questions about why Sir George did not make complaints, it might be as well that you should have the letter handed in to you, and for Sir George to refer to it. (*The letter was handed to the Chairman.*)

Chairman.—The letter is dated the 31st July, 1922, and is written from Victoria Street by Sir George: " I began a letter to Your Excellency some time ago, but decided, as Sir Lawless Hepper was on his way home, to wait until I had seen him, as I know you have quite sufficient worries without my adding to them. At our last meeting in Bombay I told Your Excellency that there seemed to be some misapprehension as to our position. Mr. Lewis appeared to be regarded as the Chief Engineer in fact as well as in name, and that at the meeting of the Advisory Committee I was not even introduced to the members. After my return home we were very much concerned at the absolute cessation of all letters and reports from Mr. Lewis, and on the 3rd June, 1922, I wrote a strong letter of remonstrance, and sent a copy to Sir Lawless Hepper. Since then, and I think principally because Mr. Lewis has gone on leave, the veil has been lifted, and we are getting our reports by nearly every mail. Sir Lawless Hepper called here on the 26th, and I showed him a letter, of which I enclose a copy, the original having been despatched. The letter speaks for itself, the gist of it being we should like to do our job according to our reading of the agreement. Mr. Lewis, either through ill-health or a misconception of our position, has been keeping us in the dark and treating us as consultants. Sir Lawless Hepper takes our view, and the matter will have to be cleared up if and when Mr. Lewis returns to duty." Then there is a matter about South Africa. " I have written this letter because I know how very interested Your Excellency is in everything connected with the Back Bay Scheme, and would like to hear of any difficulties direct from me." That is dated 31st July, 1922. The letter speaks of an enclosure, Sir George?*

A.—Yes, I think that is among your documents.

Q.—May we just identify it. It should be round about July, 1922, if we have it?

A.—I can give you a copy of it.

Q.—It will not take you a minute to tell us if I hand you my copy of the documents. *There* is the 9th June (*handing document to Witness*). Your letter is the 31st July. Will you just pass through those letters from the 9th June?

A.—No, you have not got those letters.

Q.—Will you let us have a copy of it?

A.—I will.

Q.—Would you like to have this back?

A.—The original is with Sir George Lloyd.

Q.—Have you another copy?

A.—I am not quite certain.

Q.—I think perhaps the best plan is that you should give us a copy, and retain that. Is there anyone whom you could send down to get a copy of the letter enclosed, or will you give us the substance of it?

A.—I will try to get it for you after lunch.

Chairman.—Thank you very much. Will you now proceed to put your further questions, Sir M. Visvesvaraya?

Sir M. Visvesvaraya.—Did you get any reply to, or acknowledgment of that letter from Sir George Lloyd?

A.—No; but what happened was, that when I did get to Bombay I had a long interview with Sir Chimanlal Setalvad in Sir Lawless Hepper's presence. All the real action that was taken, however, was that Mr. Lewis's letters were directed to be sent through the Director of Development instead of to me direct; otherwise, the main issue was evaded. It is not evidence, but I remember that Sir Lawless Hepper told me that he was not pleased with me for addressing a letter direct to the Government.

Q.—In reference to my question of yesterday, have you worked out any figures of your own showing the time you spent in Bombay?

A.—I do not quite understand you.

Q.—What time did you spend in Bombay?

A.—You have all the particulars.

*See Appendix XIII.

Q.—But have you worked out independently any figures showing how many months you spent in Bombay? You remember I put the question yesterday?

A.—I have given the figures to this Committee.

Q.—You have given a general statement?

A.—No, I gave a detailed statement.

Q.—But in that statement you included work which you did outside Bombay. Cannot you give us the actual net time which you spent on the Bombay work? However, we have got some figures. Do you consider that you have devoted the greater part of your time to the work as stipulated in the contract?

A.—I consider I have done everything within the contract.

Q.—If Sir Lawless Hepper complains that you were in Australia or in other places, that is not a reasonable complaint?

A.—He never has complained.

Q.—In your own statement you mention that he has complained and that you have answered his allegation.

A.—He never made any complaint of me.

Q.—Sometimes you were in Australia and sometimes elsewhere?

A.—I was not a whole-time officer of the Government.

Chairman.—In his statement Sir George Buchanan said that before he went to Australia he had an interview with Sir George Lloyd——

A.—No, with the present Governor, Sir Leslie Wilson.

Q.—Yes, with the member in charge, and with Sir Lawless Hepper, and they discussed Australia and knew perfectly well he was going, and did not ask him to stay or suggest that his presence was necessary. That is how Sir George has dealt with the matter.

Sir M. Visvesvaraya.—You have not got a list of the plans and specifications which you sent out from London for the permanent works?

A.—No, I have not.*

Q.—Yesterday you stated that you would be prepared to show that the dredger would be a success if the staff was completely changed according to your wishes?

A.—Yes.

Q.—Do you expect to be able to do the work at the estimated cost of 5 annas, or even 8 annas?

A.—I could not say, because I am not now associated with the work.

Q.—But you said it would be possible to work the dredger according to the estimates?

A.—I cannot guarantee anything now, as I am no longer in touch with the work.

Q.—But you feel assured that the dredger is capable of doing its output?

A.—I have said that several times.

Q.—Do you expect to be able to do the work if the whole plant is placed under your direction, and you are allowed to deal with the staff as you think best? Do you think you will be able to do it at any specific rate, and do you expect to be able to pump material into the middle blocks?

A.—That is a hypothetical question, because I have nothing to do with the work at present.

Q.—You have nothing to do with the work now, but you had something to do with it originally, when you had charge of it. You stated yesterday that if you were given a free hand, you would do the work?

A.—Yes, but I have never been given a free hand.

Q.—If you were given a free hand now, would you be able to prove that the dredger could give the promised output?

A.—I should have a very good try.

Q.—That is all?

A.—I should have a very good try. I cannot bind myself down.

Q.—Then you have modified your statement. Yesterday you said that, if you had an opportunity, you would prove that it was a success.

A.—I would prove it was a success.

Q.—Now you say you would " try " to prove it?

A.—I have never been asked. I cannot go and guarantee what would happen if I was given complete control. That is a hypothetical question.

Q.—Nobody else says that the dredger is capable of doing the work which you have promised about it. I asked you yesterday whether you could prove it if you had your own way and staff. Now you say you would " try " to prove it?

A.—No; I say it could be done, but the occasion has never arisen.

* See Appendix XIV.

Q.—" It could be done." You do not undertake to *prove* it could be done?

A.—I have never been asked. I am not going here to give any undertaking. I have not been asked.

Q.—But if you were asked, you would do so?

A.—If I were asked I should consider the matter.

Q.—Then the statement you made yesterday, that you could prove that it would give the proper output, is not to be accepted as a final statement? You stated that yesterday.

A.—I do not quite follow.

Q.—You stated yesterday that, if you were given an opportunity, you would prove that the dredger complied with all the conditions under which it was purchased?

A.—Yes.

Q.—To-day you say, " I will try." Will you kindly give me a definite answer, and I will close my question?

A.—Will you put it to me, Mr. Chairman?

Chairman.—Sir M. Visvesvaraya says that yesterday you asserted that you could prove that the dredger would do her guaranteed output. Sir M. Visvesvaraya is of opinion that, this morning, you are rather going back on that and qualifying it by saying you would merely try; but, as I understand your evidence, from first to last you have always asserted that the dredger could do the work for which she was designed?

A.—Yes.

Q.—Namely, to dredge 2,000 cubic yards per hour of soft clay?

A.—Yes.

Q.—And you say, " Given proper team work, proper coal and proper incentive, and a dredging master with driving power," you believe you would get that result, or so nearly that result that nobody would quarrel with it?

A.—That is it.

Chairman.—That is how I understand it.

Sir M. Visvesvaraya.—At that rate?

Chairman.—Yes, at the rate of 2,000 cubic yards per hour of soft clay.

Sir M. Visvesvaraya.—And five million cubic yards per annum?

Chairman.—Yes, or so near that nobody would quarrel with it.

Sir M. Visvesvaraya.—Do you expect that the dredger would pump into the middle blocks also? You have, in all, eight blocks. One dredger is pumping now into blocks 8 and 7. Do you expect that the other blocks could be filled also from the same dredger?

A.—I am sorry; but I cannot go into these questions.

Q.—Is it because they are difficult?

A.—No.

Q.—You have designed dredgers and pipe-lines, and I ask you whether you would make sure that the middle blocks could be pumped into, and you now hesitate to give an answer?

A.—Yes, the middle blocks could be pumped into.

Q.—At the rate of 2,000 cubic yards per hour?

A.—I really cannot go into these details.

Q.—This must be the A B C of your work?

A.—I really cannot go into all these details of the execution of the works.

Sir M. Visvesvaraya.—As long as that is noted——

Chairman.—Is it a question of distance?

Sir M. Visvesvaraya.—Yes.

Chairman.—Would you put the distance to him? Have you the distance measured off?

Sir Frederick Hopkinson.—I will deal with this point.

Sir M. Visvesvaraya.—Of course, we recognise that pumping could be done if no regard is paid to the cost, but the main point is whether the work could be done at the estimated rate or at any reasonable rate, and whether the dredger could pump into all the blocks comprising the reclamation area. Now with regard to the tenders for the sea wall. The tenders are not in the usual form in which they are usually sent out to contractors, are they? Your tender form required the contractors to do much of the work which the engineers are expected to do themselves. For instance, you ask the contractors to submit in detail their proposals for carrying out the work. Is it not usual for the engineer himself to do that part of the work—the detailed proposals for carrying out the work?

A.—If you will excuse me, Mr. Chairman, this is a matter of our practice and procedure, and I am not prepared to enter into a discussion as to whether we were right or wrong in the professional practice which we adopted.

Sir M. Visvesvaraya.—This is an engineering question.

Chairman.—You can say in answer to it, Sir George, " That was our practice. It may be a good practice or a bad practice, but it is one which we have pursued for a number of years."

A.—That is our practice.

Chairman.—Put your question again, Sir M. Visvesvaraya.

Sir M. Visvesvaraya.—You want the contractors to specify all the plant they would require to carry out the work and the cost thereof; you want them to give a list of the staff and their salaries and office expenses; you want them to state the amount of percentage over and above the estimated cost they would require to carry out and maintain the work; furthermore you want the contractor's account books showing all discounts, rebates, commissions, and similar allowances; you also want the accounts and vouchers to be handed over to Government on completion of the work. I am only asking whether those conditions were not unusual?

A.—No.

Q.—Can you mention any big works in regard to which such conditions were observed? I may be wrong; I may be ignorant of them.

A.—I suppose you can get a number of examples, but I am not in a position——

Q.—Will you give me one example after lunch?

A.—No. I personally am not going to go into that matter. That is the practice we adopted, and we stand by it.

Q.—Is it only your firm which adopt that practice, or is it generally adopted by all firms?

A.—I will not say anything about it. We thought that was the best way to do the work.

Q.—All I want to know is whether those proposals should have been put forward by the engineers, and whether they are part of the engineers' responsibilities? If you say No, I will have your opinion recorded; that is all. I have a few questions to ask you about your statement. On page 29, paragraph 35, you say, " He would give me his entire and absolute confidence "—that is the Governor—" and if I said the scheme was impracticable he would turn it down at once and start on something fresh, but once my opinion was given he would refuse to allow any other expert to report, and he asked me not to let him down." Do you not find it an advantage in your practice to consult other experts, and take into account the experience of other works in your practice?

A.—I do not see how this arises out of this letter.

Q.— . . . " he would refuse to allow any other expert to report." That is his concern and not yours?

A.—Yes. That is a question which ought to be addressed to Lord Lloyd.

Q.—Now I want to put a question to you on paragraph 41, page 36, where you say, " Mine was the usual report prepared for a client prior to the preparation of working drawings and specifications." In the case of Mr. Kidd's scheme, it was expressly understood that the detailed project would be submitted and the work would be allowed to be proceeded with; but your scheme was allowed to be interpreted as a complete and reliable scheme. I only ask you to give me an answer, Yes or No?

A.—Mine was a report upon Mr. Kidd's scheme.

Q.—That is true, but you stated that yours was a reliable estimate, and Government understood it as such. Is there anything anywhere in the reports of the Government, or in your own report, to show that your estimate was an approximate figure?

A.—It was an estimate.

Q.—You state subsequently that it was an approximate estimate, but at the time you did not say so. It is expressly stated in the report of the Government of Bombay in regard to Mr. Kidd's scheme, but not so in the case of yours.

A.—Yes.

Q.—That is the point?

A.—Yes.

Q.—I only want information.

A.—Yes. Well, it was an estimate.

Q.—It was not understood at the time that it was an approximate estimate?

A.—Excuse me. What is the meaning of the word " estimate "?

Q.—What is the meaning of the word " estimate " in your mind? What is a " reliable estimate," and what is an " approximate one "?

A.—I should like you to look at the dictionary meaning of the word " estimate."

Q.—" Reliable estimate " and " approximate estimate " are two kinds of estimates?

A.—What does " estimate " mean?

Q.—An estimate is the value of the work derived from experience on similar works.
A.—Yes.

Q.—If that is so, was yours a reliable estimate or an approximate estimate? Reliable and approximate are not one and the same thing. If it is reliable it is not approximate; if it is approximate, then it is not reliable; you have to prepare another estimate?

A.—I should like you to read the meaning of the word "estimate" in the Oxford Dictionary.

Q.—Very well, I will drop that question. On page 39, paragraph 49, your statement reads: "I understood my firm would be in sole charge and control and that our Resident Engineer would be free from numerous restrictions on the economical execution of work which obtains in India on works carried out by Government." An engineer advises the principal about the conduct of the work, but he is not in sole charge and control, is he? Why should you not have regarded the Development Directorate as the contractor for all practical purposes, and adapted your duties accordingly?

A.—The Development Directorate was in the position of contractor?

Q.—They incurred the expenditure; they carried out the work, and of course the Development Director could overrule you. He combined in himself the duties of the contractor and the supervising authority. If he overruled you, could you not have gone to the principals then—the Government?

A.—Yes.

Q.—The engineers cannot be given the sole charge and control of any work. They are advisers. They can prepare and put out a programme. They are technical advisers, and as such, if their advice is followed by Government their responsibility ceases?

A.—Yes.

Q.—But you did not carry out the Engineers' duties, you say, because they did not respond. The Development Directorate did not respond, and you did not insist upon the Development Director doing his share of the contract?

A.—I had no power to insist that the Development Director should do so.

Q.—You could have represented it to Government?

A.—I think I have represented it to Government.

Q.—Specifically? You have allowed yourself to fall into an indifferent position with reference to the work, have you not?

A.—No, I should not say so.

Q.—You have not been definitely carrying out your duties, simply because another official of Government obstructed you. Your statement amounts to that, does it not?

A.—I cannot go beyond what I have put in my statement.

Q.—On page 44 you say, speaking about Messrs. Simons & Co.'s tender, "I was not far out when I told you that if the order was not placed before the 12th March, it would cost your Government another £100,000". When they put up the price in that way, why did you not ask other firms of dredger builders to tender again?

A.—By that time it was in the hands of Sir John Biles, and the Stores Department.

Q.—It may have been, but when they raised the price, would it not have been well to have advised them to call for tenders, even at that late stage?

A.—But I did not know. That is a question you should address to the Director-General of Stores. I did not know what the price was until the contract had been let. I had nothing whatever to do with the letting of the contract.

Q.—The prices were discussed by you before you gave the advice?

A.—They were discussed. Really, I have nothing to add to what is in this statement.

Q.—Again, on the same page you say, "I understood you would be adverse to dual control in connection with the scheme because if the dredger did not do its work, we should turn round and say that as we had had nothing to do with the dredger, we could accept no responsibility."

A.—I have dealt with that in my previous evidence.

Q.—On page 55, paragraph 69, you say "To represent and assist the engineers there is appointed a resident engineer and staff of assistants, who are under the direct orders of the engineers. Their salaries are paid, in some cases, by the engineers and in others by their clients, depending upon the terms of the agreement, but there is no dual control and the duty of the resident engineer is to carry out the engineer's orders, to see that the work is executed in accordance with plans and specifications, and to measure up the work done from time to time in order that the engineers may issue certificates for payment of the contractors."

A.—Yes.

Q.—" The resident engineer also sends the engineers progress reports, progress plans and sections and corresponds regularly with the engineers." Did you help in measuring up the work? "

A.—How do you mean " measuring up the work? "

Q.—Checking the work done on the works? Was not the work measured up and checked by any of your representatives?

A.—Our representative was the resident engineer.

Q.—Did you check the work independently?

A.—No.

Q.—The resident engineer was the Development Directorate's agent?

A.—Yes.

Q.—He was also your agent?

A.—He was also our representative.

Q.—Did you check the work of the resident engineer?

A.—Why should I? He was the man to do the work. If I got someone to check him——

Q.—There must be somebody to check the work of the man on the spot?

A.—There is a limit to checking.

Q.—Do not the engineers measure up the work from time to time and keep a record of the progress of the work?

A.—The resident engineer does.

Q.—But are not the engineers also responsible?

A.—No. As a rule the resident engineer is the engineer's servant.

Q.—He may be the servant, but are not the engineers themselves responsible for watching the progress of the work, the quantity rates and the amounts of expenditure?

A.—If you mean, do we ever personally go and measure up the work, we do not. We have our representatives.

Q.—You have some officer or representative of your own to measure up the work so as to give your principal a report as to the exact quantity?

A.—Yes, and that is our resident engineer. Our resident engineer in this case was Mr. Lewis.

Q.—Then did you accept his measurements as final and correct?

A.—I do not think he ever made any measurements.

Q.—If he did not take any measurements, should you not have insisted on his taking the measurements and keeping the accounts up to date? You did once?

A.—It is on the records.

Q.—But a general report, or a remark like that, did not relieve you of the responsibility of insisting on all the regular duties of the resident engineer being duly performed?

A.—We could not do any more than we did do. We wrote to the Governor of Bombay, and we made a fuss about the cost accounts.*

Sir M. Visvesvaraya.—I think those are very sound remarks which you made about the cost accounts. I must admit that.

Sir Frederick Hopkinson.—But we have not seen any cost accounts.

Sir M. Visvesvaraya.—On page 63, paragraph 80, you say, " We agreed to perform the work for 2 per cent., and we have only been paid 1½ per cent." Have you any objection to stating the total payment received up till now?

A.—I have not the faintest idea. If you were to take the net payment, expenses in our office, income tax, and one thing and another, you would be surprised how small it was.

Sir Frederick Hopkinson.—I think that applies to all of us, Sir George.

Sir M. Visvesvaraya.—At page 67, you state in the first paragraph, " We consider any revised estimates at this stage quite impracticable. In six months partial, and in two years complete, revised estimates possible." Why did you regard the preparation of revised estimates as impracticable?

A.—It was our opinion at the time. That was our opinion, the way the works were going.

Q.—It was not that you thought that it could not be done in a reasonable time?

A.—It could have been done by other people. It could not have been done by these people.

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* See Appendix XIX.

Q.—You state lower down, " We received, in reply to our cablegram, a letter from the chief engineer dated 19th August, 1921, saying that the estimates were required for political purposes, and were given by him on the understanding that they were not binding, and he had also stipulated that they should not be published." Is that the 702 estimate to which you refer?

A.—No. That was an estimate prepared for political purposes.

Sir M. Visvesvaraya.—What was the amount of that estimate?

Chairman.—It must be the estimate on which Lord Lloyd based his speech on the 9th August, 1921.

Sir M. Visvesvaraya.—702 lakhs?

Chairman.—Roughly 7 crores. Curiously enough, it was 702 lakhs. The date was the 9th August, 1921. That was the date of the speech made by Lord Lloyd.

Sir M. Visvesvaraya.—At the top of page 69 you say, " We do not propose to give any more detail in the revised estimate than in the original one." May I ask why you did not propose to give any more detail?

A.—We proposed to make our revised estimate on the same basis as the one in the book.

Q.—How could it be a reliable estimate unless it were detailed, with specifications, plans, and estimates? Unless these were all given, how could it be a reliable estimate? You meant to have the 702 lakhs estimate on the same basis as the 367 lakhs one?

A.—The chief engineer was working out his detailed estimates, which were being approved one by one by the Director of Development.

Q.—But there should be some check of the details also, should there not, or do you not think it necessary?

A.—I had nothing to do with the checking of the details. It was not within my province.

Q.—But the preparation of estimates is your job?

A.—It was not within my province.

Q.—The preparation and approval of the estimates is the work of the engineers, is it not?

A.—We are getting back to what we were discussing yesterday.

Q.—Just say yes or no?

A.—Estimates, yes.

Q.—And you say you did not want to give any more detail. Why did you not want to give any more detail?

A.—I am referring, and I suppose you are referring, to such works as the Khandivli Quarry and all the temporary works in connection with the scheme.

Q.—They come in the cost?

A.—Those are details.

Q.—You do not think you should go into them?

A.—It was not within our province. That is done by the Chief Engineer and Director of Development.

Q.—They are one of the acknowledged duties of the responsible engineers, are they not?

A.—No. I think we argued that at length yesterday.

Sir M. Visvesvaraya.—If you do not want to go into it I will leave it.

Chairman.—Sir George does not say he does does not want to go into it. What he says is : " I think I have already covered it in my previous answer."

Sir M. Visvesvaraya.—I want a direct answer on the statement he has made here. He says: " We do not propose to give any more details in the revised estimate." In the original estimate there were no details. He says in the revised estimate he did not want to give any details. (To the witness) : Why was that? Just make a statement, and I will accept anything you say.

A.—I am very sorry, but I do not follow the question.

Q.—You say you did not want to give any details in the revised estimate. May I ask why?

A.—Because the details did not concern us.

Q.—Without your going into details, how can you be sure of your estimate being correct and complete? Even at this time did you want to give an approximate estimate, or did you want to give a proper and correct estimate?

A.—We wanted to give a correct estimate.

Q.—How could you do it without going into details? Without giving details your estimate would not be complete?

A.—I do not think I can follow the question.

Chairman.—The point which I think Sir M. Visvesvaraya is trying to make is this. He says, why did you not go into details? The answer may be that you must yourself have gone into details, but you were giving a skeleton result?

A.—That is correct, yes.

Chairman.—If your details were all right you were merely giving the skeleton result.

Sir M. Visvesvaraya.—But the engineers not only have to give a skeleton result but the details also. In order that the estimate should be complete both the details as well as the skeleton should be given. Will you say yes or no?

A.—I say that is the custom in the Public Works Department in India.

Q.—But not for the engineers?

A.—No.

Q.—They do not give details?

A.—No.

Q.—If modifications are made in the course of the execution without reference to the details and the cost goes up, who will be responsible? How are they to know whether the contractor is going on in accordance with the original work or not unless you have the details?

A.—There again I cannot answer these questions, Mr. Chairman. I am very sorry; possibly I am very stupid.

Q.—No, no, you have your own difficulties; I can see that. On page 81 you say "A costing system would only be of use to the Executive, and of no use to the Audit Office, and he suggested that the present audit system remain unaltered, but that a system be introduced which would be of the greatest use to the Deputy Chief Engineers in charge as it would be of a technical nature and would enable the Deputy Chief Engineers to watch expenditure over each process and to effect economy." I for one entirely agree with all those remarks. It is a pity that the costing system has not been introduced on the work. The only additional remark I might make is that the engineers might have insisted on the costing system being adopted.

A.—I beg your pardon. Who do you mean by the engineers?

Q.—Yourselves.

A.—That we might have insisted?

Q.—Insisted upon the costing system being adopted.

A.—I would like to draw attention to that, because I pointed out very fully that we had no powers to insist on the Government of Bombay taking action.

Q.—You had no power to insist, but you could have made definite representations warning the Government that if they did not do it things would go wrong?

A.—I do not think there could have been anything more definite than the representations which were made.

Chairman.—You mean round about page 78 of your statement?

A.—Yes.

Sir M. Visvesvaraya.—As your agreement was with the Secretary of State and not with the Development Director, your disagreement with the latter did not release you from the responsibility of the terms of the contract you have entered with the former.

A.—One moment. In the case of the accounts my protest went as far as the Government of India and the Finance Department.

Q.—Not in writing. You sent a private note. You did not address an official letter to the Secretary. If you had you would have been entitled to an answer?

A.—I really cannot follow that. I had no power to address official letters to the Secretary.

Q.—I beg your pardon. The other party is the Government, not the Development Director.

A.—What more action could have been taken.

Q.—An official letter could have been written saying "Your Development Director is not observing the terms of the contract strictly, and I cannot be responsible if these things are not done."

A.—In addition to putting this all in my annual official report?

Q.—Yes. Ought not you to have done that?

A.—In addition to putting this all in my annual official report, which was for the use of Government, I should also have written a special letter to Government?

Q.—Yes. That is the usual practice. In reports you may say all sorts of things, which the Government may accept or deny, but on any specific point you could have addressed a specific letter to the Government of Bombay?

A.—I wish to put it on record that in my judgment we could not possibly have done anything more than we did in the matter.

Q.—At page 88 you speak of " The degree of disorganisation reached was discussed between us whenever we met, and latterly, as has been shown, all correspondence with the Chief Engineer passed through Sir Lawless Hepper's hands. As a consequence of Mr. Lewis' illness, the lack of a business like system in the Bombay office, and an atmosphere of hostility more easily felt than describable by a visitor from London, the work was an unhappy one for all concerned." All I mean is that a definite letter to Government might have helped matters. I will leave it there.

A.—It was about that time that a definite letter was written by me to the Governor of Bombay.

Chairman.—And the matter, Sir George, is referred to in the greatest detail, and with great insistence, in the report of the 11th February, 1922, page 9, paragraphs 33 and 34. You brought the thing as fairly as you could to the attention of the Government in your official report. You discuss the whole method?

A.—Yes.

Sir H. Courthorpe-Munroe.—What page are you referring to, Sir?

Chairman.—The report of the 11th February, 1922, page 9, paragraphs 33 and 34, which set out exactly his views and contrast the practice in England and the practice which obtains in India, and where he expresses a very definite opinion about the whole matter.

Sir M. Visvesvaraya.—That is true; that report is all right, but with regard to the contract, a direct statement to Government in an official letter would have brought a direct answer from Government. As a matter of fact there may have been semi-official and unofficial letters, but they do not count as complete official documents. (*To the witness.*) Will you kindly turn to page 92, paragraph 118: " I have not the proceedings of the meeting but so far as my recollection goes we unanimously considered that for various reasons the work could better be done departmentally. Meanwhile I had been giving the subject serious consideration from other points of view and I came to the conclusion that in the interests of economy it would be better to dispense altogether with the block wall and to revert to the scheme for a rubble wall throughout ". Can you give us any of the various reasons now? It is an important piece of work. You must be fully aware of the reasons. Why were the tenders dropped? That question was raised in Bombay by some of the witnesses.

A.—I have not got my reports here. I know it was considered more economical. In that connection I would like to point out that in Sir Lawless Hepper's evidence he inferred that he had not been consulted at all in the matter of those tenders. I do not think I have got it with me; I intended to bring it, but I can show you a note in my diary of that date in which I state that the tenders were considered by Sir Lawless Hepper, Mr. Lewis and myself and we unanimously decided it would be better to do the work departmentally. I will produce the diary after lunch.*

Q.—Some of the contractors complain that they were put to a lot of expenditure on that account. At the bottom of page 94, paragraph 123, you say: " It should be borne in mind that it was not possible to design the drains, cross-bunds or locate main roads until more was known about the lay-out of the reclaimed area and the preliminary scheme of Mr. Davidge, the expert town planner, was not received by me until March, 1922 ". Why was it not possible to design the drains, cross-bunds and main roads?

A.—Because nobody knew what was going to be done.

Q.—It says drains—that is, storm water drains—and cross-bunds. The development may be left out altogether. You have nothing to do with the development?

A.—No. I have only to repeat that it was not possible to design them until we had the lay-out.

Q.—Why do you want the lay-out? The sea wall is fixed, and that is the end of of the thing. You have nothing to do with the lay-out. Cross-bunds are part of the construction of the reclamation, and also storm water drains?

A.—Well, go to page 95. The Chief Engineer writes: " An inspection of Mr. Davidge's plan indicates the position of the storm water drains for the area of the reclamation. The drains have obviously to discharge under the sea wall and will naturally be placed on the axes of the main avenues running east and west across the area ".

* See Appendix XV.

Q.—That is according to Mr. Davidge's plan as shown; but there is no reason why storm water drains should not be placed wherever you find it convenient to place them?

A.—The Chief Engineer here says: " The drains have obviously to discharge under the sea wall and will naturally be placed on the axes of the main avenues running east and west across the area ". We did not know the position of the main avenues running east and west across the area until we had received Mr. Davidge's lay-out.

Q.—On page 110, paragraph 137, you say: " As regards the dredger ' Sir George Lloyd,' we hold the opinion that whatever the class of material (short of hard rock and moorum) no better dredger could be procured for the purpose of the scheme and criticisms on the mechanical efficiency of the dredger are beside the point, because up to the present the dredger has had no opportunity of showing what she can do ". There are two or three points to be considered in this connection. You had no calculations to show that the dredger could give the output which you specified?

A.—You asked me that question yesterday.

Sir M. Visvesvaraya.—And you have not given us instances of any other dredgers of similar size which have given the output you have specified. In actual test they have broken down. They have shown themselves not capable of the appointed task. There are those three points. If you wish to state anything which makes you take such a hopeful view we shall be glad.

Chairman.—We must be careful about the phrase " in actual test " because the " Kalu " and " Jinga " and the " Sir George Lloyd " are all claimed, in actual tests, to have done their job. What you mean is daily practical working.

Sir M. Visvesvaraya.—They have been tested a whole season.

Chairman.—It is only in actual tests. We must be careful that that is not mistaken for the official test. You mean the daily working. Over a period of three years you have an output of less than 50 per cent.

Sir M. Visvesvaraya.—Yes. (*To the witness.*) What makes you take such a hopeful view that the dredger is quite capable of giving the specified output?

A.—I have expressed this opinion before the enquiry.

Q.—There must be some grounds for it. You have not given any grounds. If you can give us any we shall be interested to hear them.

A.—Well, confidence in the plant once you have put it in the hands of a contractor and got rid of all the people out there.

Q.—A dredger which can give 1,000 tons per hour cannot be made to give 2,000 tons per hour even if you put it in the hands of an excellent contractor. We want to know what makes you take the hopeful view that the dredger itself is a sound piece of machinery?

A.—I would refer you to Sir John Biles.

Q.—He refers many things to you. We have asked him " Why do you suggest that? Why did you accept that output? " and all that, and he referred us to you?

A.—This is obviously a question for Sir John Biles.

Sir M. Visvesvaraya.—He says " You had better ask Sir George Buchanan ". We are being sent from pillar to post. On page 112 you say in Clause 5: " Regarding my responsibility, I have no desire to evade any responsibility or unduly to blame anyone else. During the course of this inquiry I have been subjected to attack not only by witnesses but by members of the Committee ", and then you quote statements made in the course of the evidence. One is " Sir M. Visvesvaraya. Witness: Sir Lawless Hepper. (Q.) As regards expenditure for a huge work of this magnitude, responsibility must be that of the Director of Back Bay Reclamation works ". I put that question. How do you hold me responsible for any criticism there?

Chairman.—The criticism is in the answer. Sir George Buchanan objects to the answer which Sir Lawless Hepper has given. That is the point, is it not?

A.—That is the point.

Sir M. Visvesvaraya.—The statement says that he has been subjected to attack by members of the Committee.

Witness.—As regards that question, I think it was most extraordinarily proper.

Sir M. Visvesvaraya.—In that particular case at all events there was no criticism by a member of the Committee.

Chairman.—It is the answer of Sir Lawless Hepper. Sir George Buchanan does not agree with the way Sir Lawless Hepper puts it. You put a question which Sir George considers an ideal question, and Sir Lawless Hepper gives an answer which does not please Sir George.

Sir M. Visvesvaraya.—At page 114 you say: " Sir Lawless Hepper has made the remark that Sir George Buchanan was sometimes in Australia and sometimes in Africa

and it was not practicable to send all cases of tenders for contracts that used to arise. What an extraordinary statement!"—that is your remark—" I was not carrying out our duties single-handed—I was not even the engineer. My firm were the engineers and we had an office and staff in London actively engaged in carrying out the whole of our business." That is true, but you were personally responsible under the contract?

A.—No.

Q.—You had to give the greater part of your time. You say: " I was not even the engineer," but you were personally responsible under the contract for the job?

A.—No, I disagree.

Q.—You did promise to give the greater part of your time?

A.—No; I disagree. Evidence will be given, I hope to-morrow, by my partner, and you will see the amount of work he did while I was away.

Q.—I quite agree he may have done, but you were personally responsible under the contract which says: " Sir George Buchanan shall give the greater part of his time, etc." Did you give the greater part of your time?

A.—I have already replied.

Q.—Then on page 115 you say: " Moreover, I had never any intention of being any thing but adviser, and our fees were based on that arrangement." That question was discussed yesterday.

A.—Yes.

Q.—I do not want to go very much further into it. You gave advice when you thought necessary. May it not be that as you assumed no responsibility they took your advice only when they thought it convenient? They were not bound to take your advice always because you took no responsibility.

A.—They were not bound to take my advice, and very often they did not take it.

Q.—Might it not be because you did not take any responsibility?

A.—No; I do not associate myself with that remark.

Q.—Then later on you say: " The creation of the Development Directorate and Department I consider, in the light of events, to have been a mistake." That is the creation of the Development Department?

A.—Yes.

Q.—Kindly tell me how you would carry out the work if you had your own way. Suppose the Development Directorate is abolished as far as this work is concerned, how would you carry it out? We want your own considered opinion.

A.—Yes. My considered opinion, in the light of events, is that of letting the work by contract, whatever the cost was.

Q.—Whatever the cost?

A.—Reasonably, I mean.

Q.—Could you do it within the estimate?

A.—I am not talking about within the estimate.

Q.—But anything can be done if regard is not had to the cost?

A.—You asked me what I would do. I say that the creation of the Development Department I consider, in the light of events, to have been a mistake. Very well. You asked me what, in the light of events, I would do, and I say that, in the light of events, I would let all these works by contract. Naturally, when I say at any cost I mean at any reasonable cost. I would abolish the Directorate to-morrow.

Q.—What guarantees are there that things will not go badly again? Merely leaving the work to contract will not help matters. What organisation would you substitute for the Development Directorate? What organisation have you in view?

A.—In my judgment you could not have a worse organisation than the Development Department.

Q.—What would be the organisation under your scheme if you abolish the Department? There must be somebody to control, somebody to measure up, somebody to take stock of progress, somebody to do the costing. What organisation would you have?

A.—It would depend entirely upon what the Government proposed. If they proposed to use engineers——

Q.—We have to make a recommendation on that point, and on your experience of the work you say that the Development Department should be put an end to. I want to know what alternative organisation you would put in its place. It would be a help to us to see exactly what you have in view. This is not criticism; I am just asking your advice.

A.—In the case of the Back Bay scheme, supposing that the Government retained a firm of engineers like ourselves, or of similar calibre, I should recommend that the work be gone over very carefully, and the work should be let out on a contract basis.

This has already been discussed by the Chairman yesterday, and he said: "Well, you might get people who would take the contract on the basis of receiving so much of the land." That would be a matter for consideration.

Q.—Whom would you have as agents of the Government supervising the work? What Department of the Government would there be? There must be a Department of the Government to look after the work on behalf of the Government.

A.—Do you mean outside the Back Bay scheme?

Q.—For the Back Bay scheme only. You say you would do away with the Development Directorate. What other agency would you substitute in its place on behalf of the Government?

A.—If you take the Back Bay scheme by itself, the Public Works Department would take over the equipment of the reclaimed area, and if there were engineers in this country who carried out the work for the Government there would be no Department necessary.

Sir M. Visvesvaraya.—I quite follow that reply.

Chairman.—You do not mean that you would put the works in the hands of the Public Works Department? Would you put the equipment of the area when reclaimed in their hands?

A.—Yes.

Q.—But the reclamation is to be by the contractor or contractors working under the supervision of an engineer?

A.—Yes.

Sir M. Visvesvaraya.—An engineer under what Department—under the Public Works Department?

A.—No; an independent engineer. We were not in the Public Works Department.

Q.—You were independent engineers. You want an engineer to be appointed in place of the Development Directorate?

A.—No. May I point out that analogous cases (if information is wanted on this point) are the numerous public works carried on by the Crown Agents for the Colonies in the Colonies who employ engineers in this country?

Chairman.—May I see if I have got that right? Your view is that an engineer should be chosen, and that tenders should be invited—world-wide, I suppose?

A.—No limit.

Q.—And that when you have got your contracts, and when you have got your engineers, the Public Works Department has nothing to do with the reclamation part of the work at all?

A.—Nothing whatever.

Q.—The hold that the Government has are the individual contracts with various contractors?

A.—Yes.

Q.—And their reputation, their solvency, and their ability?

A.—Yes.

Q.—That is what the Government looks to?

A.—Yes.

Q.—And they look to the reputation and supervising energy of the engineer?

A.—Yes.

Sir M. Visvesvaraya.—On page 117 you say: "I emphatically assert that the Back Bay scheme inaugurated by Sir George Lloyd is not a failure, and there is no reason why it should not be brought to a triumphant conclusion." But have you considered at what cost it could be brought to a triumphant conclusion? Could you do it within the estimate?

A.—That is an expression of my opinion. Naturally, by a triumphant conclusion I do not mean at an unreasonable cost. You would arrive at that when you begin making negotiations with contractors or taking tenders from contractors.

Q.—Would it be anywhere near the 702 lakhs estimate which was approved?

A.—Really that is not a question which I can answer.

Q.—Any work can be brought to a triumphant conclusion if regard is not had to the cost. You said that the cost was to be no consideration. That was the idea then. I do not think any Government would accept such a statement as that the cost was to be no consideration in considering an estimate for the scheme. That was the idea when you started the work, but I do not think that principle would be acceptable to any Government in these days.

A.—I went on to say that the slump in land values which at present obtains is not going to last for ever.

Q.—That is true; but I am talking of the cost of the work.

A.—To put it in another way: I consider there is nothing to prevent the work being brought to a satisfactory conclusion at a reasonable cost.

Q.—The prospect of profit has disappeared for the moment. They have to keep a close watch on the cost.

A.—Yes.

Q.—The work is delayed because it is going to cost a tremendous amount, and it is felt if it is to be brought to a satisfactory conclusion it should be done within a reasonable cost.

A.—Yes.

Q.—A reasonable cost must be some percentage, 10 per cent., or 15 per cent. on 702 lakhs. Do you think that work could be completed within that percentage with success?

A.—I cannot bind myself down to what I think is a reasonable cost.

Q.—I am much obliged to you.

A.—Thank you.

Sir H. Courthope-Munroe.—There is one point that has occurred to me which I should like to mention.

Chairman.—I do not at all want to criticise, but you are getting a little far away from the modest way in which you started, and, if I may say so, the correct way.

Sir H. Courthope-Munroe.—It was only on a question put by Sir M. Visvesvaraya. He put the question as to whether the estimate was in Sir George's opinion reliable or approximate. I do not want it to appear that Sir George was fencing with the question. He said he would look at the Oxford Dictionary.

Chairman.—Let us have the Oxford Dictionary meaning of the word " estimate."

Sir H. Courthope-Munroe.—That is all I ask for. It may appear to the looker-on as if he were fencing with the question. The Dictionary gives the meaning as follows: " Estimate: approximate judgment of number, amount," etc.

Chairman.—That is right.

Sir H. Courthope-Munroe.—Then the word " reliable " is defined as being of " sound, consistent character." So that it was impossible in view of that definition for Sir George to give a definite answer, because the word " approximate " is rather involved in the word " estimate." You will forgive my pointing that out; but that is the only reason I intervene.

Sir M. Visvesvaraya.—In engineering parlance " approximate " has a definite meaning. " Final estimate " and " approximate estimate " have different meanings in engineering language.

Sir H. Courthope-Munroe.—I leave it there, but " estimate " seems to involve " approximate."

Chairman.—Let me see if I can get the position quite clear about this. The word " estimate " does not import a definite guarantee of accuracy to the last decimal point?

A.—No.

Sir Frederick Hopkinson.—Under certain conditions, yes.

Sir M. Visvesvaraya.—Exactly.

Chairman.—If you say you have prepared a " reliable estimate," does it *not* mean that you have, as an engineer, taken out the figures with due care, and believe that the work can be done for the price?

A.—Yes.

Q.—It may be in certain circumstances put higher, but generally, perhaps that would be a fair way of putting it?

A.—Yes.

Sir Frederick Hopkinson.—I should like to carry that word " estimate " one little step further. If I, as a contractor, give you an estimate for doing certain work for a certain sum and you, as an engineer, accept that estimate, I have to carry the work out for that estimate have I not?

A.—If you give me an estimate.

Q.—And you accept it?

A.—Yes.

Q.—If you, as an engineer, give the Government an estimate for carrying out certain work, you have such things as supplementary estimates?

A.—Yes.

Q.—Which have a totally different meaning?

A.—A totally different meaning.

Q.—The Chairman has been so very exhaustive that he has left me very little to do but in order that no points may be missed I shall have to go generally through the whole thing, and you will forgive me if I ask any questions that the Chairman has already asked. I will do my best to avoid repeating any question, and I will try to be as short as I can. Before we commence on it I should like to refer to that letter you read out this morning to Sir George Lloyd, where you objected to the term " consultants " as applied to your firm. You have also objected to being called " executive engineers "?

A.—Yes.

Q.—Would you explain to me what half-way house there is between the two?

A.—Well, you perhaps know there is a good deal of ambiguity about consulting engineers and engineers. The late Mr. C. S. Meik used always to object, under any circumstances, to be called a consulting engineer. His view was : " I am not a consulting engineer."

Q.—It is a very common phrase to use?

A.—It is a very common thing indeed. I do not think there is much difference, but I was alluding to the position in connection with Public Works in India. Take the various Port Trusts in India. They have their consulting engineers at home. They are agents for the supply of materials. They never consult those engineers about the works or about anything unless they want to, and my fear was that we were going to be pushed out to such an extent that we were only going to be used as engineers when they wished us to supply tools in the same way as a consulting engineer for a Port Trust. That was the meaning of the expression.

Q.—But they have their own Director General of Stores to do all that, have they not?

A.—Government have their own Director General of Stores, but in this case it was decided that we were to do it.

Q.—In the one case you get a fee over the whole work, but the man who simply is employed to supply plant, and so on, only gets a fee on the value of that plant?

A.—Yes.

Q.—That is a very different thing?

A.—That is a very different thing.

Q.—I have been in a great deal of trouble about this Clause in your agreement, and I have been much governed in opinion by your own statement in which you say : " We interpreted our agreement to mean that we are the actually responsible engineers." That seems to me very comprehensive.

A.—Yes.

Q.—What limits your responsibilty there? There is no limit, is there?

A.—The responsible engineers for seeing that our plans were carried out.

Q.—For the design and execution of the works. The word " execution " I believe is used in another place.

A.—It is not the execution of the works—yes, the execution of the works in the sense of having a representative and seeing that the works were carried out.

Q.—I think it means more than that. I think it means really what it says—that is, the execution of the works.

A.—Well, we never interpreted it in that sense. You have got to take the facts which I have laid down, that we had no power whatever. We had no power and no control.

Chairman.—Sir George and Sir Harry, this is, in our opinion, a very curious and very difficult agreement. I do not know whether you have studied it at all, but I think if you would consent to extend your powers here a little, and would just address us for half an hour at some time on the text of this agreement, and on the point as to how far Sir George was responsible for the execution of the works as apart from supervision, it would be very useful.

Sir H. Courthope-Munroe.—I follow you.

Chairman.—If Sir George is willing that you should do so just to help us, only on that one point and nothing else—I think it would be an advantage. Nothing about the termination of the agreement, but just for you to take Clause 1 and discuss it with us and contrast it with Clause 2. Are you willing that that should be done, Sir George?

A.—I am, certainly.

Sir H. Courthope-Munroe.—You will allow me to do that to-morrow?

Chairman.—At any time convenient to yourself.

Sir H. Courthope-Munroe.—Yes; that would necessarily involve looking up some matters.

Chairman.—The position is that Sir George's firm may be engineers in supervision of the works without any executive duties. On the other hand, pushing it to its extreme

limit, he may be responsible for the execution of the works. That is the extreme limit in which he is engineer plus contractor.

Sir H. Courthope-Munroe.—Quite so.

Chairman.—Those are the two opposite views.

Sir H. Courthope-Munroe.—I quite appreciate the point.

Chairman.—He may in fact hold a sort of hybrid position in which he is engineer, and yet by virtue of supplying various articles and certain drawings and plans, he may be, in those circumstances, assuming the position of contractor. It is the measure of responsibility that one would like to have discussed under this agreement. If you could just, within the limit of half an hour, put Sir George's view and your interpretation of it as a lawyer, it would help us.

Sir H. Courthope-Munroe.—I gather you are asking me for that—an interpretation from the point of view of the law?

Chairman.—Yes; your interpretation as a lawyer, and what you say is the true construction of that agreement on that one point—engineer, executive power, contractor. One end the engineer, and the other end engineer plus contractor. It is a very curious agreement.

Sir H. Courthope-Munroe.—Quite.

Sir Frederick Hopkinson.—It is a very important point, because I have read it in one way which gives a totally different position to that assumed by Sir George Buchanan.

Sir H. Courthope-Munroe.—I quite appreciate it.

Sir Frederick Hopkinson.—It is capable of that reading, but we want to know the proper reading. We do not want to have a wrong reading of it.

Sir H. Courthope-Munroe.—You may not obtain even that until you get the Judgment of the House of Lords; but in answer to your questions, what I would suggest is for the purpose of this Inquiry you have to look at what in fact it was understood to mean by all the parties.

Sir Frederick Hopkinson.—I quite agree that that is very important.

Sir H. Courthope-Munroe.—I suggest so far as this Committee is concerned that is the position. I fully appreciate the importance that Sir Grimwood Mears attaches to the real legal meaning of the document; but for this Inquiry you have to look at what everybody thought it meant.

Chairman.—Certainly.

Sir Frederick Hopkinson.—I quite agree.

Sir H. Courthope-Munroe.—I fully appreciate the point. The same point had struck me when I read the papers.

Sir Frederick Hopkinson.—In the meantime that will not prevent me asking these questions that I have already decided to ask.

Sir H. Courthope-Munroe.—No.

Sir Frederick Hopkinson.—While we are on that point, I should like you to bear in mind, Sir George, that reading the document exactly as it is written there has coloured many of the questions that I have put to witnesses in Bombay.

A.—I appreciate that.

Q.—Have you got any plan made in 1919 showing how you proposed to work the dredgers—their position, etc?

A.—No, I have not got any plan made in 1919.

Q.—Can you tell us how you proposed to work the dredgers? I particularly want the non-technical Members of the Committee to understand this point, as you and I of course do.

A.—In 1919?

Q.—Yes; when you made your report in September can you tell me where you were going to put your dredgers, in order to make the reclamation?

A.—Certainly it was not put down on paper, it was discussed.

Q.—Discussed with whom?

A.—It was discussed with Mr. Meik.

Q.—What conclusion did you come to?

A.—Well, the conclusion, so far as I can remember when it was decided to begin the wall at both ends——

Q.—I am speaking now of 1919. There was no question then of building the wall at both ends?

A.—No.

Q.—Will you take your plan from that pocket? There you have got pipe-lines 1, 2 and 3?

A.—Yes.

Q.—Your limits of delivery of the material from the booster was 5,000 feet, I think?

A.—Yes, 5,000 feet from the booster.

Q.—I have plotted these on to this plan, and it seems to me that it was impossible for your booster to deliver the material into either one of the sites shown on your plan, that is to cover the sites?

A.—I know it was discussed at the time; and the reply is that we had at the back of our minds a land booster in addition.

Q.—But that does not appear in the estimates?

A.—No, it does not. We discussed it a great deal, and we thought it might be necessary to have a land booster. On the other hand we were not certain whether it would not be more economical to use 14,000 or 15,000 more feet of pipe-line at a reduced output.

Q.—Had you done it at a reduced output, your whole programme went, did it not?

A.—We did not mean a reduced output for the whole of it.

Q.—It is not the fact that at one time you thought of this land booster working in conjunction with the one dredger in the harbour, and not in conjunction with the "Lloyd" and the "Colaba"?

A.—No; we always had the idea that we sould want a land booster in conjunction with the "Lloyd" and the "Colaba."

Q.—I know that appeared subsequently when you are making progress at a later date—a year or two years or three years later—and if I remember rightly the price of this land booster was £172,000?

A.—The land booster?

Q.—Yes.

A.—What we were considering at the time was this.

Chairman.—Do you agree the price? Is that approximately right—£172,000 for what was called a shore booster?

A.—I do not recollect it. I have no recollection of that.

Sir Frederick Hopkinson.—That will come later on, when I go through the figures. Surely if you thought of using a second booster—that is equal to a third dredger—it was going to increase your price by nearly 50 per cent., was it not?

A.—We had no suggestion of having a booster to cost £172,000. You must remember this is a long time ago, and I cannot remember all the details.

Q.—I understand that.

A.—I remember in discussion with Mr. Meik that we thought we might have a land booster worked by electric current.

Q.—You intended originally to have a booster worked by current, but you found that the current was not available?

A.—That was right.

Q.—Therefore you put in the "Colaba"?

A.—That is right.

Q.—A steamship?

A.—Yes.

Q.—But is not that only reverting to your original programme of having two machines for doing the entire work, because in your report there is no reference whatever of any kind to a third machine for delivering the spoil?

A.—No, that is quite true.

Q.—Had you really seriously intended that? Surely there would have been a mention of it, would there not?

A.—Any work outside the report as it stood we would not make a definite statement as to——we would see how things worked out.

Q.—But that would vitiate your whole estimate, would it not? That would illustrate the definition I gave you just now of the difference between the contractor's estimate and the engineer's estimate? That would really come in the nature of a supplementary estimate?

A.—Yes, but at that time things were put into what fraction of an anna is this going to put on to a square yard of land.

Q.—I am far, shall I say, too non-political a person to consider anything of that kind.

A.—That is my answer. I have nothing more to say.

Sir Frederick Hopkinson.—I want my colleague to understand this point, so I will just put this plan on the wall, and I will make a few remarks about it.

Sir H. Courthope-Munroe.—Is this plan No. 1?

Sir Frederick Hopkinson.—Yes; I am taking the same plan that you have. We have larger ones here, but I think it better to take this one, so that you can follow it more easily. Here is pipe-line No. 1 and here is pipe-line No. 2, and here is pipe-line No. 3. This is the area of dredgable material?

A.—Yes.

Q.—Assuming that your dredger is somewhere in this area, the "Colaba", that is the booster, would be in that position. Now here the limit of practical effective dredging is 5,000 feet, and that is represented by this pencil line which I have etched as her maximum delivery. That means that all this area could not be done by the "Colaba" at her maximum rate of output. It is quite a large area. I would also point out that the reclamation nearer the wall is much deeper than it is here. It begins practically at nothing here, and goes out to about 15 to 20 feet up here. Consequently this is a very large proportion in quantity and area of the reclamation. To give you an idea of the quantity the distance beyond which you could pump effectively to the sea-wall is 1,700 feet. That is getting on towards half a mile. In the case of No. 2 pipe-line here is a similar radius of 5,000 feet drawn on, and that shows also that she could not do it. Now when we come to pipe-line No. 3, the "Colaba" being here, and the "Sir George Lloyd" being somewhere in that radius, 5,000 feet, the maximum distance to which she could pump is shewn by this line here. That means all this portion here could not be done at her effective rate; and this portion from here to the end, which is Block 1 and Block 2, is a distance of 5,000 feet. So that when your dredger has finished that distance, she has still 5,000 feet to do. 5,000 feet is practically a mile, or the distance from this room to the other side of Victoria Station—that is your pipe-line to the end here. There is no possible means of filling the area from here to the other side of Victoria Station. Therefore I want to suggest to you that your scheme as a scheme broke down before it started. Do you agree with that?

A.—No.

Q.—Will you tell me why?

A.—No. I should have to think over it a great deal before I gave that answer.

Chairman.—Will you think it over, because that is a very crucial matter. I think you had better take this map and Sir Frederick had better etch this out in red and green, so as to distinguish between them, and I think you ought to give some more clear answer to this question. It is a matter of figures.

Sir Frederick Hopkinson.—It is only a matter of arithmetic.

Chairman.—It is not a matter of anything else except measurement. Apparently on your own plan Sir Frederick points out that there are many areas which are beyond the pumping area of the "Sir George Lloyd" and the "Colaba" combined, which was 10,000 feet. If that be so, he asks you whether there was not a serious miscalculation?

A—.I shall have to look up my papers. My recollection is that we had always that land booster up our sleeve.

Chairman.—I will just pass you this plan.

Sir Frederick Hopkinson.—I will put my initials on it, and then we shall know where it is.

Chairman.—You follow how the various parts begin and where the "Colaba" is?

A.—I do.

Chairman.—You see the semi-circle which marks, according to Sir Frederick, the utmost limit of the pumping capacity of the dredger and booster combined?

Sir Frederick Hopkinson.—That is their effective output.

Chairman.—It is the two pipe-lines of 5,000 feet each. Then there comes the central area, and he also points out that there is 1,700 feet not provided for. That is 1,700 feet up on the sea-wall and at the maximum depth. Then he takes the centre of the plan, and again shows you a certain area that is outside the limit of 10,000 feet, and eventually we get two blocks each of which, if the figures are right, are very seriously outside the 10,000 feet. That was the point of my question yesterday or to-day, when I asked you whether it was physically possible, with 10,000 feet of pipe-line, to pump into areas 1 or 2?

A.—Yes.

Q.—You have prepared many memoranda in this case; but would you just give us the whole story on about half a sheet of foolscap?

A.—I will see what I can do.*

Chairman.—Thank you very much.

* See Appendix IX.

Sir Frederick Hopkinson.—Even supposing you got another 5,000 feet of pipe in order to do that, you could only do it by materially affecting the quantity of output. Is not that so? If you have your pumps double the length to pump through, they will only pump half the quantity?

A.—As a matter of fact we found out that with more than 10,000 feet the pump was pumping full bore.

Q.—That is a fallacy. You know what a pump can do. It is all horse-power. It is all work. Whatever one may think, it is bound to be a fallacy. I started the same thing in Bombay, but as soon as I came to settle down and think it out, I saw it was a fallacy.

A.—All right.

Q.—If the dredging output in the past has been in the neighbourhood of 1,000 cubic yards an hour, it follows that at the end of the extra 5,000 feet of pipe-line your output would be reduced to 500 cubic yards an hour. There are 4,500,000 cubic yards in these two blocks 1 and 2. That means something like ten years to do these two blocks —nine or ten years—which, of course, kills the scheme as a scheme.

A.—Nine or ten years to do what?

Q.—They have only been doing about 1,000,000 a year?

A.—Yes.

Q.—If you cut that down to half on account of the extra distance, it is nine years' work, taking 4,500,000 yards to do the two blocks only?

A.—You are talking of what they have done in the past?

Q.—Yes; we will have a lot of questions about that directly but we always judge people on what they do, rather than on what they say, do we not?

A.—Yes.

Q.—It is a much better way of doing it. There is one other outside point I would like to refer to before we get into the details. A question I put to Lord Lloyd has been very widely reported, in which I asked him if he really thought you had been entirely loyal. I will tell you exactly what was in my mind at the time. The first year, 1923, the working of the dredger was a failure, there is no other word for it. The second year was a worse failure. The third year was no better Having the view that I hold as to your position under which you were entirely responsible, you left Bombay on 7th January, 1925, shortly after the beginning of the working season, and you went to Australia and were entirely out of touch with the whole work until the following October; is not that so?

A.—Yes.

Q.—It seemed to me—and I generally use rather blunt language perhaps—that that was leaving them in the lurch. I may be entirely wrong, but that was my view at the time, and that was why I put the questions as I did to Lord Lloyd.

A.—Yes.

Q.—You see how my mind has worked?

A.—I see. I do not accept your view.

Q.—It depends upon the reading of that agreement?

A.—Yes. Mr. Halcrow will be giving evidence here; he will be showing exactly the amount of work that was done by him in my office while I was away in Australia.

Q.—I am very much impressed by your interview with Lord Lloyd on the 28th May, 1919, in which he said that he was relying absolutely upon you personally, and adding, quite pathetically I thought, "You will not let me down." That seemed to me to call for almost any sacrifice on your part.

A.—That was with reference to this particular report.

Q.—Was it not meaning that he was really relying entirely upon you? He was putting all his money on you, and pathetically asking you not to let him down?

A.—I repeat that was with reference to this particular report.

Q.—Was it not the scheme? Was it not by carrying out the scheme?

A.—No. There was no discussion at that time as to that.

Q.—You were appointed the Engineer?

A.—Afterwards.

Q.—But are not the two things the same?

A.—You may make what interpretation you choose of that.

Q.—The Committee will, of course.

A.—The Committee will.

Q.—I should like to run through your evidence given to the Chairman on the 28th. With regard to Mr. Kidd's estimate, which we shall come to a little later, I want to

emphasise what you said in almost the first question asked, that you had never seen more detailed information than you got in Mr. Kidd's estimate. Is not that so?

A.—No; I do not remember that.

Chairman.—Was not that with reference to the borings only?

A.—That was with reference to the borings only.

Sir Frederick Hopkinson.—You say the borings only?

A.—Yes.

Chairman.—At present Sir George says that refers to the borings only, and that is my recollection.

A.—I am quite certain it was with reference to the borings only.

Sir Frederick Hopkinson.—I want to go through these things so that they are not omitted, and we will come to the general dredging afterwards. You said also that the staff out there were determined to dredge in the hard?

A.—Yes.

Q.—Why should they be determined to do that, to give a poor output?

A.—Well, the fact remains that they were determined so to dredge in the poor material.

Q.—But why should they?

A.—I do not know why they should; perhaps it was easier for them.

Q.—No, it is more difficult. It is hard material and they are getting a poorer output.

A.—We are bringing evidence on that.

Q.—Never mind about that for the moment. Why should they want to show a poor output in the dredger?

A.—I have not the faintest idea; but the fact remains that we assert positively that they insisted on taking what you might call the last ounce of it, which we criticised, and requested them to dredge in more suitable material.

Q.—Is not it the fact that at this time your dredging area had been restricted so that you had to take all the material you could get?

A.—No; we were not obliged to go and take unsuitable material.

Q.—But you were showing in your various estimates that you were not going to have enough material to fill the reclamation after the Indian Marine had stepped in and prevented you from dredging for certain areas?

A.—No; we showed how we could—that was Mr. Lewis showed—how we could get enough material.

Chairman.—But he showed a deficit of 7,000,000.

Sir Frederick Hopkinson.—I suggest to you that they had to dredge the whole of the material they could get near the reclamation: they had no choice in the matter?

A.—Well, I do not agree.

Q.—We shall come to the figures later on. I understand you are quite right, and it was a question of the borings?

A.—Yes.

Sir Frederick Hopkinson.—It is my note that is wrong.

Chairman.—No; Sir George said "I had never seen a scheme with greater detailed information in respect of material." I put it to him "borings", and he speaks of "material", but he did not mean it in the widest sense.

Sir Frederick Hopkinson.—The one is the result of the other. You speak of the "Jinga" doing extraordinarily well and doing excellent work, and at the same time it was referred to in your report as a warning. I do not quite follow that?

A.—You will find in Mr. Kidd's evidence he talks about the wonderful work of the "Jinga".

Q.—He had nothing to do with that work; he was not concerned in it?

A.—No. I am talking about what Mr. Kidd said in his evidence the other day here.

Chairman.—I will summarise it. Mr. Kidd said he was in touch with Mr. Messent, and he said that the dredger people were very chary about putting the "Jinga" or "Kalu" on to anything except mud: that he persuaded Mr. Messent to try the "Jinga" in blue clay, and she did very well in blue clay, and he emphasised that. That is the only association Mr. Kidd had with it.

Sir Frederick Hopkinson.—Quite so. Did he know the output of the dredger?

Chairman.—It was 1,426—two-thirds.

Sir Frederick Hopkinson.—It is about 30 per cent. less than it ought to have done. What is the meaning of that paragraph that the dredging on the Sewri reclamation should be a warning?

A.—Well, I was examined yesterday by the Chairman on that point, and I have nothing really to add to what I said.

Q.—I shall have some further questions to ask you when I come to the dredging subject, so I will leave it for the moment. As to bonus on output, it has been given in evidence that they paid a bonus on output, and that the bonus scale was fixed by you, and nothing appreciable resulted from it. Have you ever been advised of that?

A.—No. So far as my information goes they did not adopt a bonus scheme on output.

Q.—That is what they told us?

A.—Well, I am bringing evidence on it.

Q.—I remember asking Girdwood if he had a satisfactory bonus, and he mentioned a figure. I said, "Well, that is very small, is it not?" and he said, "Well, it is acceptable," and we were told that you had laid down the scale of bonus.

A.— I would rather evidence was given on that subject by my partner.

Q.—You said also, in answer to the Chairman, that you never saw the soundings that were made after the dredger began to work?

A.—That is correct.

Q.—How could you supervise and control, or advise the Government as to the way the work was being carried out, unless you knew frequently and exactly what the dredger was doing?

A.—I was not in executive control of the work; I was only there for short periods, and I took the information that was given me.

Q.—We were told that the Government could never know until July or August what the dredger had been doing in the previous December?

A.—Yes.

Q.—I made some perhaps rather strong remarks about that, and then I was told that soundings were taken every day, reported to the office every day, and then I said at once: "Why did you not know at least every week exactly how much the dredger had done?"

A.—Yes.

Q.—How could you judge the performance of the dredger unless you knew what it was doing? You reported that the work was going on satisfactorily. How could you tell unless you had these soundings measured up?

A.—We were not in executive control, and we had a Resident Engineer there who was also Chief Engineer.

Q.—But you are personally responsible for the supervision and for the provision of the dredger. How could you tell what the dredger was doing unless you insisted on having the weekly reports?

A.—I was not in executive control of the work.

Q.—How could you advise the Government as to whether the work was going on satisfactorily or otherwise?

A.—I would advise the Government on general lines.

Q.—But general lines does not mean anything. It is purely a question of what the dredger is doing. There is nothing general about that. It is very particular indeed.

A.—Well, nobody knew what the dredger was doing.

Q.—I am asking you why you did not know. Why did not you insist upon being told; because my suggestion is that you could not supervise the works unless you did know?

A.—Very well. Then there is nothing for me to say.

Chairman.—Is not that the fact?

A.—What?

Q.—Is not it the fact that you would know as an engineer of experience that you could ascertain the work of the dredger by taking soundings of her previous work?

A.—Yes.

Q.—Mr. Lewis was your Resident Engineer?

A.—Yes.

Q.—They say that soundings came in day by day?

A.—Yes.

Sir Frederick Hopkinson.—And weekly reports were available.

Chairman.—Supposing on the 20th December, 1923, 12 days after the dredger had begun to work, you had said to Mr. Lewis, "How is the dredger working?" and he said, "I do not know," would not you, with your experience, have turned round on him and said: "You had better find out within the next two hours. Why do not you calculate your soundings?" The point Sir Frederick is trying to make is that you

could have got the information in the ordinary way in which information is obtained in these matters, namely, by a calculation of soundings, and you could from that have ascertained at once that the dredger was not giving 50 per cent. of her output. That is the point. Will you deal with that?

A.—My reply is that I was only in Bombay for limited periods, and we went on the pumping hours, not on the general results of the reclamation. There was a Chief Engineer and a Dredging Superintendent, and I went on their reports.

Sir Frederick Hopkinson.—But you did not get the results of the dredging until the following July or August?

A.—Very well.

Q.—By that time the whole season was over?

A.—Yes.

Q.—You could not make any alteration; you could not say: "You are doing badly; improve it," because you did not know?

A.—Well, I have nothing more to say on that subject.

Mr. Billimoria.—Was it not your duty to know it?

A.—I am being examined by Sir Frederick Hopkinson.

(*Adjourned for a short time.*)

Chairman.—It has occurred to me that you must be very tired. How would it do to interpose Mr. Halcrow and Mr. Settle to-morrow? We ought to be able to finish those two witnesses in the day quite easily, ought we not?

A.—I cannot tell very well. You have got the statements.

Q.—What I was thinking of was, that we might be able to manage to hear Mr. Halcrow's evidence and Mr. Settle's evidence to-morrow even if we sat rather late to do it, and then if it were necessary for you to come for a couple of hours on the next day that would give you a day's rest?

A.—Yes. I would like to consult Mr. Halcrow, but I think that would be very suitable.

Q.—Then let us leave it at that. We will try to get Mr. Halcrow and Mr. Settle finished to-morrow so that it shall not disorganise your office?

A.—I will be glad to answer the question that was put to me about the circles.

Q.—Will you please do so.

A.—Sir Frederick Hopkinson put a plan on the board with a number of circles on it, and shewed that in one case it was 1,700 feet from the 10,000 feet line to the extremity of the dredging. He said: "Does not this shew that your scheme was a failure from the beginning," or words to that effect?

Q.—That question included all the three. There are three semi-circles?

A.—Yes, there are three semi-circles. It illustrates the extraordinary difficulty of replying to technical questions by question and answer. You suddenly have a thing thrown at you that you have not considered perhaps for years and years, and it is not possible in a moment to give a reply. I would suggest with regard to questions of this kind that if Sir Frederick Hopkinson would write them down we will reply to them, but in many cases they require references to all our office plans and files, and it is hardly possible to expect answers instantaneously to questions thrown from the blue on matters of this kind. Now I will reply to this question. I have not had much time to think about it.

Q.—Why not defer your reply? You left the matter before the adjournment that you would write a short memorandum on it; why not do that?

A.—I will do that, but may I suggest that it would facilitate matters if Sir Frederick Hopkinson will put questions of this kind down on paper and let us have them.

Q.—I think we will go on as we are going and see if there is any question with regard to which you feel at a disadvantage in answering on the spur of the moment, and if that is so that shall be noted. Otherwise I think one could get along with most of the questions. There may be a question such as that, and then you shall have time to consider it. At all events, do not answer any question at all like that without giving the matter full consideration, or writing us a supplementary note, so that you shall feel that you have answered the question exactly as you would wish to have done?

A.—It is much more convenient to write a supplementary note.

Q.—Up to now the only matter outstanding is that question on your own plan. Will you write us a little note with regard to it?

A.—Yes.

Q.—That will do quite nicely. If any other questions of a highly technical and complex character arise we will adopt the same plan?

A.—It is impossible for me to remember everything that has happened in the last seven years in order to reply to technical questions.

Q.—We will get along as best we can with regard to it?

A.—Yes.

Sir H. Courthope-Munroe.—I understand that Sir George Buchanan is in a position to answer the question about the plan now.

Chairman.—No, not quite.

Witness.—We will leave it over.

Sir Frederick Hopkinson.—Of course, many of my questions arise out of answers that we have been given during the proceedings, and therefore it is impossible for me to put them down a day or two beforehand. I want to be quite sure that I properly understood you on the 25th and the 28th when you told the Chairman that you never contemplated going into Back Bay at all; is that so?

A.—On what date? I never contemplated originally going near Back Bay.

Q.—Quite. Both you and Mr. Kidd considered the question of dredging from Back Bay, and you both equally condemned it as being quite impracticable?

A.—That is correct.

Q.—And in view of the figures given us by Mr. Lewis, it would appear that you were both wrong, because he says that you can get 24 million cubic yards there?

A.—Yes, he does, but I would not say that we were wrong, because I do not admit that he was right.

Q.—You agreed with him?

A.—We agreed on borings, certainly.

Q.—You agreed it was quite impracticable?

A.—We agreed it was quite impracticable.

Q.—On account of the rocks, and various other things?

A.—Quite so. Mr. Kidd and I were in agreement.

Q.—Absolutely, and, as I say, you were both wrong, according to Mr. Lewis?

A.—According to Mr. Lewis, yes.

Chairman.—Then you go a step further, and you say: " Mr. Thomas, who took the borings and communicated them to Mr. Lewis in my belief made a series of mistakes "

A.—Yes.

Sir Frederick Hopkinson.—I am coming to that now. We have been given a list of borings at Back Bay, and it is on those borings that the " Kalu " first went there in the year 1924; on the same borings the " Kalu " went there in the succeeding year 1925-26, and on the same borings the " Kalu " is going there about now for the third consecutive season. Your intimation that these borings were all wrong is the first intimation we have had that there was anything wrong with them?

A.—Yes.

Chairman.—There is nothing that I know of on the documents that states in anyway that those borings were wrong up till now, except your own evidence.

A.—Yes. I think evidence will be given to that effect by Mr. Settle who went out.

Sir Frederick Hopkinson.—They showed us out in Bombay a large plan showing a large number of borings. I forget the number, and I forget the area, but it showed quite a large area on which they worked the dredger for the last season, and on which they propose to work it for the present season?

A.—Yes.

Q.—Of course you would never think of grounding a boat like the " Kalu " in Back Bay, would you?

A.—Not from what I know now, but on those borings, which showed soft clay——

Q.—I mean grounding it on the existing surface?

A.—That is a matter of opinion. When I saw those borings showing sand and soft clay, sand and soft clay, sand and soft clay, I did consider at one time that it might be possible to get her in and make her dig out a hole for herself.

Q.—That is what she did the first season, but that is not my question. I said would you, under any circumstances, ever think of grounding the " Kalu " in Back Bay?

A.—Grounding her?

Q.—Yes, letting her go in and take the ground, and stay there at low water every tide? It would be a very injudicious thing to do?

A.—I would not do it.

Q.—You would never think of it?

A.—No.

Q.—Nor would I. I am just running through your evidence. You said that Mr. Elgee wrote to you in July, 1924, asking if you had made arrangements for a staff for a double shift. Who made arrangements for the staff for the dredger; who engaged them?

A.—Do you mean the European staff?

Q.—The European staff?

A.—They were engaged by the High Commissioner.

Q.—Not by the Engineer?

A.—No.

Q.—Has the High Commissioner any qualifications to enable him to judge as to the capability of a dredging master?

A.—Not to my knowledge. The procedure was that the Development Directorate wrote to the High Commissioner, and the High Commissioner advertised in the papers. We were not consulted as to wages, conditions of service, and so on.

Q.—Were you not?

A.—No.

Q.—So you did not control the expenditure at all there?

A.—No. Then a small Committee was appointed of officials in the India Office to consider applications, and Mr. Settle went as an adviser to the High Commissioner's Office, and said what he thought about the people.

Q.—As a technical expert in dredging, he ought to have dominated the Committee, ought he not: in effect, he would say who ought to be appointed?

A.—I suppose he would say who ought to be appointed, yes.

Q.—I suppose if you took all the people together, and made them into one Committee, you could not find anybody in the India Office who knew about dredging, or dredging masters?

A.—No, but we were not consulted as to the terms, and the rates of pay.

Q.—Who decided what dredging masters were to be appointed; how many, and so on?

A.—That was decided in Bombay by the Government Directorate.

Q.—You appointed Mr. Brims?

A.—We nominated him.

Q.—That is practically the same thing?

A.—I was in Bombay, and I said: "You must have a separate head of the dredging. You cannot do it with anyone out here," and then we were asked, and we nominated Mr. Brims.

Q.—And also Mr. Speirs, I presume?

A.—I rather think that Mr. Speirs went out with the dredger, and remained on.

Q.—As I read it, it was more or less a matter of luck that Mr. Speirs happened to be there at the time, and he was appointed out there?

A.—He went out with the dredger, I think.

Q.—No, I think not. He went out to erect the floating pipes for Messrs Simons & Co.

A.—Not in this case, I think.

Q.—Yes, he told us that was what he went there for. He was there for some months before the dredgers?

A.—Yes.

Q.—He went there to erect the floating pipes, and as a consequence of his being there he was engaged to take charge of the dredger?

A.—You are probably correct.

Q.—Your revised estimate of the sea wall was 213 lakhs as against the original estimate of 118 lakhs. Had the sea wall been altered in character in any way to account for that difference in cost?

A.—No, I do not think it had been altered to any degree.

Q.—It had been reduced in cost?

A.—That is a question that I could not answer without consideration.

Q.—For instance, had not the concrete blocks been dispensed with?

A.—The concrete blocks had been dispensed with, yes.

Q.—I think they were estimated to cost 43 lakhs?

A.—Yes.

Q.—And some large stones were substituted which the project estimate put at about 6½ lakhs. Then was not the concrete wall reduced in thickness?

A.—I think they wanted to put solid blocks at the top of the concrete wall, and on one occasion when I was in Bombay, on my own initiative I said: "It seems a waste of money to put solid concrete. Put hollow blocks, and fill up the interstices with rubble."

Q.—Was not it reduced in width?
A.—The first 2,000 feet was reduced in width.

Q.—Was not it reduced in height also?
A.—That I cannot say.

Q.—You may take it from me that it was. It is quite clearly in the correspondence. Therefore your original estimate, instead of being 118 lakhs, should have been 118 lakhs less about 40 lakhs, so that would bring it down to 78 lakhs?
A.—I will not argue the point.

Q.—You can take my figures.
A.—Yes.

Q.—I am quite sure of them.
A.—I will take your figures.

Q.—So that when you got this estimate of 213 lakhs, that was really multiplying the original estimate by three, approximately?
A.—Yes.

Mr. Billimoria.—The figure ought to be 200.39 lakhs. There is a misprint there.

Sir Frederick Hopkinson.—I think I took out these figures myself.

Mr. Billimoria.—If you take the total you will see that the 13 lakhs ought not to have been there.

Sir Frederick Hopkinson.—It does not make any appreciable difference.

Mr. Billimoria.—I totalled it up and found it out.

Sir Frederick Hopkinson.—(To the Witness) would you mind looking at the sample of mud that is here? That is a can of what has been called silt?
A.—Yes.

Q.—It is taken from the reclamation?
A.—Yes.

Q.—It has been called silt generally throughout the proceedings. I suggest that that is quite a wrong name, and that it ought to be mud, and mud only. You will find that there is practically no sand in it at all. You get a few grains of very, very fine sand, but quite a small percentage?
A.—Yes.

Q.—Silt, as I understand the word, means that it is largely composed of fine sand?
A.—Very often you see the expression silt and sand.

Q.—Yes, silt and sand, because silt contains sand?
A.—Pure alluvium you call sand.

Q.—Pure alluvium I should call mud, I think. That is mud, without any question?
A.—In Mesopotamia we used to call the material silt. You would call it mud, probably.

Q.—Yes. That material that you have seen there, when it has passed through two pumps, I think could only be described as dirty water, could it? When it has been agitated by two centrifugal pumps it is only dirty water?
A.—Yes, I am inclined to accept that view.

Q.—Do you think that is a suitable material for forming reclamation?
A.—Apparently they have been forming reclamation with it.

Q.—If you had seen that in September, 1919, would you have recommended the Government to use that for reclamation purposes?
A.—If I had seen that?

Q.—Yes.
A.—It is not a question to which one can reply at once, because Mr. Kidd had already stated his opinion.

Q.—I am not asking you Mr. Kidd's opinion. I am asking for your opinion?
A.—It is a very difficult question to answer right off.

Chairman.—Are you in any doubt about it?
A.—What I am thinking about are the present results.

Q.—The question that is put to you is: Suppose that had been shown to you in 1919 before you had made the Report would you have regarded that as suitable material for reclamation, or would you, in your own Report, have said that there was a very large area superimposed upon the mud which, in your opinion, was unsuitable for reclamation? That is really the question.
A.—I did regard it as suitable, because I think in my Report——

Q.—Yes, you did, but then you had not seen it. That is the point that is being put to you. Now that you have seen that material, are you of opinion that that would make good reclamation, and would you have recommended the reclamation with the knowledge

of the existence of all that mass of material that had to be dredged before you could get to the blue clay?

Sir Frederick Hopkinson.—That is the point.

Chairman.—Just think it over and tell us. Just take it quietly.

A.—Yes, I think I should have recommended it for the bottom; in fact I did recommend it as the bottom layer.

Sir Frederick Hopkinson.—Yes, I was just coming to that.

A.—With the clay superimposed upon it.

Q.—I noticed that you said that. As we saw that material out in the actual reclamation I sent a man in to go and pick me a piece of clay some fifty yards away, and to my utter astonishment he went in up to *here* (*indicating chest*).

A.—Yes.

Q.—And he struggled manfully through it, and got the piece of clay. I would like to ask you how could the clay, whether hard, stiff, or soft, that came up in lumps stay on top of that mud?

A.—The mud did harden out in time, you know. You may say that it would be the sun, but the mud hardens out like bricks.

Q.—If you spread it out in the sun?

A.—Yes, in the sun.

Q.—I can imagine that, but this was all under water?

A.—Yes.

Q.—It could never harden out unless you exposed it to the sun. What I want to know is how possibly could the clay float on that mud?

A.—If you put it in that way I see the difficulty.

Q.—I could not understand it, because I do not see how clay cut out in pieces, as it would be by that cutter, could ever stay on top of that mud. That material, after it had been churned by two centrifugal pumps and then deposited into water, escaped through the rubble mound. Of course it escaped. There was nothing to stop it escaping?

A.—There was nothing to stop it escaping.

Q.—It was bound to escape?

A.—Yes.

Q.—And I gathered from both Mr. Brims and Sir Lawless Hepper that you apparently did not wish to retain it as you thought it was not worth retaining. A very large quantity escaped in the first two seasons dredging?

A.—Yes.

Sir M. Visvesvaraya.—900,000 cubic yards.

Sir Frederick Hopkinson.—I do not think it was as much as that. It was 45 per cent. of the output.

Chairman.—It was 45 per cent. in one year and 55 per cent. in the other year.

Sir Frederick Hopkinson.—That would be nearly a million yards in two seasons. That was half the season's work.

A.—In point of fact a great deal of that mud has dried out and has made good land.

Q.—On the other hand a great deal of it has escaped.

A.—A great deal of it has escaped.

Chairman.—Taking the two years it is 50 per cent. It is 45 per cent. in one year. and 55 per cent. in the other.

Sir M. Visvesvaraya.—How many cubic yards is that?

Sir Frederick Hopkinson.—That is roughly one million cubic yards.

Sir M. Visvesvaraya.—It is nine lakhs of cubic yards.

Sir Frederick Hopkinson.—It is 900,000 cubic yards. That in two seasons is one-twenty-fifth of the whole dredging operations, but they told us quite definitely that you did not apparently wish to retain this, and you took no steps to retain it?

A.—No, that is not correct. When I said it was not worth while retaining there was very little of that material at all.

Q.—But I suggest to you that your first year or two's dredging was almost entirely mud?

A.—No.

Q.—Are you sure?

A.—Quite sure.

Q.—This is a copy of the plan that you sent out to Bombay, and you began operations in block K?

A.—Yes.

Q.—In block K there were 2,281,000 yards of material of which the clay was none?

A.—Yes.

Q.—That is where you began dredging?

A.—Yes.

Q.—In block B there were 1,578,000 yards of mud and no clay. In block J there were 893,000 yards of mud and 646,000 yards of clay?

A.—Yes.

Q.—In block H there were 4,189,000 yards of mud and 300,000 yards of clay. Altogether was about one million yards of clay to 9 million yards of mud?

A.—Yes.

Q.—Therefore I suggest that you could not have had much clay in the first two seasons dredging.

A.—In point of fact there was a considerable amount of clay.

Q.—It is not shown in the borings, is it?

A.—It is not shown in those borings.

Q.—It is not shown in those very complete borings which were made. I do not see how you could possibly have had any clay in the first two seasons unless you went right to the outside edge?

A.—A great deal of that material was really hardening out very well in various parts of the Reclamation.

Q.—But it was all under water. It could not harden out. It was impossible for it to harden?

A.—Were you there in the hot weather?

Q.—I was not there at all in those years. The material was covered by the tide every day, and it was also held in by a bund, and all the water coming into the pipe kept it absolutely wet. It was never exposed to the sun: it was always covered with water.

A.—It was always covered with water?

Q.—Yes?

A.—Mr. Settle, who is giving evidence, went very particularly into the question of material. He was there much later than I was, and I should like you to ask him.

Q.—We shall be glad to have any information that we can get, and I hope that he hears the questions so that he can carefully consider them and give us the proper answers. Do you remember that in your estimate of September, 1919, you provided for backing up the sea wall with moorum?

A.—No.

Q.—If you will look at your original report I think that you did?

A.—Yes.

Q.—Why was not that put in?

A.—It is not very much, is it?

Q.—It is not very much I agree; it is not nearly enough. It is item No. 8 on page 29. In your comparative estimate on page 13 you mix the two up together. You call it moorum backing and topping 1,919,000 yards?

A.—Yes.

Q.—The general quantity for one foot of moorum I think was 1,860,000 yards, was it not?

A.—There have been various numbers, yes.

Q.—I think it only varied between that and double that quantity?

A.—Yes.

Q.—That leaves about 59,000 yards for moorum backing?

A.—Yes.

Q.—That would not be enough to back up the wall, would it?

A.—That would not be enough to back up the whole of the wall.

Q.—No?

A.—It was what we considered necessary in this preliminary estimate.

Q.—Wherever you were pumping mud it was necessary, was it not, because that mud churned up by two pumps would flow wherever water would flow, and as the tide went out it was bound to go out with it?

A.—As you probably noticed, in one of my reports I say it might be necessary to make settling ponds.

Q.—Yes, and that is what was done under Sir Lawless Hepper's orders?
A.—Yes.

Q.—Then in November, 1925, your firm wrote out to say that the necessity for doing this appeared to be indicated?
A.—Yes.

Q.—That was two years after the dredging had begun, and nearly a year after the wall had been closed with moorum?
A.—Yes.

Q.—Why did they say that? Can you give me any idea? It was eighteen months after it was first suggested. It took eighteen months for somebody in your office to find out that it was indicated and that it might be necessary?
A.—Yes. Mr. Halcrow can give evidence on that very point.

Q.—Put yourself in the position of the man in charge out in Bombay, what do you think he would think of an engineer in London writing such a letter as that in October, 1925. Do you think he would have any respect for him?
A.—I cannot reply to the question. I think that you would require to know all the circumstances.

Q.—The circumstances are very simple.
A.—They are not so simple.

Q.—They are quite simple?
A.—No.

Q.—Here you were pumping material into a lagoon which was escaping through a wall that you had built. You could not have anything simpler. The question is to put a cork in the hole and stop it?
A.—I do not agree with you in your remark as to what the engineers would think about the engineer at home.

Q.—I will tell you frankly that I know what I should think?
A.—You must remember that we were in the extraordinary position of having a representative who was not a representative. You know perfectly well that if work had been undertaken by contract, and we had had a resident engineer in the ordinary course of things looking after their interests many things would have been done differently.

Q.—I hope so any way.
A.—We had a resident engineer who was not—well, I need not say any more. He broke down absolutely.

Q.—As you have mentioned the subject I will refer to it here. Do you really think that Mr. Lewis was ever, whatever his health was, capable of tackling a job of that magnitude? Was his past experience such as to warrant his ever being appointed to take charge of that work?

Chairman.—Had he the energy and drive to do it?

Sir Frederick Hopkinson.—I will ask that question later. Had he the necessary experience, first of all?
A.—Yes, I think he had the necessary experience.

Sir Frederick Hopkinson.—I have asked Mr. Lewis very complete questions about the whole of his career, and it does not appear to me that anybody could, under any circumstances, have been warranted in placing him in charge of such a large and important work.

Chairman.—Sir George, do tell us anything you can about this, because this is a matter in which I think we feel a good deal of seriousness—the appointment of Mr. Lewis. We have seen Mr. Lewis here.
A.—I am sorry you did not see him in a condition of good health. Originally I had another officer under contemplation. He failed me. The Governor said: "We must start work." I searched round. It was very difficult indeed to get men at that time.

Sir Frederick Hopkinson.—Nobody knows that better than I do.
A.—I nominated Mr. Lewis, and naturally I should not have nominated him unless I thought he was up to the job. He had done most extraordinarily good work with me in Burma, opening out large quarries, which was what we wanted him for first of all.

Q.—In Burma?
A.—Yes.

Q.—What was that work?
A.—The River Training works.

Q.—Do you mean Rangoon?

A.—Rangoon. He had entire charge of the quarries. They were large quarries. I think we had 1,000 tons a day.

Q.—That was only an offshoot of the thing in Bombay. In Rangoon he said all he had to do was to look after that quarry.

A.—I think he had more than that to do. He had quite a distinguished record.

Sir M. Visvesvaraya.—He was quite a different man when I met him in Bombay, Sir Frederick.

Sir Frederick Hopkinson.—I am not saying anything about his physical capacity. I am speaking of his experience of large works. With the exception of Rangoon, which appears to be only working a quarry, I do not remember any experience which he gave us which was of any size at all.

A.—In point of fact, he had rather a distinguished record in the Public Works Department. When I nominated him for this position he was chief engineer to the whole of the province of Burma. You cannot be chief engineer to the whole of the province of Burma without some experience.

Q.—That is not quite my point. My point is experience of, and managing, a large work of this kind?

A.—He had had practical experience. I cannot remember the whole of his record. Have you seen all his record, chapter and verse?

Q.— We have got it.

A.—Or have you only got what he has said here?

Q.—I asked him complete questions about it, and he never seemed to have been in any position for more than a few months, and they were all comparatively small works. I suggest to you that, for properly carrying on this work, you ought to have had the best man obtainable in the world, because there are very diverse propositions in it. You agree with that?

A.—I agree with that.

Q.—And it would probably have paid you over and over again if you had given £10,000 a year to the man who was best capable of doing it?

A.—Excuse me, it was for the Government of Bombay to say what they would give?

Q.—No, I do not think I can agree with you there. I think you were in the position at that time of adviser to the Government of Bombay, and it was for you to say to them what they ought to do. Who is there in the Government of Bombay who can decide on the capacity of a man for carrying out a work of this kind? Is there anybody?

A.—It is not a matter of the Government of Bombay. It goes to the Government of India.

Q.—Go to the Government of India if you like.

A.—However, I can assure you, Sir Frederick, that you would not have had the very slightest chance of getting a man at—I will not say £20,000 a year.

Q.—£20,000 is rather a large sum?

A.—Say £5,000 a year. I do not want to say anything against Mr. Lewis. I know him much better than you do.

Q.—Quite; I understand your feelings.

A.—He has great powers of organisation. You saw a wreck. You did not see the real man.

Q.—I am not saying anything against Mr. Lewis personally.

A.—When I proposed a salary for him—I forget what the exact salary was?

Q.—Rs. 3,000 a month.

A.—It was objected to. It had to go home to the Secretary of State for sanction, and then it was objected to, and at the last moment I had to write to Sir George Lloyd and say, "I do not know what we are going to do; I have got this one man, and the Secretary of State has refused to sanction him at Rs. 3,000 a month."

Q.—At certain times we all know quite well that Governments are always penny wise and pound foolish, are they not?

A.—I agree.

Q.—In other words, if you want a good thing you have to pay for it?

A.—Yes.

Q.—To go to another subject, you said it was cheaper to begin the sea wall from the Marine Lines end. I wish you would tell me why you thought that?

A.—For the simple reason that the railway from the quarry led straight on to the Marine Lines work.

Q.—But you only had to extend your railway to the Colaba end, as you did afterwards?

A.—What did the Colaba railway cost—7 lakhs of rupees.

Q.—But you had to do it?

A.—We should not have had to do it if we had gone the whole way from the Marine Lines.

Q.—It was necessary to do it. How are you going to build the first 2,000 feet at the Colaba end?

A.—With regard to the first 2,000 feet, we did get a great deal of stone thereabout, it was concrete.

Q.—But 2,000 feet of wall means very large quantities, and surely you could not economically get that in penny numbers? You want to do the thing properly. In any case, you would have to take the railway there some time in order to take your moorum topping, would you not?

A.—Well, there again, one is going over years. We might have been right or we might have been wrong, but, at all events, we considered it was best to begin at the Marine Lines end.

Q.—I suggest that that was quite wrong. I suggest that the advice that you ought to have given to the Government of Bombay was "At any cost begin work at the Colaba end; finish that Block 8. Then immediately you have finished it (it required no development) hand it over to the Government of India for their military use," and they would pay you two-thirds of your total estimate for doing the entire work, and those two-thirds would have financed your scheme entirely.

A.—Well, it may be so. One can always be wise after the event.

Q.—But is not that rather elementary? The first thing you do when you are thinking of carrying out a large work, is to say to yourself "How am I going to finance this?" You were spending £1,250,000. At 6¼ per cent. that cost you nearly £100,000 a year?

A.—I was not financing it. It was the Director of Development who was financing it.

Q.—You were the adviser to the Government?

A.—I was not an adviser on financial matters.

Q.—But you do not need to be an adviser on financial matters. That is the ordinary business way of doing a thing. Surely the question of 6¼ per cent. interest on £1,250,000 should weigh very largely with you in determining how to do the work, should it not?

A.—However, take it as you like. We decided it would be better to start from the Marine Lines because it was near the quarries. The Government asked us to begin at both ends, and you know the events which followed. Whether we were right or whether we were wrong is a matter of opinion. I say one can always be wise after the event.

Q.—The wise man is a man who is always wise before the event, is he not?

A.—Unfortunately they are very rare in this world.

Q.—Do you not find that all successful business men are wise before the event rather than afterwards?

A.—I could not say; I do not know.

Q.—It is the men who are unwise before the event who end up in the Bankruptcy Court. I suggest to you that you gave them thoroughly bad advice in advising them to begin at the Marine Lines end, for the reason I have given to you, if for no other. You are spending nearly £100,000 a year in interest—which you are spending to-day, and which you have been spending every day since you have started the work at the Colaba end. I should just like to run through your statement. There are a few points in it which the Chairman has not thoroughly dealt with, from my point of view. First of all I would like to ask you one or two questions about your earliest connection with the work. It would appear that you arrived in Bombay on the 19th May, and you left on the 31st. That gave you about ten working days?

A.—Yes.

Q.—Do you think that anyone could do justice to such a scheme as this in ten days?

A.—I undoubtedly do. I should not have thought of leaving otherwise.

Q.—Did you select a quarry in those ten days?

A.—No. I made enquiries about a quarry, but look at my terms of reference? I was not asked to select a quarry.

Q.—"To examine and report on Mr. Kidd's estimate." How could you do it?

A.—Very well, Sir Frederick Hopkinson. I had the whole of Mr. Kidd's plans and estimates. I obtained the local information I required in Bombay, and I still maintain

(it is a matter of opinion; I have my opinion and you have your opinion) that I had sufficient time for the work. I should not have gone away if I thought I had not got all the information.

Q.—I do not personally see how you could possibly make up an estimate for doing the work unless you had settled where the quarry was to be. You did not know how far it was going to be away. You did not know what the railway rate was going to be. You did not know how much it would cost to open it up. You did not know what length of roads you would require.

A.—I think we are confusing issues, Sir Frederick. I was not making out a working estimate then at all. I got my information as to what the ordinary price of stone was, but I was not going into the details of a quarry.

Q.—But the price of stone depends upon the conditions, does it not? I saw some prices in your list of estimates which you gave me yesterday. It might have been in cart loads. You had to start an entirely new and large scheme. I do not see how you could possibly fix a price for your sea wall unless you knew where the stone was coming from and what it was going to cost you?

A.—Did you ever know the late Mr. C. S. Meik?

Q.—Quite well.

A.—Do you think he would have assisted in preparing an estimate that was not safe about the prices?

Q.—I never knew him in any estimating capacity, so I could not possibly say, but I do not see how Mr. Meik, in London, could possibly know what it was going to cost in Bombay. It was for you to do, really, was it not, and not Mr. Meik? You had been on the site. At any rate, I suggest that ten days was an utterly disproportionate time to allow for the approval of such a scheme as that.

A.—I wish it to be put on record that that is a matter of opinion, and that I dissent —that I consider that I had ample time.

Sir Frederick Hopkinson.—I do not think I need say anything more about Mr. Kidd's estimate. You have done that pretty thoroughly, I think, Mr. Chairman? As to your original appointment, Sir George, Lord Lloyd told us the other day that he had not previously known you. Is that so?

Chairman.—He had met you for a few moments in Mesopotamia, just socially?

A.—Well, we had a long talk of perhaps an hour or two in Mesopotamia.

Sir Frederick Hopkinson.—But not about technical matters, I presume? It would appear that your appointment to undertake this work depended upon the fact that you happened to be in India at that particular time?

A.—That is for you to say.

Q.—Lord Lloyd had been telegraphing home to know if they could send an expert out, and because they said they could not send one out before October he decided to use your services. Is not that it?

A.—With the consent of the Government of India.

Q.—So I say it depended upon the fact that you happened to be out there at that particular time?

A.—That is one way of putting it.

Chairman.—Lord Lloyd also said that your selection was fairly obvious.

Sir Frederick Hopkinson.—On Page 32 of your report, the 6th line from the top, you say " We recognised at once that the crux of the scheme lay in the efficiency of the dredging plant and success of the dredging operations, and on these matters we concentrated our attention. We had both had great practical experience with dredgers of all types and in dredging." As you recognised that the crux of the scheme lay in the efficiency of the dredging plant, you would, of course, take exceptional means to satisfy yourselves that the plant you proposed would be suitable for the work?

A.—Yes.

Q.—Broadly, without going into any details, the machines you have supplied have done half of what you estimated they would do?

A.—Yes.

Q.—You mention further down on the same page about the Rangoon river training scheme. There was a lot of dredging there, was there not?

A.—There was.

Q.—Can you tell me at what cost?

A.—No, I cannot.

Q.—I will tell you then. It cost 1s. 6d. a cubic yard.

A.—I have not the figures before me, but I told the Chairman that in all these matters the circumstances surrounding had to be considered.

Q.—The material at Rangoon was light sand—ideal dredging material, much easier to do than that of Bombay, I think, was it not?

A.—It was silt and sand.

Q.—In fact material for which suction dredgers were first invented to deal with?

A.—Yes.

Q.—The cost I have taken from a paper read by you at the Institution of Civil Engineers. I want to know how, with that record so near you, you could ever conceive of doing this work for eight annas per cubic yard?

A.—It is not a question I can possibly answer without reference to the paper quoted.

Q.—Did not that price influence you in fixing your price of eight annas?

A.—I cannot answer any of these questions by question and answer. I cannot go over what happened in Rangoon in 1912 without referring to my figures.

Chairman.—You can tell us this, Sir George. You must have had in your mind, when you were drafting the report of 1919, that Rangoon had cost 1s. 6d. a cubic yard, must you not? You would carry that in your mind?

A.—Possibly.

Q.—Certainly. A material matter like that would not pass out of your mind?

A.—No.

Q.—You must also have had it in mind that it was silt and sand—the material on which you were working in Rangoon?

A.—Yes.

Q.—Did it never occur to you, when you were drafting your report and knew you were going into a material of silt and blue clay, to consider whether you would do better in silt and blue clay than in silt and sand? Silt and sand is an easier operation than silt and blue clay, is it not?

A.—Yes.

Q.—If it cost you 1s. 6d. to do silt and sand, presumably it would cost you more than 1s. 6d. to do silt and blue clay. Did that point of view ever occur to you?

A.—It may have occurred to me, but one must consider all the circumstances. I cannot answer questions of this character.

Sir Frederick Hopkinson.—The circumstances at Bombay were so different that you required two dredgers to do the same work, and therefore your cost would be very nearly double, would it not?

A.—Yes.

Q.—You had only one at Rangoon, and if I remember rightly, the horse power of your dredger at Rangoon was about 3700. Moreover it was a double stage pump; that is, there were two pumps on the one boat?

A.—Yes.

Q.—That is a much more efficient tool, is it not, than a single pump?

A.—I am not prepared to answer any of these questions.

Q.—That is an ordinary matter of ordinary technical knowledge?

A.—No.

Q.—You claim to be an expert in dredging?

A.—Rangoon has gone out of my knowledge.

Q.—Leave Rangoon alone. You claim to be an expert in dredging. Is not a double stage pump far superior to a single stage pump?

A.—Of course it is.

Q.—That is the point. Then why did you put a single stage pump at Bombay?

A.—Why did I put a single stage pump at Bombay?

Q.—Yes, a single stage pump on each boat?

A.—That I certainly cannot answer by question and answer.

Q.—The "Sir George Lloyd" and the "Colaba" each had one pump, but the "Pelican" at Rangoon had two pumps, double stage?

A.—Yes.

Q.—You say it is a much more efficient tool, and I entirely agree with you, and yet you put a single stage pump into the Bombay machines?

A.—I am not prepared to answer that question. We did not design the dredger in Rangoon and we did not design the dredger for Bombay.

Q.—But you gave the specification for the dredger at Bombay?

A.—We gave a skeleton specification. We did not say what the pump was to be.

Q.—Then what is your specification worth, because that is the heart of the machine?

A.—We asked the builders to specify the best for the work.

Q.—Then you did not make the specification. The builders did it?
A.—The builders did the specification.

Q.—You have claimed hitherto that you drew up the specification for the pump for the " Sir George Lloyd "?
A.—No, I have never claimed that.

Sir Frederick Hopkinson.—I think you have—jointly with Sir John Biles. It appears in your statement.

Chairman.—The witness referred to a letter of September 12th. You are referring to the letter of September 12th of Simons & Co., are you not, in which Simons gave you a general specification with certain modifications after discussion between Sir John Biles and yourself which formed the basis of the contract?
A.—Yes.

Q.—The letter of September 12th, 1919, is the first document in which anything like a general description of the vessels is given?
A.—That is correct.

Q.—And that was drawn up by Messrs. Simons & Co.?
A.—That is right.

Sir Frederick Hopkinson.—But we have been told that you made the preliminary specification for that dredger. You would tell Messrs. Simons before that, would you not, what they had to provide for? Did you not say it must pump 2,000 yards an hour?
A.—Yes.

Q.—Did you not give them the length of the pipe?
A.—Yes.

Q.—Did you not give them the height to which they were to pump?
A.—Yes.

Q.—That is all you gave them?
A.—That is all we gave them.

Q.—And for that you received 1 per cent.?
A.—I beg your pardon.

Q.—For that you received 1 per cent. of its cost?
A.—We have not received one per cent. of the cost.

Q.—You have hopes I expect?
A.—No, I have not.

Chairman.—You have received ¾ per cent.

Sir Frederick Hopkinson.—And the other is owing.

Chairman.—Also, Sir George, you had various consultations with Sir John Biles and other people, apart from these one or two interviews with Simons before July, 1925?
A.—Yes. Put it in this way. We were to get so much on the whole work. Very well then. There was a discussion as to how that was to be arrived at, and it was decided that we should have so much of the dredger as part of the whole work, and Sir John Biles drew up the specification. I think he showed it to us. I do not know when, but we considered he was responsible for the specification.

Sir Frederick Hopkinson.—What I am trying to find out is who is actually responsible for the original specification for the dredger, and why the dredger was built with a single pump.
A.—The reply to that is that the original specification was drawn up by Messrs. Simons & Co. in the usual way.

Q.—Then they practically dictated what kind of a dredger you were to have?
A.—Yes.

Q.—And the dredger they specified was almost a copy of the " Kalu " and " Jinga " in all the essentials?
A.—In all the essentials.

Q.—It was a little bit bigger?
A.—Yes.

Q.—And had a little bit more power?
A.—Yes.

Q.—One was 2,700 h.p. and the other was 3,000 h.p.?
A.—Something like that.

Q.—One had to dredge a shorter distance than the other, and a lower elevation, but in essentials they were copies. Now we know as a matter of fact that both the " Kalu " and the " Jinga " were failures at Sewri. Together they did a little more thar 50 per cent. of what they were designed to do?
A.—We have already discussed that very considerably with the Chairman.

Q.—I know, but I wish to emphasise the point that although you know a double stage pump was more efficient than a single stage pump, you allowed them to specify a single stage pump?

A.—Yes, and if I may justify that I will do so in a separate communication.*

Sir Frederick Hopkinson.—We shall be only too glad, Sir George.

Chairman.—Just make a note of that will you, Sir George?

Sir Frederick Hopkinson.—Do you remember in this connection that the dredger specified by Lobnitz & Co. for doing the Bombay work was a double stage pump?

A.—No, I do not remember.

Q.—Well, it was. If this large and important scheme was almost entirely a question of the dredging, do you not think it would have been fair to the dredger builders to have made certain that they had a sample of the material—the clay—which they had to dredge in order that they might design a dredger best capable of dealing with that material?

A.—No, I do not admit that.

Q.—What do you think was the proper way of asking them to design a dredger? Surely you must give them some indication of what the machine is to do?

A.—We are getting back to the old question of stiff clay and unctuous clay and soft clay.

Q.—I am taking it in rather a general way. I am suggesting that, both for your own protection and for the protection of the dredger builders, they ought to have been given a sample of the exact material with which the machine they had to design had to deal. Do you not think that would have been the proper thing to do?

A.—All I can say is that I have never done such a thing, and I do not know of any case where it has been done.

Q.—I advisedly put in the words " for their own protection " because you see the position now. It has been advertised to the world that this dredger has not been successful. That is bound to reflect in some way upon the dredger builders, is it not?

A.—Well, it has been advertised to the world that the dredger is not successful, but there will also be presumably advertised to the world the other side of the question—that the dredger has not been worked properly.

Q.—We will deal with that in more detail when I come to dredging. I am only trying to clear up a few points in this volume. There is one thing which I do not quite understand here. At the top of Page 37 you say " I modified and very considerably cheapened a section of the wall proposed by Mr. Kidd for reasons given in my report "?

A.—Yes.

Q.—Would you mind explaining to me how that can be, when Mr. Kidd's wall was going to be built for 64 lakhs and yours was to cost 118?

A.—That is very obvious.

Q.—It may be to you, but it is not to me, and I hope you will make it so.

A.—This is all I have to say on the subject. Mr. Kidd's estimate of 1912—sea wall, 64·22 lakhs. My estimate at the same time of Mr. Kidd's plans, 56. My estimate for a sea wall—which, as I say, was cheaper than Mr. Kidd's sea wall, in 1919, which is seven years later, 118·7.

Q.—Twice as much as Mr. Kidd's?

A.—Yes.

Q.—I do not quite see how you very considerably cheapened it?

A.—If I had Mr. Kidd's plans here I could show you, but really I cannot show you without Mr. Kidd's plans.

Q.—Well, I have not got them. Now if you will turn to Page 38, you give the order in which you suggested the work should be done: No. 1, order dredging plant; No. 2, order railway tipping wagons; No. 3, open up quarries for stone and murum; No. 4, begin building wall from Colaba end?

A.—Yes.

Q.—There is not a word there about beginning from Marine Lines, is there?

A.—No, not a word.

Q.—Is that because the Government instructed you afterwards to begin from Marine Lines?

A.—No. It was because at a later date we considered that transport conditions would be easier at Marine Lines.

Q.—I suggest to you that that order is quite wrong; that you ought to have been ready for the dredgers before they arrived there. Your dredger, when you let the contract, was promised to be finished in 14 months?

A.—Yes.

Q.—Probably if you had gone to a little expense and paid for a little overtime you could have got it done in ten or eleven months, or even twelve. Allow two months

* See Appendix XVI.

for the voyage out there. That meant 14 months. Was it possible for you, from May, 1920, to be ready to start dredging in July, 1921? Could it ever have been possible?

A.—It was hoped to be possible.

Q.—I want to go further than that. I want to know, could it by any possibility have been ready, because you did not order your plant till about October, 1920, and the bulk of it was not delivered until 1922. How could you have been ready for the dredger in July, 1921? You have got to order your plant, get it out there, open up your quarries, lay all your railways in, get your plant erected, build your sea wall, build your cross wall, and be ready for the dredger to start, and the storm water drain if necessary—and which was necessary in Block 8. I suggest that the order is entirely wrong and that you ought to have held your hand about the dredger?

A.—Dredgers sometimes sink, and then you have to order another one.

Q.—It is insured, is it not, so you do not lose anything except time; but you surely did not lay down this order of doing the work on the presumption that the dredger was going to sink? Surely that would not have influenced you?

A.—I wish to point out, Mr. Chairman, that these are all expressions of opinion. Sir Frederick Hopkinson can have his opinion: I can have my opinion. I have no doubt that we could both call in experts who would also express opinions. I am willing to leave it at that. If Sir Frederick Hopkinson differs from me, naturally he will put down that he differs from me, and we will agree to differ.

Chairman.—That is right. As long as you give your explanation in answer to Sir Frederick's question, we shall then know just where we stand.

A.—I do not accept always what he says. I say that this is a matter on which we could both of us bring experts to consider and decide.

Sir Frederick Hopkinson.—It meant that you would have to order your plant in October, 1920, get it delivered in Bombay and erected, and have your quarries opened, and be all ready in eight months. Do you consider that a feasible thing?

A.—Not in eight months.

Q.—Yes, in eight months—from October, 1920 to July, 1921, nine months. We need not go on opinions at all. Going on the facts, when did your plant get out there for opening up the quarry? It was towards the end of 1922.

A.—You forget, Sir Frederick, that that was on the assumption that a contract was going to be let in Bombay in October, 1920, and the work was going to be taken in hand at once.

Q.—You mean the first piece of wall at the Colaba end?

A.—Yes.

Q.—You were going to do 700,000 yards of dredging in 17 days? That was only providing for 17 days' work for the dredger. There are 2,000 feet of wall at the Colaba end?

A.—Oh, no; we had hoped to do more than that.

Q.—But that is what you say now—that this was on the assumption that you were going to get 2,000 feet of wall built by contract? Now, on page 39 you say: "The Development Directorate had not been created, and I understood my firm would be in sole charge and control, and that our resident engineer would be free from the numerous restrictions," and so on?

A.—Yes.

Q.—I am only pointing this out in order that your Counsel may consider this as one of the points. What correspondence has ever taken place since that has altered the impression you had at that time that you were to be in sole charge and control? It is control, if you observe, not supervisory control, but control.

A.—At that date we had no agreement. We had not been appointed engineers to the work. At that date no Development Directorate had been created. I do not see that the matter applies; but that is a matter my Counsel will deal with.

Q.—I hope he will; but that is what you had in your mind at that time: that you were to be in sole charge and control. That meant in executive control, did it not?

A.—At that time I supposed the staff of engineers would be appointed independently of the Development Directorate.

Q.—But you were put in sole charge and control?

A.—I was not in sole charge and control.

Q.—My question was: What has taken place since that has altered the view that you expressed there?

A.—Well, many things have happened. However, that I prefer to leave over. It must be common sense that one cannot be in charge and control if actually all power is elsewhere.

Q.—I entirely agree. If you are going to be in sole charge and control you must have both powers?

A.—Yes.

Q.—Otherwise you cannot remain in full charge and control?

A.—No.

Q.—The delay I am causing is entirely to be attributed to the Chairman. He has taken so much of the wind out of my sails that I have to find what he has not touched upon. There is one point I would like to emphasise a little on page 50, where you say :" I had agreed on behalf of my firm, and had promised to make the carrying out of the work my principal object; if necessary, to decline works elsewhere, and I had agreed to go out and spend several months every winter in Bombay." I should like to contrast that with the year 1925, when you left Bombay on the 7th January and did not return again. You went out of touch with the works?

A.—What time did I arrive in Bombay in that year?

Chairman.—The 24th November, 1924.

A.—I think it was October.

Chairman.—Yes; it was October, 1924.

Sir Frederick Hopkinson.—That is about two and a-half months?

A.—Yes.

Q.—As you yourself have said, questions were always arising, and you were not in a position to deal with any questions which arose after 7th January, which was the bulk of the working season—from then on to May or June?

A.—They were most admirably dealt with in my office.

Q.—Possibly; but the point I am trying to make is that you had made this your personal care, not your office, and sometimes there is a good deal of difference in that.

A.—It is curious they were always so very pleased to say good-bye to me in Bombay, is it not, and they never asked me to remain?

Q.—It is not very flattering?

A.—It is in one way.

Q.—I should like them to say good-bye to me with regrets.

A.—Yes.

Q.—Then on page 53 : " I also said I was not aware of any other case where the execution of the work had been specially confined to the personal attention of one particular member of a firm."

A.—Yes.

Q.—That is another thing?

A.—Yes.

Q.—Then three lines further on you say : " But the one of my personal attention was retained." I am simply emphasising what Lord Lloyd said to you in 1919 : that he trusted you entirely not to let him down.

A.—Yes.

Q.—There is one point I want to mention about costs. I have read all the correspondence about the costs that took place between the Director of Development and the Government. That was a case where the Government showed very great stupidity in resisting the appointment of a proper staff to keep costs; but the point I want to make is this : You agree you were in general supervision of the works. Is not that so?

A.—Supervision of the permanent works—advisory.

Q.—I mean permanent works.

A.—Yes.

Q.—I want to suggest to you it was not possible for you or anybody else properly to supervise the works unless you knew the costs.

A.—I quite agree.

Q.—It is an essential factor in the management and supervision of works, is it not?

A.—Absolutely essential.

Q.—And that not knowing these costs you could not possibly supervise them properly?

A.—I agree. You perhaps understand the procedure in India with public works, which is that they do not keep detailed costs.

Q.—I should think that is probably a very serious blot upon their control of works.

A.—I have always thought so.

Q.—I entirely agree with you.

A.—A project estimate is prepared and sanctioned. The estimate has so many heads. The only concern of the auditors is that nobody steals a rupee, and that the sanctioned estimate under the various heads is not exceeded; regardless of the fact

that by keeping costs properly and exercising economy expenditure can be very much reduced.

Q.—Keeping costs enables you to exercise economy?

A.—Keeping costs enables you to exercise economy, but the fact that the cost of public works might thereby be very much reduced does not come within the purview of the audit.

Q.—Then you come to the question of who makes these project estimates. It seems to me rather a comic-opera performance, because the man who makes the project estimate is the man who is going to carry out the work.

A.—That is true.

Q.—Therefore, he would be more than human if he cut his prices down.

A.—Exactly; I agree.

Q.—If he cut his prices down and the work cost a little more than his estimate showed, he would get into serious trouble?

A.—He would.

Q.—If he put his prices twice as much as he need and he did it for three-quarters, he would be considered more or less a reliable man?

A.—I quite agree.

Q.—Although the work might have cost 50 per cent. more than it ought to have cost?

A.—Yes.

Sir Frederick Hopkinson.—I am glad we agree on something.

Mr. Billimoria.—It is lamentable that in spite of the project estimate being excessive we have not been able to do anything even within the project estimate, as far as this scheme is concerned.

Sir Frederick Hopkinson.—We are only keeping within the one principle at the moment.

Mr. Billimoria.—The 702 lakhs estimate has been far exceeded.

Sir Frederick Hopkinson.—I should not like to be led into making any remarks about the efficiency of the audit in your presence, Mr. Billimoria. Then you complain here, and very rightly complain: "At no stage were we informed what the work was costing." My suggestion is that you could not possibly, without that information, supervise the works.

A.—We are in agreement.

Q.—Therefore I should go a step further and say: Why did you not insist upon having the costings? Why did you not write to the Governor-General and say: "If you do not do this I cannot possibly supervise the works. I cannot carry out my contract with you properly to supervise the works unless you help me"? It would be a quite sufficient reason for a threat of resignation, I think. Do you not think so?

A.—I think we discussed this this morning.

Chairman.—Is it not quicker to say yes or no whether, in those circumstances, you ought not to have made strong representations right up to the Governor and direct even to the Government of India? That is Sir Frederick Hopkinson's point.

A.—It went to the Government of India.

Q.—It went by easy stages to the Government of India. It is the same point that Sir M. Visvesvaraya was putting: that direct personal representations by you would have much more effect than sending a letter to Mr. Lewis which, in the ordinary routine, eventually finds its way to Simla.

A.—I do not agree, because Government does not understand what costing accounts are. They looked upon my proposals with surprise. They said: "We do not understand this. What is this about cost accounts?"

Sir Frederick Hopkinson.—Then is not it your duty to make them understand, and tell them you cannot possibly carry out your contract unless you have these? I should have thought it would be. You say on page 64 that you sent out Mr. Settle to report on the dredging, to criticise the execution of the works, and make a thorough inspection of the works?

A.—Yes.

Q.—Did he make a report?

A.—He did make a report.

Q.—To whom?

A.—To us.

Q.—What action was taken on it?

A.—By that time we had ceased to have any connection with the works.

Q.—On page 70 you speak about savings on the estimates other than those connected with dredging as amounting to something like 35 lakhs of rupees. I suggest to you that was entirely due to the alteration in design, and to the omission of the concrete blocks; so there is no particular credit attaching to anybody about that.

A.—The omission of the concrete blocks is a saving, is it not?

Q.—Yes; but it is a saving in the cost.

A.—I do not for a moment say that the saving was in execution.

Q.—I see. It was an omission. It was something which you did not find necessary?

A.—Yes.

Q.—So you very properly omitted them. Then you say on page 82 that the chief engineer, for all reclamation schemes, was under the direct orders of the Director of Development: "But as far as the Back Bay scheme was concerned he also had duties to my firm." Was not he almost entirely responsible to you, to advise you as to what went on in your absence?

A.—Well, really he was supposed to carry out the duties of a resident engineer.

Q.—Normally, if a man did not carry out his duties you would dispense with his services?

A.—Certainly.

Q.—There is one thing which rather struck me which occurred in the middle of 1923. You are complaining that Mr. Lewis is too old for the job. He had only been appointed in 1920. Surely you would have known in 1920 that he was going to be too old in three years, and you would not have appointed him to a job which was going to last six or eight years?

A.—Well, a man may be old and fit for his work, and a man may break down suddenly. I do not think you can labour that point.

Q.—It does not say anything about breakdown. You say: "He is still either suffering from bad health or he is too old for the job." If he was too old in 1923, of course he is too old to appoint in 1920?

A.—Yes—well, I do not think you need labour that point.

Q.—I do not wish to. Having regard to what took place out there I should like to ask you one question, which is this. Why, when this dredging was dragging its weary length along in 1923-24, and 1924-25, did you not say to yourself: "I am going out to Bombay for, if necessary, the whole 171 working days, and so put it right"? Do not you think it was your obvious course to pursue? After all, you are the chief engineer for the whole scheme. If the scheme fails it is bound to reflect upon you, is it not, whatever the reason? Did it not ever occur to you to do as I suggest?

A.—I do not think it ever occurred to me to do specifically what you suggest; but Mr. Lewis went on the 12th July, 1924. As I have pointed out, I consider that his retention after his first breakdown was of the very greatest possible harm.

Q.—Was not that an additional reason for you to go out there and pull things round?

A.—No, because he was the man in control of the carrying out of the work—I was not the executive—and if he chose to refuse to give me any information, I was powerless.

Q.—I am looking at it from rather a larger point of view, and that is this: did you not feel you ought in honour bound to go out and pull the thing together and make a success of it?

A.—Nothing is easier than to come to these conclusions sitting round this table; but if you had been in my shoes, I do not think you would have taken any different course.

Q.—I remember once I had some dredging work abroad, and the dredger was not doing what it had been designed to do. It could not do it. I remember going on board one morning and saying: "I am not going to leave this ship until I find out the reason for it." I was there continuously for 48 hours until I did find it out. That is the sort of thing I mean.

A.—Yes; but you presumably were in control.

Q.—Absolutely.

A.—Well—I was not.

Q.—But you could go and take control?

A.—No, I could not. I disagree there.

Chairman.—I should like to know who would have defied you. If you had gone and said to Lewis: "The whole job is going to pieces, I am going to step in and I am going aboard that dredger, and I am going to see what is the matter," who would have disputed your authority? You would have said: "I am here as expert Engineer, Adviser and assistant to Government and I am supervising. 'Supervising' means watching over, and I am going to watch over this work, and I am going to see it start." Who would have defied you then?

A.—Everybody.

Q.—Mention any one of them?
A.—The Director of Development.

Q.—The Director of Development?
A.—Yes.

Sir Frederick Hopkinson.—He was equally interested in pushing the work on, surely?
A.—I say it would have been an unheard of procedure.

Chairman.—If the Director of Development had defied you, it would have taken you exactly eight minutes to get to Government House and to have laid the whole of your case before the Governor. I do feel puzzled about this. I feel that you were in a commanding position, at all events in a position in which, if you had taken command, everybody would have done as you told them. If they did not, your reference was to the Governor, and if the Governor raised technical difficulties about how you were described, the next steamer was your place home, and a public exposure of the way in which the work had been done.

A.—Well, in drawing repeated attention to the necessity for making a change when Mr. Lewis's health broke down, we considered that we were doing all that we could.

Sir Frederick Hopkinson.—When did you decide to abandon the use of the 20-ton blocks?

A.—At a comparatively early date.

Q.—Why did you not decide that before you brought the 20-ton crane fixing them?

A.—I do not remember that we did buy a 20-ton crane.

Q.—Yes, you did. It is there; I have seen it.
A.—But it was bought by Mr. Lewis.

Q.—Not by you?
A.—No.

Chairman.—You mean it was bought by Mr. Lewis at the time when he was in your office?

A.—We did not buy any of the plant; we did not recommend what plant was wanted.

Sir Frederick Hopkinson.—I will use the term you requisitioned it, and you forwarded it to the Director of Contracts to buy.

A.—It was not on our initiative. We did not buy any of that plant on our initiative. Mr. Lewis came home.

Chairman.—Let us get it correct on the facts. Mr. Lewis came to your office, arriving some time in July, 1920?
A.—Yes.

Q.—He was there from August and onwards?
A.—Yes.

Q.—You left 25th August, 1920?
A.—Yes.

Q.—He was assisted by Mr. Meik in the preparation of the plant list?
A.—Yes.

Q.—Amongst items he ordered was a 20-ton crane, which at this moment I suppose is still standing on the sea-wall?
A.—Yes.

Q.—The evidence is that that 20-ton crane was designed to lift and swing out pell-mell 20-ton blocks as a protection from the sea?
A.—Yes.

Q.—You or your firm altered the design, and came to the conclusion that the stone which was being got at Kandivli was sufficient in weight. It is said in the evidence that that crane has never done more than 7-ton blocks, and that very rarely; and that its usual work is on 3-ton and 4-ton blocks?
A.—Yes.

Q.—And to that extent that there has been a waste of money. That is the point.
A.—Mr. Lewis had sole responsibility for the whole of that plant.

Sir Frederick Hopkinson.—That does not agree with what Mr. Lewis says.
A.—I think Mr. Lewis said that he indented on his own.

Q.—No. He said that Mr. Meik and he together got this out. He went so far as to say that Mr. Meik had been advised by a contractor in London not to put up a

gantry as it was unnecessary, but Mr. Meik thought it was a desirable or convenient way of doing the work.

A.—Yes.

Q.—So that Mr. Meik apparently settled all these things in conjunction with Mr. Lewis?

A.—In conjunction with Mr. Lewis.

Q.—I cannot imagine Mr. Lewis designing and settling what plant was required there, because he had no experience behind him that would warrant it?

A.—He had a particular experience in quarry work.

Q.—In small works?

A.—Well, it was a very large quarry. He went home armed with a list of materials he wanted for the quarry.

Q.—But you know as well as I do that the question of managing a quarry is a thing that we generally leave to a foreman, with occasional supervision. You do not want a highly qualified engineer to work a quarry. I have had dozens of them. I have never had an engineer in a quarry in my life.

A.—Yes, I quite appreciate that view.

Q.—There is no experience to be got in a quarry after a couple of days. Then you know pretty well all about it. If the design required 20-ton blocks, a crane obviously naturally followed for that size, and it must be supplied?

A.—Yes. My recollection is—I will look it up—that Mr. Meik wrote a note in which he said that he did not want Mr. Lewis to order the 20-ton crane.

Q.—He would want a 20-ton crane for 20-ton blocks, which was the proposal?

A.—He particularly advised against the purchase of a 20-ton crane until it had been ascertained whether 20-ton blocks were required or not.

Q.—Perhaps you will look that up and let us have it?

A.—I will look that up.*

Q.—Thank you, very much. Again, I cannot imagine Mr. Lewis ordering a 20-ton crane in defiance of Mr. Meik's remarks that it was possibly not required. Now here is an extraordinary thing. I am reading on page 105 of your statement, paragraph 6: "We hope that it will be possible to obtain all the moorum required for the Back Bay scheme in the vicinity of the Kandivli quarry and bring it down from time to time, as each section of the reclamation is completed; and we would emphasise the fact that as the deliveries will be spread over five years or probably more, it should be possible by judicious arrangement to transport the moorum without undue interference with the transport of the stone." The quarry at its maximum was laid out for 2,000 tons a day. I do not know if that is a letter of yours or whether it is a letter of Meik and Buchanan's signed by somebody else, but there is the letter. Now the moorum required in order to do that was 3,600 tons a day. The whole of your transport was fully occupied in dealing with 2,000 tons a day. How could you possibly interpose 3,600 tons to be done by the same plant?

A.—Well, I cannot remember the details of that.

Q.—I should say that instead of being a judicious arrangement it would be a supernatural arrangement. I forgot to mention when we were speaking about the reclamation at the Colaba end that Mr. Thomas stated positively that the reason the dredger could not work in the extreme end of the Colaba reclamation was that a certain storm water drain had been overlooked. I believe he meant this one—that drain is 2,500 feet long and 5 or 6 feet in diameter. He said that was the real reason why the dredger could not start at the end of 1922. Do you know if that is correct?

A.—As far as I can recollect it is quite incorrect.

Q.—Mr. Thomas stated it quite positively.

A.—I think that is a sufficient reason. If Mr. Thomas stated a thing positively I should think it probably was incorrect.

Q.—If Mr. Thomas said "Yes," you would say he meant, "No"?

A.—That is so.

Chairman.—Sir George has lost all faith in Mr. Thomas as a result of the record of his borings. That is how we read your mind.

A.—I had.

Q.—Mr. Thomas has stated positively that the dredging could not go on in block 8 because there was a storm-water drain there which had been overlooked. If Mr. Thomas is the authority for that, you say that confirms me in my belief that the storm water drain was ready?

A.—In point of fact there is a note of mine—I must try and find it—in which I discuss that storm water drain and point out that the dredging can be proceeded with.

* *See* Appendix XVII.

Sir Frederick Hopkinson.—The dredging was not proceeded with?

A.—The dredging was not proceeded with.

Chairman.—In the absence of that storm water drain or while it was under construction?

A.—Well, I must look that up, if I can. There is also a note of ours to Sir Lawless Hepper in which we say that it is quite evident that Mr. Lewis is so obsessed with the idea of starting dredging at Marine Lines that he refuses to make a beginning at Colaba.

Sir Frederick Hopkinson.—But on that question of borings in Back Bay Sir George said quite positively that the borings were all wrong. It is the first time we have had from any source the suggestion that there is anything wrong with those borings.

Chairman.—I think we might tell Sir George what our information is. When we left Bombay the dredging masters and all the people there were confident that when they went in about this time in November into Back Bay, they would get very good results. That is the impression left on my mind. All the dredging people at Bombay were of opinion—and it can be seen in the evidence—that when they went into Back Bay this year they were going to do very well.

Sir M. Visvesvaraya.—I have that impression.

Sir Frederick Hopkinson.—It was partly on that that this Committee recommended to the Government of Bombay to proceed with this season's work.

Chairman.—It comes as a great surprise to me that the borings of Mr. Thomas are all wrong.

Sir Frederick Hopkinson.—I do not know anything about it.

A.—Mr. Settle has some information on that point.

Chairman.—We must go carefully into that.

A.—Do you say that the dredger was going to be put into the same position?

Q.—Not the " Sir George Lloyd " but the " Kalu."

A.—Yes—that she was going to be put in the same position as she had been in last year?

Q.—Yes.

A.—Mr. Settle will be able to prove to you that she has already been moved 1,000 feet from the place where she was first of all.

Sir Frederick Hopkinson.—She has been dredging, and she has dredged 300,000 to 400,000 cubic yards.

A.—Yes.

Q.—That would take her more than 1,000 feet.

A.—He will explain.

Q.—You say on page 110 that the human factor is all-important. Well, that applies particularly to all constructive works?

A.—Yes.

Q.—Without that proper human factor you can make no success?

A.—That is so.

Q.—What I would like to know is, who has done anything to improve that unhappy state of affairs, when the human factor was not used to produce proper results? Who has done anything, whether by whip or carrot?

A.—Well, I do not think that much has been done to improve the human factor.

Q.—I would like to suggest here that reliance has been placed on letters throughout the whole period. It is action that is wanted, not letters.

A.—Have you ever lived for long in India?

Q.—No, I have not.

A.—Well, if I may say so, it would be a very useful experience to you.

Q.—I have lived in the Sudan, and I encouraged all my staff to look upon the Sudan as a health resort. It was rather difficult, I can tell you, but in the end they agreed in a semi-humorous way that it was.

A.—I suggest that you should go and live a few years in India, and then you would get the proper atmosphere.

Q.—If that is going to lead me to carry on works like the Bombay reclamation, I shall certainly decline to go.

A.—I say in one of my reports that one of the difficulties the Government has in carrying out the work is that they are not allowed to give any encouragement for good service.

Sir Frederick Hopkinson.—I agree that that is a great blot on their procedure.

Chairman.—You have made that point perfectly clear.

A.—Yes.

Q.—It is Mr. Merritt's point put in another way.
A.—Yes.

Chairman.—We remember that.

Sir Frederick Hopkinson.—One word on the last paragraph of your statement about the works being brought to a triumphant conclusion. I suggest that is manifestly impossible; they never can be brought to a triumphant conclusion, and they never will; it is impossible.

A.—Well, again that is a matter of time and opinion.

Q.—No, not of opinion, because the scheme was to have been done in six years. Four years have elapsed, and there is no sight of the end. On this question of control I would like to ask you this. In the case of a work of that kind let to a contractor, would he design and buy the dredger and take it out in the ordinary way? Suppose you let the work to a contractor, he would design and purchase the dredger?

A.—That is a matter of arrangement.

Q.—Suppose you let anyone the contract at so much a yard?
A.—Yes, of course he would.

Q.—He would have a dredger designed, and would buy the dredger?
A.—Yes.

Q.—He would design the gantry for building the sea wall?
A.—He would.

Q.—He would settle on what plant was to be used generally throughout the work —locomotives and cranes?

A.—He would.

Q.—He would also purchase all the plant?
A.—Yes.

Q.—Or requisition it?
A.—Yes.

Q.—And he would engage all the staff?
A.—He would.

Q.—Settle their duties—he would make the dredging programmes?
A.—Yes.

Q.—He would decide where and how the dredgers were to work?
A.—He would. He would do all those things.

Q.—He would approve or disapprove of buying more plant if it were required?
A.—Yes.

Q.—All those things you have done?
A.—We have done a certain number of those things as advisers to Government.

Q.—You have done all of them?

A.—Well, leaving that an open point, the contractor would also have complete control of the costings.

Q.—Let us settle this before we go any further. You have done all those things?
A.—No, I do not accept that.

Q.—Which of those have you not done?
A.—I have bought plant on requisitions.

Q.—Yes.
A.—But I had nothing to do with the settling as to its necessity.

Q.—You had to approve the requisition?
A.—No, I had not.

Q.—In one case you remember you refused to buy it. You said you did not think it was necessary, and you were not going to buy it?

A.—I absolutely refuse to accept the suggestion that I had to approve of the plant. I drew the Chairman's attention to a letter yesterday, and said: "You will note this is a demand, an indent, that I am not asked to approve."

Chairman.—That is the 17th March?

Sir Frederick Hopkinson.—But the original plant was got out by Mr. Lewis in conjunction with Mr. Meik. It was Mr. Meik who settled the procedure.

A.—Excuse me, Mr. Meik did not settle the number of cranes, the number of shovels, and so on.

Q.—That is what Mr. Lewis told us.

A.—Mr. Lewis did not. I read Mr. Lewis's evidence. He said Mr. Meik assisted him.

Q.—You cannot imagine a man like Mr. Meik assisting a man like Mr. Lewis. Would not it be the other way about?

A.—No, I do not agree. Mr. Lewis came to the office and he had the use of the office and the use of the staff. He went to Mr. Meik and said, " What do you think about this? What do you think about that? " I refuse to accept the suggestion that Mr. Lewis was not completely independent to order what he wanted, and I refuse to accept the suggestion that all the plant ordered thereafter was not on demand. It was not for us to say whether we would send it or not. If we wrote and objected, we did it voluntarily as advisers to Government. We had no power whatsoever to say, " We will not send them " or " We will send them." If we suggested " We do not think these things are necessary," the Director of Development said, " I disagree with you and I will allow their purchase."

Q.—So far as the gantry was concerned, Mr. Lewis said positively that Mr. Meik took the advice of a contractor at Westminster and acted against that advice, and said it was the design to build it from a gantry—it was one of your obligations under your contract?

A.—It was one of my obligations.

Q.—The preparation of plans and specification for all the other plant required in connection with the construction of the work?

A.—Yes, on indents received.

Q.—I see what you mean; I see the point.

A.—On indents received.

Q.—But not initiate how much plant was required?

A.—No.

Q.—It is pretty certain that Mr. Meik decided on building that gantry?

A.—Mr. Meik did decide on building that gantry. The gantry was in our original 1919 project.

Q.—It does not matter. He decided that that gantry should be built?

A.—Yes.

Q.—That is a contractor's job, is it not—to decide a point such as that?

A.—Well, in this 1919 Report we considered the best way of carrying out the work, and we designed a gantry. The gantry was some use apparently as it was left in the works afterwards.

Q.—What you mean is the draw was left in?

A.—Yes. It is matter of opinion whether the gantry was necessary or not. I could bring ten engineers to say——

Q.—I am not asking you anything about that. I am only saying that Mr. Meik decided that that gantry should be built?

A.—Yes.

Q.—That is a contractor's job. I am sure you will agree with me there?

A.—Yes, it is a contractor's job.

Q.—I make out that making allowance for the elimination of the concrete blocks and the reduction of the size of the concrete walls, that would reduce your 367 lakhs estimate to 329 lakhs?

A.—Yes.

Q.—The present estimate—that is the present estimate of the engineer—not what you have called the estimate made for political purposes, but Mr. Elgee's present estimate—is 1,000 lakhs. That leaves 671 lakhs as an excess cost over the original estimate. Assuming for the moment that you had let this work to a contractor at 367 lakhs, his loss by the time he had finished the work would have been slightly over £5,000,000 sterling?

A.—No contractor at that time would have taken the work on a fixed basis.

Q.—You think not?

A.—No.

Q.—Not in 1920?

A.—No, I do not think so.

Q.—Not with the sliding scale as contracts were taken in those days, on the advances or reductions in certain items? Generally speaking, surely you would get a contractor to take the dredging and the building of the sea wall on, because the only thing that could affect a contractor out there would be the cost of his plant? Before he made a tender he would get firm offers for the supply of the whole of the plant?

A.—Yes.

Q.—I do not think he would have had any difficulty in getting a tender. However, the point is that had he done so there would have been a loss of £5,000,000. I do not

know of any contractor who could anticipate with complaisance a loss of £5,000,000 on one contract; I do not know if you have ever met one who could?

A.—No; I cannot say that I have.

Q.—The thing is absurd, is it not?

A.—Contractors are not in the habit of losing money if they can help it.

Q.—I quite agree with you. About these steam navvies, I will just make one remark concerning them. You bought four steam navvies. I suggest to you that none of those was suitable for the work it was bought for. They are the wrong type altogether and never could do anything there, and never ought to have been bought?

A.—Well, we did not recommend them.

Q.—Who recommended the first one, the one that was bought in 1920, the "Bucyrus"?

A.—Oh, we come back to the old "Bucyrus"?

Q.—Yes.

A.—I had a telegram—you know all the particulars of it.

Sir Frederick Hopkinson.—I do not. I have never been certain who recommended that.

Chairman.—It started by a telegram sent by Lord Furness to Lord Lloyd, Lord Furness being then on his own yacht at Colombo. He mentioned that there were two "Bucyrus" shovels, and he gave technical details, and he gave prices. There was a cable sent to you asking whether a "Bucyrus" shovel would be of use at the work, and you replied by cable that it would. Do you remember that?

A.—I remember the circumstances. We considered it would be useful for moorum.

Sir Frederick Hopkinson.—My suggestion to you was that it was entirely unsuitable for the work in this quarry?

A.—We had it inspected, and it was purchased.

Q.—But it was the wrong type altogether. None of them could have been any use there. You remember rock crops up all over the place. You could not get a level bed to work the machine on. There are pinnacles of rock all over the place directly you get the moorum off, and no machine could work there.

A.—This was intended for moorum.

Q.—That is what I am speaking of—for taking off the moorum?

A.—In the quarry.

Q.—But in the moorum there are pinnacles of rock sticking up all over the place; you could not work the machine at all. It would be idle for three-quarters of the time while you blew off these pinnacles of rock to allow it to move. It is the wrong type of machine altogether. Did you ever in any of your estimates consider the question of interest?

A.—Never.

Q.—You do not say so, I think, in your report anywhere?

A.—No, I do not say so anywhere.

Q.—In work taking six or eight years the question of interest becomes a very important one, does it not?

A.—Yes. I had nothing to do with interest.

Q.—Did you tell the Government that you left them to consider the question of interest?

A.—Well, it was known; there was no need to tell them.

Q.—Up to the present time the cost of the works has been increased by 25 per cent. for interest charges?

A.—Yes.

Q.—That is a very serious addition to an estimate, is it not?

A.—Yes.

Q.—On January 10th, 1923, you wrote: "In particular the annual programme of work should be worked out with the greatest detail and in close conference with the officers concerned, otherwise smooth working is impossible." That is all very well as a statement, but can you tell me what was done? I have never seen any case of a detailed programme for the ensuing year. Can you tell me if that was ever done?

A.—Where is this?

Q.—It is page 20 of volume 8 in your annual report, February, 1922. I have given you the actual words: "In particular the annual programme of work should be worked out in the greatest detail in close conference with the officers concerned, otherwise smooth working is impossible." Did you insist upon an annual programme for the ensuing season being worked out in the greatest detail?

A.—We come again to the old question of writing letters.

Q.—No, supervision.

A.—Supervision—I had no power to insist on anything. I could write that in a report and do my best, but I had no power to do anything.

Q.—Then I will not carry that any further. You have made a complaint that the dredgers have been mishandled; I do not quite know what that means. Do you mind explaining to me exactly what you mean by mishandled?

A.—Well, I should prefer Mr. Settle to do that, he has been in Bombay.

Q.—This is your letter to the " Times " of April 14th, 1926.

A.—I will give you one example. They worked only one shift a day—that is mishandling the dredger.

Q.—We will come to that to-morrow. That is one instance. Then one of the questions that arises on that is, did you give instructions for two or three shifts a day to be worked?

A.—When Mr. Brims went out his instructions were to work 24 hours a day. I put in a letter here yesterday when we wrote out and said, " Are you making arrangements for two shifts? " We got a reply from the Chief Engineer quoting four letters that he had written to the Government asking them to get the necessary crew. I can only repeat that we had no control.

Q.—I do not think I have seen those at all.

A.—It came up yesterday.

Chairman.—Is that one of the letters you have handed in?

A.—Yes.

Chairman.—I have not had time to read all those yet.

Sir Frederick Hopkinson.—I have not got it.

Mr. Ewbank.—I do not think I have seen it.

Chairman.—You say it has been handed in?

Sir H. Courthope-Munroe.—Do you remember the date of it?

A.—I do not remember the date of it.

Chairman.—What is it?

A.—We wrote out to Bombay " Are you doing everything you can to put on two shifts for this dredger? " We telegraphed to that effect. We got a letter back from the chief engineer saying, practically: " I have written four times to the Government asking them to sanction the men, and I have not any reply yet."

Sir Frederick Hopkinson.—I would like to see those letters. I have not seen them yet. Was it your original intention to work the dredger 24 hours a day? *

A.—Yes—well, 15 pumping hours.

Q.—In two or three shifts?

A.—In two shifts.

Q.—Two 12-hour shifts?

A.—Yes.

Q.—I think you said you had nothing to do with the actual agreement with the men who went out, so you cannot tell us if it was provided therein that they should work 12 hours a day?

A.—I cannot tell you.

Q.—Your whole scheme depended upon the dredging, did it not?

A.—Undoubtedly.

Q.—Even if your dredgers did 2,000 yards an hour it would be no good to the success of the scheme if they only worked eight hours a day?

A.—Not the slightest.

Q.—What puzzles me is that although the dredger began in December, 1923, up to the end of June, 1926, there was no working 24 hours a day.

A.—No.

Q.—It seemed to come as a shock to them that I suggested that they ought to work 24 hours a day. It was an absolute shock to them.

A.—You will see it in Mr. Brims' evidence. He says that when he left London he left London with instructions to work 24 hours a day.

Q.—What I would like to know is: who is responsible for working only a single shift of eight hours in the first season, and a double shift of eight hours each in the second season? Your scheme as a scheme was destroyed by that?

A.—Yes. I say the responsibility was with the Executive.

Q.—There again comes up the question: what did you do?

A.—Well, we have said quite enough about what we can do; but there you are up against it. How can you guarantee a dredger's output if your hands are tied behind

* See Appendix VI.

you and you have no power to give bonouses or appoint dredger men or increase their pay, or make any arrangement at all?

Q.—Did you ask me what should I do?

A.—I said would you consider yourself responsible under those conditions.

Q.—I thought you said you would like to know what I would do. I can tell you exactly what I should do. I should leave the vessel. I should not stay there five minutes. In the same letter you say that nevertheless the dredger has done nearly double the work attributed to it?

A.—Yes.

Q.—Can you explain that? The work is measured by your staff out there. Do you say they have under-measured it by 100 per cent.?

A.—No; we know about that. That is the old question of the leaking through the wall.

Q.—But they have attributed to them only the quantity dredged?

A.—No.

Sir Frederick Hopkinson.—The figures have all been given to us.

Chairman.—There are two columns. 1,020 dredged, 627 retained; 856 dredged, 462 retained.

A.—I cannot follow that.

Q.—It is quite simple. I will just give you the figures. It is page 3 of Sir Lawless Hepper's report: 1923-24, 1,020 dredged, 627 retained; 1924-25, 856 dredged, 462 retained; loss of more than 40 per cent. in 1923-24; a loss of more than 55 per cent. in 1924-25. It is a total loss of 900,000 cubic yards. That is how the figures are split up.

Sir Frederick Hopkinson.—You cannot blame the dredger if the material leaks through the wall.

A.—No.

Q.—It is nothing to do with the dredger.

A.—That is quite true.

Q.—You must not consider that in judging the dredger.

A.—That is so.

Q.—You must take the quantity that the dredger has done by the sections in the harbour?

A.—Yes.

Q.—That is what I presume the engineers have done in giving the total quantity dredged, because they have all these soundings. They are done in a very inefficient way, because instead of plotting the sections, as they ought to plot them, they are going on the soundings?

A.—Yes; I can quite understand that.

Q.—So that was a misstatement, where you say it has done double the work attributed to it? You probably did not know that they had made that allowance?

A.—Probably not.

Q.—Further on you say that you know the dredging results have improved enormously this year. I am sorry to say that is not correct. I think they are a little worse than previously. There is no enormous improvement at all?

A.—Well, I am not surprised.

Q.—But you said as a fact that they had improved?

A.—Well, I understand they have improved.

Q.—Not at all. They are, if anything, a little worse.

A.—Very well.

Chairman.—I am not sure that that is so.

Sir Frederick Hopkinson.—I beg your pardon. There was a little improvement in the third year. It was 1,020 the first season per pumping hour; 856 the second season, and 959 the third. I had transposed the figures?

A.—Yes.

Sir Frederick Hopkinson.—But that is not an enormous appreciation.

Sir M. Visvesvaraya.—Did not they get 1,800,000 yards?

Sir Frederick Hopkinson.—That will include both dredgers.

Chairman.—But how much they retained they did not know.

Sir M. Visvesvaraya.—They say they retained more than they got.

Sir Frederick Hopkinson.—It is only fair that that should be pointed out to you. The last figures show the impossibility that they retained more than they dredged.

Sir M. Visvesvaraya.—Probably they over-estimated the loss.

Chairman.—About the letter where the double shift occurs, these are the only documents I have: the note that you handed in yesterday, the proof of Mr. Halcrow, Mr. Settle's statement, and this other document. I do not quite follow what this is. Is it possible it was handed back to you?

A.—It is possible it was handed back. I will look for it. At all events, you remember its being put in. I read it.

Q.—My memory fails me for that, but it will be on the Shorthand Note?

A.—Yes.

Sir Frederick Hopkinson.—I do not remember hearing it.

A.—I read it.

Chairman.—Then it will be on the Shorthand Note?

A.—It will be on the Shorthand Note.

Q.—Would it be convenient for Mr. Halcrow to come at 11 o'clock to-morrow morning?

A.—Am I nearly finished?

Sir Frederick Hopkinson.—I have only two subjects to deal with. It is not worth while starting on them at two minutes to five.

A.—Which are they.

Sir Frederick Hopkinson.—Dredging and estimates.

Chairman.— Do you prefer to come to-morrow morning yourself or interpose Mr. Halcrow? What do you say.

Sir H. Courthope-Munroe.—I do not quite gather what the question is.

Chairman.—Sir George Buchanan has been in the box for four days and is probably tired. It will only be a question of a couple of hours to finish him off. The point is would he like to go on to-morrow morning, or would he care to have a rest and interpose Mr. Halcrow? We are trying to suit Sir George's convenience in the matter.

Witness.—Yes; Mr. Halcrow can come to-morrow.

Chairman.—Then Mr. Halcrow and Mr. Settle will be begun to-morrow.

Sir H. Courthope-Munroe.—You have got his report. That has been handed in with his draft proof.

Chairman.—That is right. We hope to get through both of these gentlemen to-morrow, but we do not want them to leave the room without having told us everything they wish to. There is one other matter. We have all a demi-official engagement at half-past 12 until 3, so that we would adjourn at half-past 12 and return here at 3 o'clock.

Sir H. Courthope-Munroe.—If you please. It is understood that Sir George Buchanan will not be here to-morrow.

Chairman.—No; Sir George Buchanan will not be here to-morrow, but we will spend the day with Mr. Halcrow and Mr. Settle. If convenient to you we could sit at 10.30.

Sir H. Courthope-Munroe.—No; I should prefer 11 o'clock.

Chairman.—Very well.

(Adjourned to to-morrow at 11 a.m.)

The Committee Assembled at 11 a.m. on the 3rd November, 1926, all the Members being present.

56th Witness, Mr. William Thomson Halcrow, M. Inst. C.E.

WRITTEN STATEMENT.

My connection with the Back Bay Reclamation Scheme dates from October, 1922. At that time I was asked by the late Mr. C. S. Meik to visit and inspect various works abroad for which his firm were the engineers, including the Back Bay Reclamation Scheme.

Sir George Buchanan, whom I had met on one or two occasions, had already left for the East, and the general particulars of the Back Bay works and personnel were described to me by Mr. C. S. Meik.

I learnt that Sir George Buchanan had been called in to report on the scheme and that the Government of Bombay had decided to adopt his report and had appointed the firm as engineers for the work.

I was also informed that the Government of Bombay had entrusted the execution of the work to the Development Department under the management of its Director, Sir Lawless Hepper.

The firm had to advise the Government of any matters which they considered necessary in connection with the carrying out of the work.

In addition to the ordinary duties of engineers for large works, the firm had to invite tenders and examine and report to the India Stores Department upon the tenders for any plant which the Development Directorate desired to purchase in this country. When orders were placed by the India Stores Department, the firm carried out the necessary inspections and tests and reported progress to the Development Department.

Also, in the case of staff or other employees which the Department required from this country, the firm assisted the High Commissioner in the selection of suitable men. The agreements under which the men were engaged were prepared by the Government and the salaries, wages, or terms of appointment were fixed by the Development Department.

Prior to my departure for the East I was shown copies of the drawings of the work and handed copies of the detailed specifications which the firm had prepared and also a copy of the Development Department's project estimate and programme for carrying out the work.

I arrived in Bombay on 1st December, 1922, and left on 20th January, 1923.

On arrival in Bombay, I presented my letter of introduction to Sir Lawless Hepper and had an interview with him. I had already studied his project estimate and drew attention to one item which in my opinion required the most serious reconsideration, namely, that the Department did not propose to commence dredging until the season 1924-25. The dredger " Sir George Lloyd " had arrived in Bombay in time to commence dredging in the season 1922-23 and the state of the works at that time was such that there did not appear to be any reason why the commencement should not have been made in that season. The Director did not appear to be very interested in my suggestions and passed me on to his Chief Engineer.

I had several interviews with the Chief Engineer, who was I thought in a very poor state of health. Although I was anxious to learn something of the methods which the Development Department adopted for carrying out the work, it appeared to me by his attitude that the Department objected to anything suggestive of interference on the part of the engineers in matters of construction.

I was particularly anxious to see the detailed programme for working the dredging plant but failed to obtain any information as to whether a programme had been prepared or not. I formed the opinion that the Department had not dealt with this matter as they had laid out their general programme to commence operations in the season 1924-25 and it was then only 1922.

Regarding designs for permanent work, which it was the firm's duty to prepare, I learned before leaving London that some difficulty had arisen through the Chief Engineer in his capacity of Resident Engineer refusing to send home the data necessary to complete the designs of the storm-water drains.

I discussed this matter with the Chief Engineer, who informed me that the Director of Development had instructed him not to send the information as a question had been raised as to whether these drains were included in our work. I learned that the drains had all been designed and that work on their construction had already commenced, and in the case of one culvert work was approaching completion.

I made the following note at the time that we had asked the Chief Engineer to show us the drawings for the drains : " Difficulties were at once put in the way and all sorts of objections raised by the Chief Engineer."

It was subsequently decided that the drains were part of the work comprised in forming the reclamation, and later on copies of the plans prepared by the Development Department were sent to London.

In this connection the question of whether or not the system of roads and drains as laid down by the consulting Town Planner should be included in the firm's work was discussed. The complete lay-out of the reclaimed area had not originally been contemplated and in my view the Government of Bombay would not complete the surface as a whole for many years to come. It was decided at that time that the firm's work referred to the reclamation only and not to the lay-out.

While I found it difficult to obtain information about the work from the Chief Engineer, I was introduced to the Deputy Chief Engineers and paid several visits to each of the sections under their charge. Here, I learned something of the organisation of the work. The Deputy Chief Engineers (sub-agents, as a contractor would call them) complained that there were no conferences regarding the work as a whole, that each worked in a watertight compartment, and was given a minimum of information by their chief. I note that in the evidence taken by the Committee in Bombay, the present

Chief Engineer (Mr. H. A. Elgee), who was then Deputy Chief Engineer, Marine Lines, stated that he had never been given detailed specifications for the work, although these specifications had been prepared.

Two of the three Deputy Chief Engineers appeared to be dissatisfied with their seniors in command; the third did not make any complaints, but was anxious to find another billet when he next came home on leave.

As an instance of the manner in which the general management of the work was conducted by the Department, on one occasion when I visited the Colaba section, the Deputy Chief Engineer told me that he had just received two steam cranes which he did not want, as he had already more cranes then he required.

The firm informed me that in their capacity as advisers to the Bombay Government they had had occasion to point out that the Development Department were in their opinion ordering quantities of plant which appeared to them to be excessive. They asked me to look into this matter and let them know whether I thought they were unjust in their criticisms. I examined the quantities of material to be handled, basing as requirements the Development Department's project estimate and programme of work. After allowing that the Department would require more plant than a contractor would place on the works, I estimated that there was a considerable excess of land plant. The Department's working programme in relation to the quarry output I subjected to criticism. The average annual output of stone required was about 230,000 cubic yards, the programme required for the year 1923-24 an output of 440,000 cubic yards, which is nearly double the average output. To handle this quantity, considerably more plant would be required than would have been necessary under a more evenly proportioned programme.

In the case of the concrete, the ratio of maximum output for one year of the average is even greater, the figures being 27,500 as against 64,000 for the season 1923-24.

When discussing the matter of excessive rolling stock and other plant to handle stone, I was informed that the Back Bay scheme was not the only work for which Kandivlee quarry had been opened and that the Development Department had other uses for the stone. As the firm had nothing to do with these other works, further criticism was of little value.

In the notes I made of my first visit, the following occurs: " Of the 24 cranes of various types on the works, only five were working during my inspection." This condition of affairs continued throughout my visit, and I saw enough to form the opinion that Sir George Buchanan was justified in his criticism of extravagance.

I inspected the materials used for concrete, and checked the relative proportions of aggregate and cement. These I found to be in accordance with the firm's specifications for the work.

Several matters concerning the construction of the permanent works were discussed during my visit and it was impressed upon the Development Department the necessity for carrying forward the protection stone to the rubble mound so that it might be deposited before the monsoon broke. I mentioned also the necessity for using the run of the quarry for the rubble wall; they would thus have all sizes of stone.

I note from the evidence taken in Bombay that uncertainty is implied as to how or why large stones were substituted for concrete blocks. I quote the following clauses from the firm's specification :—

> *Reclamation Wall. Clause* 46.—The Northern section of the wall which is referred to in this specification is to consist of a continuous bank or mound of rubble stone surmounted by a superstructure of mass concrete, the rubble stone being obtained from the quarry at Kandivlee. All stone used in the work is to be of best quality, hard, sound, and free from all imperfections.
>
> Before blasting and quarrying the rock the overburden is to be removed so that the stone can be obtained free from any clay, soil or sand.
>
> The stone, after being blasted and broken down, and before it leaves the quarry, is to be graded as follows :—Large stone 4 tons in weight and over are to be reserved for protecting the sea face of the wall. The remainder will be used for the rubble mound and for crushing for concrete aggregate.
>
> *Protection on Sea Face of Rubble Mound. Clause* 49.—After the concrete wall referred to in the last clause is completed for a sufficient length and before the finishing layer of concrete is placed on it, large stones (see Clause 50) or alternatively concrete blocks are to be deposited on the sea face of the rubble mound.
>
> *Large Stones on Sea Face. Clause* 50.—If a sufficient number of suitable stones not less than 4 tons in weight can be obtained from the quarry the Engineers may permit them to be used for protecting the sloping sea face of the rubble mound. All such stones are to be brought from the quarry in suitable wagons which are to be conveyed over a temporary railway placed on the top of the concrete wall to a travelling crane also on the wall. The stones are to be lifted by this

crane and deposited on the slope of the rubble mound commencing from the toe of the slope and working up to the base of the wall. Care is to be taken in selecting the stones so as to get them wedged together in order to prevent their being moved by the action of the sea.

Large Concrete Blocks on Sea Face. Clause 51.—Should a sufficient number of large stones not be procurable from the quarry then large blocks of concrete are to be used for the protection of the sea face of the rubble mound; these blocks will weigh approximately 20 tons each and are to be of the dimensions shown on the drawings, having all edges chamfered 2 inches by 2 inches measured on the square. They are to be made in accordance with Clause 37 herein in the proportion of 1 of cement to 6 of aggregates and are not to be deposited on the sea face until they are 3 months old.

If concrete blocks are used they are to be placed " pell mell " on the surface of the rubble mound as it will not be possible to wedge them together as specified for the stones.

In London, after the death of Mr. C. S. Meik, I acted for Sir George Buchanan when he was away and assisted in examining and reporting on tenders for plant ordered by the Development Department, and in examining applications by candidates for vacancies on the staff of the Development Department which were sent to us by the High Commissioner.

As an instance of the attitude of the Development Department to my firm, when Mr. J. R. Settle, M.Inst.C.E., an Engineer with much greater experience in the design and construction of sea works than any member of the Development Department, of whose record I am acquainted, returned from Bombay, I learned that the senior members of the Department did not avail themselves of his knowledge and experience.

Estimates.

When Sir George Buchanan reported to the Government of Bombay on the Back Bay Scheme, in 1919, he estimated the cost of the work at 367.61 lakhs. It is well known to all Engineers or Contractors who carried out public works during the years following the termination of the war that there was an enormous increase in all prices during 1920 and 1921; such increases could not have been foreseen and authorities and companies suffered financially in consequence.

During the period to which I refer, I have knowledge of extensive sea works carried out in the Tropics, of which the following brief particulars are of importance.

The increase in prices between 1912 and 1919 was from 10 to 20 per cent. and between the end of 1919 and 1921 from 50 per cent. to 100 per cent.

This case is parallel to the Back Bay work which passed through the same phases as regards cost.

The prices in Sir George Buchanan's report of 1919 compare well with prices of the work referred to above and in some cases are higher.

When I read Sir George Buchanan's report and had beside me at the time the Development Department's project estimate, I applied to the former's estimate a percentage based upon my knowledge and experience of works carried out after the war and I found that, after deducting from the project estimate a sum which had been included to cover the cost of the Town Planner's lay-out of the reclaimed area, which was not contemplated at the time Sir George Buchanan's estimate was made, I found that the project estimate for the reclamation proper was rather in excess of what I would have considered a reasonable increase to Sir George Buchanan's estimate. It is, in my opinion, wrong and misleading to the public to compare any estimate prepared in 1919 with an estimate of 1922 without allowing for the rise in prices which took place after the war and which could not have been foreseen in 1919.

In the knowledge of what the work has actually cost, as carried out by the Development Department, Sir George Buchanan's estimate of 1919 is, in my opinion, a fair one. Having learned that the late Mr. C. S. Meik had been closely associated with Sir George Buchanan in the preparation of the estimate, I am convinced that no better or more reliable estimate could have been prepared at the time.

Sir George Buchanan complained that the project estimate, which was prepared by the Development Department and approved by the Government without his knowledge, was excessive; that he was justified in his statement has been shown in the evidence taken in Bombay in which Sir Lawless Hepper states that he anticipates a saving on the works other than dredging of 35 lakhs.

As regards the cost of dredging, the Development Department estimated to operate the plant at a cost of 5 annas per cubic yard. Sir Lawless Hepper has revised that estimate and now states that the dredging will cost 310 lakhs instead of 82 as he originally estimated. It has been revealed by the evidence taken by the Committee in Bombay that the revised dredging estimates were based on improper data and are therefore of no value.

While I accept all figures and measurements made by the Development Department with reserve, in the absence of proper cost abstracts, I feel disposed to accept the figure given by the Deputy Chief Engineer, Dredging, in evidence as to the present cost, viz., 8 annas per cubic yard. This cost is the result of working the dredgers for less than two-thirds of their proper time, and further without energy or incentive to the men to get the best out of the plant, and it is difficult to believe that the dredging cannot be carried out at about the rate of 5 annas estimated by the Development Department themselves, working full time.

Dredging.

It has been proclaimed to the world that the dredging plant is a failure, and that in consequence the cost of the work will be 1,100 lakhs instead of 700 lakhs of rupees; also that this state of affairs is entirely due to Sir George Buchanan. The estimates and statements are absolutely misleading and inaccurate, as has been revealed in the evidence taken in Bombay.

The Development Department laid out their programme of work to commence dredging in the season 1924-25. (See print copy of project estimate.)

In consequence of a protest by Sir George Buchanan, the Development Department improved upon their programme and commenced dredging in the season 1923-24. As far as my investigation of the work went, I could see no reason why the dredging could not have been commenced in the year 1922-23, the dredging plant having arrived in Bombay in time for that season.

In the spring of 1925, having perused the weekly statement of progress which was sent to London, a letter was addressed to the Department drawing their attention to the low output of the dredgers. The reply received was unsatisfactory, and only emphasised what I have always felt with regard to the Development Department, that they resented interference by the engineers in matters of execution.

In July of 1925, a letter was received from Bombay informing us of the revised estimate which had been prepared based on the actual dredging output. On reading this letter I concluded that the estimate must have been prepared for special reasons, and, on the face of it, was grossly misleading. This is the only conclusion at which any fair-minded engineer could arrive.

Mr. Brims, the Deputy Chief Engineer, Dredging, came home on leave in the summer of 1925 and called to see me. I took the opportunity of trying to find out what was at the bottom of the dredging difficulty in Bombay. Mr. Brims was rather reticent, but I learned enough of the way things were going to come to the conclusion that the dredging plant as a whole was not being properly handled.

The material did not differ from what was expected, but he admitted that there had been a tendency to get the last yard of material which the dredger would cut. I told him it was, in my opinion, a mistake to attempt to scrape hard material from the bottom. There were ample supplies of mud and clay, for which the dredger was built, and to retard the output for a few yards of hard moorum was not right. One result of scraping the bottom was that the cutter blades were damaged.

Sir George Buchanan, owing to serious ill-health, was unable to proceed to Bombay, and returned to this country, when I put before him all that I had learned. He protested to the Department in reply to their 11-crore estimate that they were mishandling the plant, and that he was justified in making that statement has been proved by the evidence taken in Bombay. Two points only need be mentioned to prove mishandling: (1) The dredgers had not even by the end of the second working season been put on their full working time of 24 hours a day, and (2) no incentive by way of bonus to the crews of the vessels had been arranged. Brims admitted to me that he had never known of a case of the kind where bonus was not arranged right away at the start of the work. This is the standard practice of the most experienced contractors in dredging, and the Director of Development certainly made a grave error of judgment in not insisting that the dredgers should work 24 hours a day and that the men should be properly bonused on output.

Although the Director states that he knows nothing about dredging, he might have learned something from his staff, some of whom, to my knowledge, had been many years on the staffs of eminent firms of contractors. Brims spent years on a large dredging contract where they continuously worked two shifts of 12 hours a day.

Brims stated that apart from dredging he felt that he did not get the support he would have liked from his superiors. He told me that much material was being lost through the wall, and that he wanted to blind it, but this was not allowed.

Mr. Settle reported on his return from Bombay that Mr. Brims, the Deputy Chief Engineer, and Mr. Speirs, the dredging-master, spent much of their time in superintending the overhaul of the "Jinga." In fact, the operating of the expensive dredging plant appears to have been left largely to the assistant dredging-masters, who came fifth in order of seniority.

I have particulars of dredging on fixed price contracts amounting to more than 15 million cubic yards. On one home contract the working hours were 132 per week, being 11 shifts of 12 hours, and on another contract in the tropics the working hours were 144 per week in two shifts per day.

Sir George Buchanan in his estimate allowed 15 hours pumping time per day of 24 hours, which is equivalent to 62½ per cent. actual pumping time for the dredging plant. This is a reasonable estimate.

It has been suggested in the evidence that the nature of the materials to be dredged in the harbour was not known. In all my experience I have never come across a mass of material so thoroughly investigated by boring as the area under consideration. Over 1,300 borings were taken. In the case of the dredging contracts to which I have referred above, less than 5 per cent. of that number of borings had been taken for the removal of 15 million cubic yards of material; the contractors in these cases did not take any borings to verify those placed before them when tendering and carried out the work as already stated on fixed prices.

My experience is that when borings err, as they sometimes do, the level of hard material has invariably been found at a lower level than that indicated by the borings. I can find no evidence that the depths of dredgable material in the harbour are less than those indicated by the borings; on the contrary, it has been stated in evidence that the materials have so far generally agreed with the borings.

The material in the harbour consists of mud, soft clay and stiff greasy clay, overlying hard materials, rock and some hard moorum. A dredger should be designed to give an average output on the average material, which is soft clay. Stiff unctuous clay is good material for a vessel of the type of the " Sir George Lloyd " to cut, and represents the hardest material required to be dredged.

The output per hour, as returned by the Development Department, for the " Sir George Lloyd " is only about 50 per cent. of the designed output, and personally I was not surprised at the low figure when I learned that no proper system of bonus had been arranged at the start as an incentive to the crews to get the best out of the plant.

The number of pumping days worked by the " Sir George Lloyd " last year is stated as 167, and there was a delay of 17 days, which proves that Sir George Buchanan's estimate of 170 days was reasonable.

The Development Department state that the dredger can average 2,000 cubic yards an hour for a month. If for a month, there is no reason why it cannot continue for six months.

Much has been said in evidence about a guarantee by the builders that the dredger would pump 2,000 cubic yards per hour. I do not remember any case where the builders of plant for constructional works were to guarantee that purchasers would obtain a specified output.

When purchasing plant for excavating purposes, say, dredgers, land excavators, grab cranes, &c., it is customary to have a detailed specification for the boiler and engines and to require certain speeds of operating, e.g., lifting, slewing, derricking, travelling speeds, or in the case of dredgers, when of the bucket type, the number of buckets lifted per minute, and where of the suction type, the discharge and power of the pump.

The plant is tested against the specification before being taken over from the builders, and the purchaser takes the responsibility of getting the best out of the machine. Experience alone teaches those who handle excavators or dredgers what outputs to expect in varying classes of material. Although I have experience of hundreds of thousands of pounds' worth of plant purchased and handled, I do not recollect one case of a guarantee by builders that purchasers would obtain a specified output when worked *in situ*. It is highly improbable that any firm of dredger builders would guarantee a specified output for a dredger worked by the Development or any other Department.

Mr. Wm. McMurray, Director of Messrs. Wm. Simons & Company, Limited, told me he was in Bombay when the dredger " Sir George Lloyd " was first put to work, and that he had endeavoured to help the Department in any way he could, but his efforts were not well received. He felt he was not wanted and left Bombay.

Criticism has been made that it was estimated that the nett result of the filling would be the same as the quantity of material dredged from the virgin strata at the bottom of the harbour. All forms of clay bulk when cut out of their natural beds are deposited as filling. Mud contains a much higher percentage of water when pumped through a pipe-line and deposited as filling. The surface of the mud when exposed to the sun will dry out and give up a considerable quantity of its moisture, but the drying out will not carry to any great depth, especially in the case of the Bombay material, which has an unctuous nature. On balance, one would expect an increase of bulk, and an estimate allowing for no bulking would be said to be on the safe side. According to the figures given in the evidence on the season's work completed this year, the bulking works out at 24½ per cent.

Evidence has been given as to the manner in which the possible shrinkage was investigated. One witness explains that he took a pot of the finest surface mud from the reclamation, evaporated the sample, and based a calculation for the whole scheme on the result, which showed some 35 per cent. shrinkage, and I gather was the basis of the 40 per cent. figure in one estimate.

Again, moorum filling is assumed to shrink after excavating from the solid when deposited in Back Bay.

It is stated that considerable loss took place in the reclamation, due to material escaping through the rubble part of the wall. The specification for the rubble is given in clause 46 as already quoted above.

If the run of the quarry be tipped in the wall, the interstices depend on the nature of the material as quarried. If there is a large percentage of small material, the rubble would be choked by the pumped filling. In the case of a large reclamation with which I am acquainted, no blanketing was put on the mound. In that case the class of stone contained a large percentage of small material. After his 1923-24 visit, I enquired of Sir George Buchanan regarding this point, and he informed me that he saw very little loss through the rubble, but that there was considerable loss through an opening in the wall, which he advised the Department to have closed up. The necessity or otherwise for blanketing the mound with moorum or similar material was discussed during my visit to Bombay, and I understood the matter was left to the Chief Engineer to observe carefully what actually took place, report, and take the necessary action. If the loss of fine material was not serious, it was to the advantage of the reclamation to have a large quantity of better material and save on the moorum topping. It would appear, however, that if the measurements of the Development Department are correct that the loss was considerable in the first and second years, but no report to that effect ever reached my office until the final figures for the season were available. In the third year there was a large gain.

When in Bombay I learned that the then Chief Engineer of the Department was very anxious to find the whole of the material for the filling in Back Bay, because he believed it to be better material than that which was available in the harbour. He had in hand at that time a series of borings in Back Bay, the results of which he eventually reported, stating that there was available 25,332,000 cubic yards, or more than enough for the whole reclamation.

The material would be more difficult to obtain, and the programme eventually decided upon was to fill the Marine Lines end from Back Bay by the " Kalu " and the centre and southern parts from the harbour, as originally intended. This arrangement overcame the difficulties which had been put in the way by the Port Trust and the Royal Indian Marine, who wished to restrict the area of dredging in the harbour.

In order to help the Department we looked into the question of the best way to put the " Kalu " to work in Back Bay. I suggested that the " Kalu " should cut a flotation channel, pumping the material through a short pipe-line, say 100 yards, to one side; having reached a pre-determined point she would connect up to the pipe-line and commence pumping into the reclamation. To cut a channel, the removal of about 100,000 cubic yards of material was necessary. With the dredger working her full time, but only allowing one-third of her output, say 500 yards an hour, the cut could have been completed in two to three weeks.

Viewing the dredging as a whole, notwithstanding the methods adopted by the Department in handling the plant, they have accomplished about 4,000,000 cubic yards of filling out of a total of 25,000,000. They admit in evidence that they could increase the output of the " Sir George Lloyd " by 50 per cent. This they can obviously do if they work the customary 24 hours a day instead of 16, and drop the luxury of stopping for meals. That would bring the " Sir George Lloyd's " output of dredging (based on the figures given in evidence for last season) up to 2¾ million cubic yards per annum, but this output could be greatly increased by proper organisation and should reach 5 millions with the excellent plant and ample quantities of good dredgable material proved. The " Kalu " is reported to have dredged 338,000 cubic yards in 2½ months. In six months she could do, say, 800,000 cubic yards, and if put on proper working time this would be increased by 50 per cent. and reach 1,200,000 cubic yards.

Without allowing for any improvement in intensity of output due to organisation the two vessels as worked by the Department could dredge 4 million cubic yards per season.

According to the project estimate, at the end of the season 1925-26 the amount of dredging accomplished should have been 7½ million cubic yards. Against this they have accomplished 4 million cubic yards. To complete the work within the Development Department's project estimate, viz., by the end of the season 1930-31, there remain five seasons still to go and the quantity to be handled about 21 million cubic yards. In five seasons this represents 4,200,000 cubic yards per season, so that with the plant available and without exercising any greater energy than in the past, except to work

the dredgers 24 hours a day instead of 16, they could finish the work in accordance with their own estimate.

Sir George Buchanan's and C. S. Meik and Buchanan's Position with Regard to the Work.

Conflicting evidence has been heard with regard to the position of the Engineers for the work, and some confusion appears to exist as to the relative meaning of the terms "Consulting Engineers" and "Engineers responsible for supervising the work." Professional firms or the individual partners in a firm are sometimes the one and sometimes the other. I occupy both positions at the present moment. As Consulting Engineer I report and advise when requested, but my clients have their own engineering staff who prepare designs and specifications, and when required I examine plans submitted and visit and inspect works under contruction. As Engineer for works, I am responsible for preparing plans and specifications and supervising the construction of the works, but in no case do I have executive control over plant or labour.

In the case of Back Bay the firm were appointed "Engineers." They prepared plans and specifications of the permanent work in accordance with the practice of the profession and inspected the carrying out of the work. The Government of Bombay placed the execution of the works in the hands of the Development Directorate who took the same position as contractors, and rightly assumed full control. They prepared their own works programmes and submitted to the Government their own estimates for carrying out the work. They ordered the plant and materials, and engaged the men they required. They fixed rates of pay and arranged sub-contracts, all without reference to the Engineers.

In view of the work being departmental, Sir George Buchanan undertook to prepare enquiries for plant, to examine them and advise the India Stores Department on tenders received, and to inspect plant before shipment. He also agreed to advise the Government on all matters relating to the works under construction. All these duties have, as far as I can judge, been performed. The Director of Development in many cases did not act on his advice when given, clearly showing that he knew that the responsibility for the execution of the works rested on his own shoulders.

Sir George Buchanan had to visit the works every year. He did so and remained in Bombay for a longer period than was necessary in my opinion, and certainly much longer than I have ever known an Engineer for large works to stay. The opinion I have formed from my knowledge of the work is that the Director of Development did not approve of having an independent engineer who could criticise the work.

No Engineer or Contractor could possibly be in executive charge of works unless all the staff and employees were subject to his orders, and he was in a position to engage or dismiss whom he willed. It is absurd to suggest that Sir George Buchanan or the firm held that position. It is neither implied nor stated in their agreement, and I have not seen any evidence to lead me to believe that there was any intention other than that the Development Directorate were to be in sole charge of construction, as in fact they were.

It is possible that the position of the Chief Engineer requires explanation. The Director of Development had works other than the Back Bay scheme under his charge, and the firm had the nomination of a resident engineer for Back Bay who had to carry out the duties of the chief executive officer to the Director. Such cases only occur when work is done "departmentally." The duties of the resident engineer are light in the circumstances, but at one time the Government suggested that the firm should have a separate staff. Sir George Buchanan has dealt with this matter in his statement. Personally, I should have preferred that the firm had had a separate resident engineer under their direct control.

The dual position is not novel. I occupied a similar position on a pier work some twenty years ago, being responsible to the firm's clients direct for the execution of the work and to the firm for carrying out their plans and specifications.

More recently, in 1922, and also abroad, a harbour work was let by contract under competitive tender, and we appointed our resident engineer. At the end of a year the contractors had made such poor progress that the contract was determined, and the firm's clients decided to carry on the work by direct labour. The resident engineer undertook the work, ordered his plant, and made all arrangements for labour and materials for the clients. He reported progress, and referred all questions as to quality of materials, details of design, etc., to us. The work was completed with entire satisfaction to all parties.

Conclusions.

There is nothing wrong with the Back Bay scheme as an engineering work. It consists of two main items (1) four miles of sea wall and (2) 25 million cubic yards of filling. The former is over 90 per cent. completed, and the design has proved to be

satisfactory; the latter is about 16 per cent. completed, and as I have endeavoured to show above, there does not appear to be any physical reason why the remaining dredging should not be done with the plant available within the time estimated by the Development Directorate, namely, by the summer of 1931.

The outcry against the scheme is unjustifiable from the engineering point of view for the following reasons :—

(1) The sea wall has proved a success.

(2) There are ample quantities of filling material in the harbour and Back Bay. The borings taken by Mr. Kidd in the harbour are the most complete I have ever seen or heard of, and have in practice proved to be reliable. Those taken by the Development Department in Back Bay are open to doubt, but there is plenty of suitable material for filling in the Northern sections of the reclamation.

(3) The dredger " Sir George " if properly handled can give her designed output in the material in the harbour. The Development Department staff have admitted this to the Committee.

An action taken by the Bombay Government is open to criticism. The Advisory Committee appointed to investigate the activities of the Development Department had as its Chairman the Director of Development.

When the Advisory Committee issued their report, which must have given rise to doubt in the minds of the Government, the action to take would have been to refer the matter to the Engineers for the work for their opinion and report. No such action appears to have been taken and the estimate of £8,000,000 was broadcast. A little later, the Government publicly stated that they would have to modify the estimate, showing that the £8,000,000 was of little value.

In my opinion the proper course to pursue was to :—

(1) Complete the sea wall, parapet and storm water drains.

(2) Complete filling, by dredging from the harbour and Back Bay.

(3) Defer moorum filling except where immediately required for roads, or to prevent ponding.

(4) Defer the development of the area as laid out by the Town Planner.

(5) Complete the work by contract.

According to the Development Department's estimate, they required 39 lakhs to complete (1).

On the basis of 5 annas per cubic yard, for operating the dredging plant it would require about 66 lakhs to complete the filling, but the Back Bay material is harder than that in the harbour and will bring up the average cost. Against this, the better class of material will ultimately effect a saving in the moorum topping. Taking an overall average of 7 annas, we have 93 lakhs for dredging.

The total cost for completing the reclaimed area (1) and (2) above is therefore 132 lakhs which, added to 474 lakhs stated to have been spent to 31st July, 1926, gives the total cost of the reclamation at about 606 lakhs of rupees and without allowing credit for the sale of plant on completion of the sections of the work.

When investigating the scheme, I found there was no intention of covering the whole area with moorum one foot deep. That quantity was taken as a sufficient estimate to cover what would be required. Where clay was pumped from the harbour, no moorum would be necessary; on the other hand, in mud areas, the depth would be greater. Land to be built over would not require any moorum.

While land values are outside my province, I am impressed by the figures given in evidence. The cost of the work to date is stated to be 474 lakhs of rupees. The military area is approaching completion, for which the Government of Bombay is to receive 236 lakhs, which is at the rate of 20 rupees per square yard. This figure is the lowest value put upon the land by any witness. The area to be reclaimed is 1,145 acres, or 5,541,800 square yards. At Rs. 20 per square yard, the value is 11 crores. The gross project estimate, which it appears need not be exceeded, is, excluding interest, 770 lakhs.

Oral Evidence.

Chairman.—Are you now partner with Sir George Buchanan?

A.—I am.

Q.—In December, 1922, when you went to Bombay, what was your position in relation to the firm?

A.—My position was this. At that time I was Resident Engineer on the Lochaber water power works which were about to be commenced, and Mr. Meik put forward a proposition to me that I should join them in partnership. At that time I had that offer made to me, and while I had it under consideration they asked me to go out to India and also to Greece and inspect various works which they had in hand at that time.

Q.—Do you agree with Mr. Kidd that dredging on an open sea front is one of the most difficult, expensive and uncertain operations imaginable in engineering?

A.—It depends entirely upon the open sea front.

Q.—It depends on the extent to which you get tide and wind.—Is that it?

A.—That is right.

Q.—The tide proved a great difficulty at the outset, did it not, in this harbour dredging?

A.—Not on the open sea front.

Q.—In the harbour; that is my question?

A.—In the harbour.

Q.—Did not the tide prove a great difficulty at the outset in this harbour dredging?

A.—I have not been out again, I must say, since my visit in 1922. That was my only visit to Bombay. Therefore my information comes from the correspondence and from interviews with those who have been there. So that I have not seen the dredgers in operation, and therefore, of course, I cannot give my own personal opinion on the matter.

Q.—Is there a misprint at page 7 of your statement, where you say, "The increase in prices between 1912 and 1919 was from 10 to 20 per cent."?

A.—No.

Q.—There is not a misprint?

A.—No. It may not be quite clear as to what I mean there. I am talking about the cost of local labour and materials in the tropics on the works with which I was connected at that time. The increase in wages, and in the purchase of local material, such as timber and so on, amounted to between 10 and 20 per cent. between the period 1912 to 1919. In 1919, towards September, I should think, or possibly October, prices began to soar, and went up by quite 50 per cent. to 100 per cent. between the latter part of 1919 and 1921.

Q.—When you say "prices" are you confining yourself to labour?

A.—Labour and local materials. I am not talking about anything in this country, but only what took place abroad.

Q.—In order to clear up any misapprehension which might exist, we must just follow that up. The phrase in the statement is, "The increase in prices between 1912 and 1919 was from 10 to 20 per cent."—in India?

A.—This was not in India. It was in the Straits Settlements, where Indian labour was largely used.

Q.—After all, Back Bay is India, is it not?

A.—Yes.

Q.—The harbour is India?

A.—Yes.

Q.—The reclamation works are India. Is this meant to be an assertion that in India, which is the only place with which we are concerned, the increase in prices between 1912 and 1919 was from 10 to 20 per cent?

A.—No. What I wish to bring forward here is that during this critical period of 1919 to 1921 I myself was in charge of the construction of large public works——

Q.—One moment. Let us keep to 1912 to 1919 first of all. Does this statement of yours—that the increase in prices between 1912 and 1919 was from 10 to 20 per cent.—apply to India?

A.—This is not stated with reference to India.

Q.—Does it apply to India—yes or no, please?

A.—My figures here——

Q.—Mr. Halcrow, does it apply to India? Tell me yes or no?

A.—That I cannot say.

Q.—But you are the author of this document?

A.—Yes.

Q.—You come here putting this document forward. Tell me yes or no, does that apply to India?

A.—I cannot say whether that applies to India or not. It applies to work on which I was engaged at that time.

Q.—Then, as regards this statement of yours, although you have included it in a report dealing with India and India alone, you say that you do not know that it applies to India?

A.—That is so.

Q.—Now you go to Bombay, and you say the dredger " Sir George Lloyd " had arrived in Bombay in time to commence dredging in the season 1922-23. By that you really mean that she had arrived physically in Bombay in March, 1922. That is all you mean, do you not—that she was there?

A.—She was there.

Q.—There is no doubt about it; it was one of the unfortunate matters in this case. " Had arrived in Bombay in time to commence dredging in the season 1922-23, and the state of the works at that time was such that there did not appear to be any reason why the commencement should not have been made in that season." By that you mean " Why the dredging should not have been commenced in October or November, 1922," do you?

A.—Yes.

Q.—Will you please tell me how much of *this* wall had been constructed in October, 1922? (*Indicating on plan.*)

A.—At that time I think there were——

Q.—Mr. Halcrow, you have made a definite statement?

A.—2,000 feet; I have it here.

Q.—2,000 feet had been constructed. That was the position?

A.—Yes.

Q.—How much of *this* cross-bund had been constructed?

A.—That had not been constructed.

Q.—How much of the storm water drain had been constructed?

A.—That had not been constructed.

Q.—How much of *this* little storm water drain had been constructed?

A.—That one had not been constructed.

Q.—Then will you tell me please, what becomes of your statement that there did not appear to be any reason why the commencement should not have been made in that season?

A.—The opinion that I formed was this—and it can only be an opinion, having gone round the works there, namely, that had the line of railway which takes you out from Colaba to the end of the wall there been arranged in another way, they would have had an area there which would have contained anything up to, perhaps, a figure of about 1,000,000 cubic yards of material, which in my opinion, it would have been worth their while to commence in that season.

Q.—A million cubic yards?

A.—Yes. True, it is a small quantity, but I formed that opinion at that time—that it would have been worth while——

Q.—It is one-thirtieth of the whole amount to be deposited?

A.—I think one-twenty-fifth.

Q.—Well, say one-twenty-fifth. To retain the material, there would have had to have been a cross-bund?

A.—Yes. That was formed in taking the railway out to the wall.

Q.—Where is that shown?

A.—In the corner there.

Q.—Do you really mean it would have been a good business proposition to reclaim *this* little bit?

A.—Down at the end *there*.

Q.—Will you come to the plan and show us what you mean?

(*The witness indicated on the plan.*)

A.—The point I had in mind was this. They carried this railway right away down *there* and took it to the end of the 2,000 feet wall there. I am expressing the opinion that if they had come down further over *here* and joined *there*, they would have had *here* an area which it would have been worth their while to have pressed ahead with.

(*The witness proceeded further to explain by means of the plan.*)

Q.—We have to get this on the shorthand note. The blue line is railway?

A.—Yes.

Q.—When you arrived there you found that railway in *that* position?

A.—Yes.

Q.—That was an accomplished fact?

A.—Yes.

Q.—You say, however, that if, some months before, it had occurred to them to bring the railway down along *this* green line, somewhere in *that* direction, they would have enclosed a larger area?

A.—Yes.

Q.—Does it occur to you that the depth along this green line might have been considerably greater than the depth along *here*?

A.—It was not considerably greater.

Q.—At all events, the fact, as you found it, was *this* railway running along *that* blue line?

A.—That is so.

Q.—Then will you tell me, with the facts as they were, and with only 2,000 feet of wall built, with no retaining cross-bund and no storm water drain, how it was possible to begin the dredging in the season of October-November, 1922?

A.—I am endeavouring to describe my visit there and what I learned when I was out there. If it is superfluous in my statement, I shall take it out altogether.

Q.—It is not that. You are here as an expert witness, and you say there did not appear to be any reason why the commencement should not have been made in that season?

A.—Yes, had the works been otherwise arranged.

Q.—What is that?

A.—Had the lay-out of the work been otherwise arranged. That is what I mean when I say that here.

Q.—If the Development Directorate had done constructions differently from what they have it might have been possible to pump in October, 1922?

A.—Yes.

Q.—Naturally, if they had built a cross-bund; if they had built a storm water drain and if they had built a sea wall, they could have begun in October, 1922. But dealing with the hard facts as they were, with only 2,000 feet of wall completed, and no storm water drain, and no cross-bund, pumping could not have begun in October, 1922?

A.—Not as they had it there, no.

Q.—That is right; we understand each other. You say at page 2, "I was particularly anxious to see the detailed programme for working the dredger plant, but failed to obtain any information as to whether a programme had been prepared or not." I do not understand that. If you had asked a plain question, must you not have got a plain answer?

A.—That is what I expected, but I did not get it.

Q.—But it is only a matter of perseverance?

A.—I persevered, but in asking these questions I was asking them of a man who, in my opinion, was a very sick man.

Q.—Surely he was not too sick to answer this question: "Have you got a dredging programme." He was not too sick to be asked that, was he?

A.—He would not answer that question.

Q.—What would he have done? Would he have fainted?

A.—I asked him the question, and I could not get a direct reply.

Q.—Did you study any of the papers in the office before you went out?

A.—The papers I studied——

Q.—Answer the question. Did you study any of the papers before you went out, is my first question?

A.—I studied certain papers.

Q.—Amongst them did you notice the dredging programme prepared in Sir George Buchanan's office, of April, 1921?

A.—No.

Q.—In fact that dredging programme was in the office of the Development Directorate at the moment, but you say that notwithstanding all your efforts you could not get any information from anybody as to whether there was a dredging programme in existence?

A.—Other than *this* programme.

Q.—What is that document?

A.—This document is described as the project estimate. That is the only document I had. I knew of no other programme. I wanted the elaboration of *this* programme.

Q.—Certainly. We all understand. What you wanted was the dredging programme?

A.—The elaboration of *this* programme.

Q.—And especially, I suppose, the work that the dredger was going to do as soon as she was put in commission?

A.—You mean the output?

Q.—Especially the work that the dredger was going to do—where she was going to dredge?

A.—Exactly.

Q.—The length of the pipe line; the position of the shore line; the position of discharge. All those matters you wanted?

A.—Yes.

Q.—It is Mr. Lewis you are referring to?

A.—I am referring to Mr. Lewis.

Q.—Mr. Lewis was too ill to explain to you whether or not they had any dredging programme?

A.—That is so.

Q.—That was in October, 1922. In those circumstances did it not occur to you that you should have cabled home to Sir George Buchanan at once? Was Sir George Buchanan in India?

A.—Sir George Buchanan was there I must explain, during the whole time of my visit.

Q.—Did not you at once hurry off to Sir George Buchanan and say to him "I cannot even get from Mr. Lewis whether there is a dredging programme"?

A.—I did.

Q.—"And the whole thing is going to collapse"?

A.—No, I did not say the whole thing was going to collapse.

Q.—You did not think that?

A.—No.

Q.—Had you confidence in Mr. Lewis?

A.—I had never met Mr. Lewis in my life before.

Q.—Had you confidence in Mr. Lewis.

A.—I could not express an opinion of a gentleman whom I had never met or knew nothing of before.

Q.—How long were you seeing Mr. Lewis—for how many weeks?

A.—I was there from the 1st December, 1922, to the 20th January, 1923, and I saw him many times during that period. I went to his office and had interviews with him.

Q.—Having seen him many times are you not able now to express an opinion about him?

A.—My opinion is that he was not in a fit state of health to be carrying on the work.

Q.—That was October, 1922—fifteen months before the dredger began to work?

A.—In December.

Q.—In December—January—twelve months before the dredger began to work?

A.—Yes.

Q.—Did you urge upon Sir George Buchanan that Mr. Lewis ought to go?

A.—In my opinion——

Q.—Did you urge upon Sir George Buchanan that Mr. Lewis ought to go? That is the question.

A.—That he should have leave. I did not suggest to Sir George Buchanan that he should go. I suggested that a man in his condition of health, as I saw it, should have a prolonged leave.

Q.—With all this terrible expenditure of money we cannot afford to indulge in sentiment. We have to look at the thing brutally.

A.—Absolutely.

Q.—Mr. Lewis was the representative chosen by Sir George Buchanan. Sir George Buchanan vouched for him, did he not?

A.—He chose him.

Q.—He vouched for him?

A.—By choosing him.

Q.—Exactly. Nobody can avoid feeling ill. Your opinion in December, 1922, was that Mr. Lewis was a man too ill to do this responsible work. That is right, is it not?

A.—That is so.

Q.—And you urged that upon Sir George Buchanan. You appreciated, of course, that if the work was a failure, the very presence of Mr. Lewis there would, to some extent, involve Sir George Buchanan?

A.—I do not quite see that point.

Q.—Would not people turn round and say, " Well, this work has been a failure. It has been a failure partly because Mr. Lewis was not a big enough man for it. Sir George Buchanan appointed him." In that way it would reflect upon Sir George Buchanan, would it not?

A.—I do not know that it would. I do not see that point at all.

Q.—Very well. There is another and wider aspect of it altogether, and that is that Sir George Buchanan was the technical expert adviser to the Government, was he not?

A.—He was engineer for the work—technical adviser for the work.

Q.—With a responsibility to communicate to the Government anything that he considered of importance?

A.—Yes.

Q.—Was the state of Mr. Lewis's health a matter of the greatest importance?

A.—I consider it was a matter of importance. Mr. Lewis had, of course, a senior over him, but at the same time, as far as I could see, he was the executive in charge of the work.

Q.—He was the resident engineer?

A.—And he therefore should have been a man in the very best of health.

Q.—Exactly. When you urged upon Sir George Buchanan that Mr. Lewis ought to have long leave, what did Sir George Buchanan say about the matter?

A.—He quite agreed.

Q.—Did he go off to the Governor at once?

A.—I cannot say what he did.

Q.—Do you know whether he did?

A.—I do not know.

Q.—Do you think he did?

A.—I believe he took the matter up with the Government, but I have not the papers on that matter with me.

Q.—Do you agree that the increase in prices of plant and material between 1912 and 1919 was at least two-and-a-half times?

A.—In England?

Q.—Yes, in England?

A.—Yes, about two-and-a-half times I should put it roughly.

Q.—We have had figures given us by Colonel Paddon which have all been set out in detail. He thinks two-and-three-quarters times. Sir George is willing to go to two-and-a-half times. Had you any previous experience of reclamation on an open sea front in 1922?

A.—I have had experience.

Q.—Where was that?

A.—During my service with a firm in which I am now partner, which commenced between 25 and 30 years ago. There passes through my mind two works carried out in that time involving sea walls with reclamation behind, and during the period I was with contractors, amounting to about 10 years, there was a reclamation carried out which involved the construction of a rubble mound and reclamation behind it, also on the sea front.

Q.—With suction dredgers, or bucket dredgers?

A.—In that case the dredger was a bucket dredger with a shore pumping station. The material was actually pumped into the reclamation behind the wall.

Q.—You had a bucket dredger, and what we might call a booster?

A.—No, not a booster—a shore pumping station.

Sir Frederick Hopkinson.—The dredger dredges the material, and it is put into barges, which are taken alongside the wall, and it is pumped from there on to the reclamation.

Chairman.—Was that how it was done?

A.—Yes.

Sir Frederick Hopkinson.—It was not clay or sand?

A.—It was river silt and mud.

Q.—Sand?

A.—Not sand.

Q.—Not clay?

A.—No; river silt and mud.

Q.—Silt?

A.—And mud.

Sir Frederick Hopkinson.—Silt contains mud.

Chairman.—I am only asking you that, because I see that you have expressed an opinion about the price of reclamation. Do you remember that, on page 29 of the report, Sir George Buchanan estimates that the dredging will cost 8 annas a cubic yard?

A.—Yes. 8 annas a cubic yard, I think, is his price.

Q.—Do you approve that figure?

A.—I approve that figure.

Chairman.—Would you mind just taking down a figure or two? Would you put down £732,000. That is the price of the " Sir George Lloyd ", the " Colaba " and the pipelines. Would you put down £180,000; that is the price of the " Kalu," her repairs and her pipeline. Would you put down £10,000, which is the price of the " Jinga ", and you might put down £10,000 for her repairs, as she has been in dock for about 16 months.

Sir Frederick Hopkinson.—I think you can put down £40,000 for that.

Chairman.—Is that your view, Sir Frederick, that that is what the " Jinga " is going to cost?

Sir Frederick Hopkinson.—Something like that.

Chairman.—(*To the Witness.*) Put down £40,000 for that. Will you add all that up. How much does it come to?

A.—£952,000.

Q.—Will you tell me how many 8 annas there are in £952,000?

A.—I am afraid I must have misunderstood your question. I thought you were referring me back to the 1919 estimate.

Q.—We are coming to that in a moment. Would you tell me how many 8 annas there are in £952,000, or would you like me to do it for you? I will do it in two ways for you. Am I right in thinking that, if you take Rs. 15 to the £., the amount is 28,560,000 8 annas in £952,000?

A.—I do not make it the same figure, but I will accept your figure for the purpose.

Q.—I want to get it right. There are 28,560,000 8 anna pieces in £952,000. Now if you take Rs. 12 to the £ you will find there are 21,848,000 8 anna pieces in £952,000. Sir George was proposing to dredge 25 million cubic yards, was he not?

A.—25 million cubic yards is the figure in his report, yes.

Q.—He had exhausted all his 8 annas in the plant, had he not? It had all gone?

A.—I am afraid I cannot quite see that, because the figure which you have given me at the present moment, as I understand, is the actual cost of the plant?

Q.—Yes.

A.—His report was based—

Q.—On his estimated cost of the plant.

A.—Which was based on an estimate by a dredger builder in 1919

Q.—So be it.

A.—And the figures, as far as I have gone through this report, set out here that the charge of the plant amounts to 3·92 annas, based on an actual estimate made by the firm of dredger builders.

Q.—Quite so, and then, if there was an under-calculation on the estimate of plant required, we know that the actual fact is, as set out in these figures, that that dredging plant—the " Sir George Lloyd," the " Colaba," the " Kalu," the "Jinga," pipeline and accessories—came to £592,000. That being so, the whole of the 8 annas is exhausted in the mere purchase of the plant, is it not?

A.—Undoubtedly—the price that the plant actually cost. It cost two or three times as much as it would have cost in 1919 owing to the rise in prices in this country after the war.

Q.—You are not quite exact about that, but still. You say that the working cost of dredging a cubic yard of material from the harbour or Back Bay and putting it into the reclamation will be 8 annas, do you not? You agree?

A.—You are now talking about Sir George Buchanan's report. Is that right?

Q.—I have now got on to page 8 of your report on which you say : " I feel disposed to accept the figures given by the deputy Chief Engineer, Dredging, in evidence as to the present cost, that is, 8 annas per cubic yard. This cost is the result of working the dredgers." If it is going to cost 8 annas per cubic yard—and assume for the moment that 21 million yards still have to be reclaimed—you are going to spend another £800,000 on the mere working cost alone, are you not?

A.—That is 8 annas by 21 million cubic yards?

Q.—It is 21 million 8 annas?

A.—Yes. I was just looking back to see what I made it on the basis of 7 annas.

Q.—Rs. 10½ million.

A.—I take that figure.

Q.—Rs. 10½ million is rather a staggering amount, is it not?

A.—Compared to the quantity to be dredged, I do not think so.

Q.—Compared to Sir George Buchanan's estimate that the whole of the work could have been done for 367·61 lakhs?

A.—Had it not been for the increase in prices from 1919 onwards.

Q.—But Sir George disputes it. He is willing to accept it with some reservation that the price went up to 668 lakhs in February, 1922. If you are paying £952,000 for your dredging plant; £350,000 for your other plant; if you are going to pay Rs. 10½ million to reclaim the remaining 21 million cubic yards— those three sums are out of all proportion to the 367 lakhs, are they not?

A.—I do not agree.

Q.—Would you like me to take you through the arithmetic?

A.—My whole point is this, as far as my evidence can go—that looking back on Sir George Buchanan's estimate, 1919, I know from my own experience of works during the subsequent years that there was a very great increase in prices all round, and therefore any estimate made in 1919 must, in my opinion, be increased by at least 50 per cent. to give a proper idea of what the work would actually cost.

Q.—Increase it by 50 per cent. 50 per cent. on 367 lakhs brings it up to about 550 lakhs?

A.—Yes.

Q.—Take 550 lakhs. Sir Frederick Hopkinson has pointed out to me that if your figure for dredging cost is right, 8 annas per cubic yard——

A.—Not my figure. I am taking this figure from the deputy Chief Engineer's evidence—this figure of 8 annas per cubic yard.

Q.—Mr. Halcrow, you have put your signature to a document in which you say "I feel disposed to accept the figure."

A.—I feel disposed to accept it.

Q.—And I feel disposed to ask you, under the circumstances, whether the estimate of 367, even if increased by your 50 per cent. to bring it up to 550—whether that estimate of 550 lakhs was not a ludicrously low estimate in view of what has been found to be the necessary cost of the work—a ludicrous estimate?

A.—I do not agree.

Chairman.—I have nothing more to ask you.

Sir M. Visvesvaraya.—May I ask what you propose to establish by this note? What are the main points you want to put forward for the consideration of the Committee?

A.—I say for the consideration of the Committee, from my visit to Bombay I formed the opinion there that as far as the wall work was concerned they were doing the work pretty well. I have been accustomed to contractors' methods, but their methods were strange to me. Making allowance for conditions I did not understand, I thought the wall was getting along fairly well. At the same time I formed the opinion that they had been rather extravagant in the provision of plant for the work, and I could have done the work with less plant myself. There were various items of organisation there with which I became acquainted which were strange to me. They did not appear to have much co-ordination amongst the senior members of the staff. These are the impressions I formed when I was out there.

Q.—I understand you are making some definite recommendations or suggestions in this statement?

A.—In the light of what has happened since 1924 my personal opinion is that it is very much better that the work should be completed on a contract basis.

Q.—It can be completed on the estimate already sanctioned?

A.—I have taken the figures which have appeared in the evidence, not having any other figures to go on.

Q.—The evidence is of various kinds. Some people say one thing, and others say another. If you accept one person's view and calculate on that only you may get a certain result.

A.—I think it is very difficult, but on page 16 of my notes you will see what I say. The figure for last year's working of the dredger was, I believe, 1,800,000 yards for the "Sir George Lloyd," and they state that they were only working 16 hours a day instead of the customary 24. By working 24 hours that would put that figure up to 2¾ million cubic yards, without increasing the intensity of the volume, if you follow me,—simply at the pace at which they have been carrying on. That brings it up to 2¾ million cubic yards per annum; but in my opinion, that output can be greatly increased—in fact, the members of the Development Department who are carrying out the work say so themselves. They say in their evidence that they could increase it. Then as regards the "Kalu" working in Back Bay, she is reported to have dredged last year 338,000 cubic

yards in 2½ months. In six months, I take it, she could do 800,000 cubic yards, and if put on full working time it would bring it up to 1,200,000 cubic yards. Adding those two figures together without allowing for any improvement in intensity of output due to organisation, those vessels could dredge 4,000,000 cubic yards in the season.

Q.—Have you also seen the evidence given by Mr. Spiers when he says you cannot work it in the same way at night time—you cannot do as much work at night time as in the day time?

A.—I must disagree with Mr. Spiers. My experience of dredging in works I have been connected with is that they have always worked 24 hours a day in two shifts, either 132 hours or 144 hours per week. It is either 5½ or six day of two shifts.

Q.—Contractors work that way?

A.—Contractors always work 24 hours a day, and it is very well known to the staff out there. They know that very well indeed. They are men with experience on the staff of contractors. They have had experience with eminent firms of contractors.

Q.—Then why did not they themselves suggest working 24 hours?

A.—That is absolutely beyond me. I cannot understand it.

Chairman.—We asked the same question.

A.—Yes. To me it is inexplicable altogether. I do not understand why they did not start right at the beginning.

Sir M. Visvesvaraya.—It may be because they did not want to take the trouble of making the work.

A.—It may be that. I do not know what the reason was. It is a fact that they know it, because I personally know the deputy dredging engineer, and I know that for years he was engaged on a dredging contract in this country where they worked 132 hours per week. In fact, I considered that is so important that I put it in my statement.

Q.—You have taken all the favourable items from the evidence and developed this note?

A.—I hope I have not taken the most favourable items, because I think in the evidence the deputy dredging engineer says he could get 2,000 cubic yards an hour out of the " Sir George Lloyd "—for a month, I think he said.

Chairman.—Will you show us where, because we should like to see that? The " Sir George Lloyd " did something reasonably well when she got into an extremely favourable patch of soft clay and soft mud. If you can show us that in the evidence we should be glad. We want to find what is your authority for your statement about the " Kalu " doing a certain dredging output, and the statement on the last page of your statement here. We would like to see that in the evidence, and where it comes from.

A.—I have not got a copy of the evidence.

Sir Frederick Hopkinson.—You say on page 16 that the " Kalu " is reported to have dredged 338,000 cubic yards in 2½ months.

A.—Yes.

Q.—Where does that report come from?

A.—Speaking from memory, it comes from Sir Lawless Hepper. I shall have that searched for.

Chairman.—Would you kindly look up that point about the " Kalu," and let us have it within the next two or three days?

A.—Certainly I will do that. I shall endeavour to let you have it before then.

Q.—There is the point about the " Kalu," and the point on page 20: " The Development Department staff have admitted this to the Committee." " The dredger ' Sir George Lloyd ' if properly handled can give her designed output in the material in the harbour "?

A.—Yes; I can find that also.

Q.—Do you mean by that that some one witness has said that? Do you mean a witness like Mr. Brims has said: " I think she could give her output." Is that what you mean by the Development Department staff have admitted this?

A.—That is right.

Q.—You mean some member of the Development Department staff has said it?

A.—One of the senior members, I think it was. Probably the deputy chief engineer in dredging, I think they call him.

Q.—Mr. Brims?

A.—Yes.

Q.—We will have a look at that.

A.—Yes; that is it.

Sir Frederick Hopkinson.—The maximum they told us they could possibly hope for from the dredger this season was 1,600,000 yards, and that is what they were going to base their calculations on.

A.—Really.

Chairman.—There is some mistake about this, you will find. Mr. Brims may have made some statement like that, but if you look at the whole of Mr. Brims' evidence you will see that it obviously does not bear it out. We want to know about the statements on page 16 and page 20 of your note.

A.—Yes; that is the "Kalu's" output of 338,000 cubic yards, and Mr. Brims' statement that 2,000 yards an hour can be obtained from the "Sir George Lloyd."

Sir Frederick Hopkinson.—He is the man who is responsible for getting 2,000 yards. Why should he say that he could get 2,000 yards in the future when he has never been anywhere near it in the past? Can you understand that?

A.—It is difficult to understand.

Q.—It is impossible to understand. He is paid to do it.

A.—I have put my views in here, and I will not allude to that.

Q.—You do not think he is hanging up a flag to say: "I am paid to do 2,000 yards, and I can only do half that."

A.—I do not know.

Sir M. Visvesvaraya.—On page 1 you say: "The firm had to invite tenders and examine and report to the India Stores Department upon the tenders for any plant which the Development Directorate desired to purchase in this country." I suppose you recommended which tenders should be accepted in every case?

A.—That is right.

Q.—This was the only occasion which you visited the works in Bombay—in 1922?

A.—That is the only occasion, 1922-23.

Sir M. Visvesvaraya.—On page 2 you say: "I was particularly anxious to see the detailed programme for working the dredging plant, but failed to obtain any information as to whether a programme had been prepared or not." You say you did not ask for a programme?

Chairman.—He said he did ask, but could not get an answer.

Sir M. Visvesvaraya.—Did you ask officially and get a reply?

A.—This was an interview with the chief engineer.

Q.—I think he has said he was not asked, but you have a recollection that he was?

A.—I can only put down here the result of my interviews, because Sir George Buchanan was in Bombay, and, of course, I was only there as one of the staff of the firm.

Sir Frederick Hopkinson.—If you told Sir George Buchanan that they had not got a programme at that moment, surely he would have turned round and said: "But I made one myself and sent it out last year"? He sent out a full programme in April, 1921, for the dredging operations.

A.—I do not recollect any conversation on those lines. I am speaking now entirely from memory of four years ago.

Sir M. Visvesvaraya.—You may send out programmes, but did you see in your office that the programmes were being given effect to?

Chairman.—At that time, in 1921, he was not associated with the work.

A.—Before October, 1922, I may say I knew nothing whatever about the Back Bay work at all. I was engaged on other works in other parts of the world. I merely knew that that work was going on, and that is all; so that I am not able to speak of anything before that date.

Q.—Subsequently have you been sending out programmes from your office and insisting upon their being observed on the spot? Did you send out programmes, or did you suggest to the engineer, or discuss with him, programmes for adoption?

A.—I wish to make my position in connection with Bombay quite clear. Sir George Buchanan was either out in Bombay or he was back in this country. When he was in this country he dealt with all these matters. From time to time he may have discussed matters with me in order to obtain my opinion on one point or another.

Q.—Did you follow the correspondence?

A.—I have not necessarily followed the correspondence because I have my own work to do and my own clients to attend to, and I dealt with matters of Bombay when Sir George Buchanan wished me to. If perchance he was not in England then I would have to deal with the matters in detail.

Q.—This is a very important point, as to whether you were sending out programmes for the execution of the work, and whether they were being acted on by the people on the spot.

A.—The only definite case which I can remember that I myself had looked into was the question of dredging in Back Bay. In that case what happened was, I think, that Mr. Brims was appointed as dredging engineer, and before he went out I showed him my ideas as to how the Back Bay dredging could be tackled. Actually they did not adopt that suggestion.

Q.—Passing on to page 6, you have made this statement: "I learned that the senior members of the Department did not avail themselves of his knowledge and experience "—that is as to Mr. Settle?

A.—Yes.

Q.—Did he give his knowledge and experience in writing?

A.—When he was out there he told me that for the most part he was left—I do not know that I should tell you very much what he told me because he is going to give evidence, and it is better that I should not repeat what he said to me; but it has an important bearing on it.

Q.—" I learned that the senior members of the Department did not avail themselves of his knowledge and experience."

A.—He will explain all that.

Q.—On page 8 you say: " It is difficult to believe that the dredging cannot be carried out at about the rate of five annas estimated by the Development Department themselves, working full time." So that you are of opinion that they can do the dredging at 5 annas even now?

A.—It is based on this—that they have been working the dredgers 16 hours a day instead of 24 hours. It will lessen the cost at once when they work 24 hours.

Sir M. Visvesvaraya.—When you say that the dredger works 16 hours, does not it mean that it works sometimes 18 or 20 hours, and sometimes 20 to 22 hours, and the time they do the pumping is 15 hours?

Chairman.—No; 11 hours, 40 minutes.

A.—When I talk about the working time of the dredger I am talking of the gross working time, not the net actual pumping time which was estimated, as I see in Sir George Buchanan's report, at 15 hours per day. You may take it that I would expect to work 24 hours a day in order to get 15 hours net.

Sir M. Visvesvaraya.—They were working longer than 15 hours already.

A.—I understand that they are working 15 hours a day

Q.—Probably due to stoppages—they have not been working very satisfactorily—the number of hours' work is 18 to 20 hours, they told me.

A.—Really, I was not aware of that.

Chairman.—The average pumping rate is 11 hours, 40 minutes for the last season.

A.—That is the actual pumping time?

Q.—Yes.

A.—That is out of what?

Q.—It does not matter what it is out of. The fact is 11 hours, 40 minutes was the net pumping time.

A.—Very well.

Sir Frederick Hopkinson.—Even then that ought to have given twelve-fifteenths of 2,000 yards an hour.

Sir M. Visvesvaraya.—Did you see any of the clay when you went there?

A.—When I went there, they brought up a small sample from the bed of the Harbour.

Q.—15 hours pumping time you calculated as the average number of hours pumping time?

A.—Which 15 hours is that?

Q.—It is on page 10: " Two points only need be mentioned to prove mishandling: (1) the dredgers had not, even by the end of the second working season, been put on their full working time of 24 hours a day "?

A.—That is in order to get 15 hours' pumping time a day—actual pumping hours.

Q.—Had you advised them at any time that they should work 24 hours a day before that date?

A.—Before which date?

Q.—Before they commenced the operation?

A.—I personally advised them about it? I had no authority—I have no recollection of it.

Sir Frederick Hopkinson.—When you were out there in 1922, did you not give them instructions that they ought to work 24 hours a day?

A.—I personally did not.

Sir M. Visvesvaraya.—When did your firm advise full working time of 24 hours a day for the first time?

A.—These matters are all dealt with by Sir George. He was actually there giving advice.

Chairman.—He says Mr. Brims went out with definite instructions to work 24 hours a day.

Sir Frederick Hopkinson.—That was in the very early days. From that time there is no reference, I believe, in any letter or correspondence of any kind that they were to work 24 hours a day.

Chairman.—I do not think this gentleman ought to be asked about these matters. These are all foreign to him. That is how Sir George puts it, and no doubt it is quite right. Mr. Brims was told to go out and do a working day of 24 hours a day, which he never did. Sir Frederick says there is a curious silence in the correspondence about it afterwards; but you would not know anything about that.

A.—No. It might help to get matters through more quickly if I mentioned the points which do appeal to me very much.

Sir M. Visvesvaraya.—Certainly.

A.—In February, 1925, when Sir George did not come home as he usually did after his visit to Bombay, I felt it incumbent upon me to look into the matter of dredging. I went through the reports which were sent down. I waited a week or two to see whether there was any direct improvement as a result of Sir George Buchanan's visit out there. I found there was no improvement, and therefore I addressed a letter to the Development Directorate asking for an explanation why the dredgers were not getting the specified output. At the same time I asked them—it was rather a bow at a venture—to let us know what bonus terms they had arranged with the crews. The reply they gave us was that they had not arranged any bonus terms with the crew at all, although they were then in their second season of dredging.

Sir Frederick Hopkinson.—The third season, was not it?

A.—The second season.

Q.—When Sir George went to Australia it was the third season?

A.—No, the second season.

Chairman.—It is 1923-24 and 1924-25; and then Sir George goes to Australia. 1923-24 is the first season of dredging?

A.—Yes.

Q.—1924-25 is the second season?

A.—Yes.

Q.—It was on January 7th that Sir George Buchanan went off to Australia, in the middle of the second season?

A.—That is right.

Q.—Then he being absent, you took the matter up?

A.—He being absent I took the matter up at that point. As I have just said, I found that they had not got any of their crews on the basis of payment by results. To my mind that is a terrible thing. I do not know that I can say more. Letters were exchanged. They admitted openly that they did not have the dredgers on the bonus. When Mr. Brims came home on leave the following summer and came to see me, I asked him particularly about that point and said: "Have you ever known of the case of a big dredging contract being carried out without payment by results?" And he said "No."

Sir M. Visvesvaraya.—On page 16 you say: "Viewing the dredging as a whole, notwithstanding the methods adopted by the Department in handling the plant, they had accomplished about 4,000,000 cubic yards of filling out of a total of 25,000,000". That 4,000,000 cubic yards is in three years?

A.—Yes.

Q.—As against 15,000,000 expected?

A.—Expected from the plant, yes; but not so much as from their own project estimate. Owing to Sir George Buchanan's personal representations, they started a year earlier than they intended. From their estimate they intended to start in the year 1924-25 and to do 10 per cent. of dredging.

Sir Frederick Hopkinson.—Mr. Lewis said they intended to start in 1923. He said distinctly: "Not an ounce will be done before December, 1923"?

A.—I am referring to the programme of work.

Q.—I am referring to the letter. What is it you are referring to?

A.—To the long statement which is entitled " Programme of working and probable annual expenditure "; and under the year 1924-25, item 12 dredging 10 per cent.; and in the year 1925-26, 20 per cent.

Mr. Billimoria.—Actually Sir George Buchanan told them they ought to begin in 1922, and Mr. Lewis replied: " Not an ounce will be done before December, 1923 ".

Sir Frederick Hopkinson.—That was subsequent to that.

A.—Subsequent to this programme?

Q.—Yes, that programme was in course of preparation for twelve months. It may have been in the last month of the 12 months that they put that in. That has no value at all.

A.—Well, this is the document that I have always gone by.

Q.—It is of no value at all?

A.—So far as my connection with the work is concerned, it is their final programme.

Sir M. Visvesvaraya.—You advise 24 hours' work?

A.—Absolutely.

Q.—Would you do it in two shifts or three?

A.—My experience has been in two shifts, but that is a matter of detail. Some people prefer to work three shifts.

Q.—Then on page 17 you say: " The firm were appointed Engineers. They prepared plans and specifications of the permanent work in accordance with the practice of the profession and inspected the carrying out of the work ". You have a definite understanding, according to your contract with the Government. The contract requires you to perform all works and duties devolving upon Engineers of large works such as the final provision and inspection of estimates and prices and tests and also trials of dredgers. In fact the final inspection and supervision of the tests and trials of the dredgers were not attended to. The trials of the operation of the dredger have not been attended to. I do not know whether you know that? The firm prepared the original estimate; but what else did you do in the way of preparation of plans and estimates after the original estimate? Is there any document comparable with that report prepared at any later stage, or any important work that your firm did in the matter of reporting on plans and estimates after this report was submitted? Do you follow me?

A.—I have not quite caught that.

Q.—This report was first submitted in 1919?

A.—Yes.

Q.—After that is there any report submitted by your firm or by Sir George Buchanan comparative with this?

A.—To the Bombay Government?

Q.—Yes, any important plans or estimates, or any report like this?

A.—The plans which I have seen were working plans for the wall and specifications as to what had to be done.

Chairman.—And Sir George Buchanan's annual reports?

A.—Yes.

Sir M. Visvesvaraya.—But the specifications of the wall were not adopted on the spot. The engineers there did not follow exactly what was described there?

A.—To a certain extent they departed from the specification, but in the main I should say not.

Q.—In the main they adopted them?

A.—In the main, yes, but there were certain details in my opinion in which they were not adhering strictly to the specification.

Q.—Then on page 18 you say: " Sir George Buchanan has dealt with this matter in his statement. Personally I should have preferred that the firm had had a separate Resident Engineer under their direct control "?

A.—Yes.

Q.—To faithfully carry out the terms of the contract, would it not have been necessary to have a separate Resident Engineer of your own on the spot?

A.—I think not, from what I recollect of the contract.

Q.—Measurement and inspection—all the work that is usually done by the engineers. It is stated here in the contract that your firm is expected to do all the work which engineers reckon to do on a work of this kind?

A.—Yes.

Q.—Without a Resident Engineer, how could you do it?

A.—As I found things when I got there and had the position explained to me, the position was that the Resident Engineer really had a dual position. That is why I state here that I did not like it.

Q.—Should not you have had a separate Resident Engineer?

A.—That point was discussed when I was in Bombay, and I believe Sir George Buchanan has dealt with that in his statement. In fact I have seen that he has, as I have read it. He refers to meetings which took place out there at which the Government said: "Why do not you have your own Resident Engineer?" He said he was perfectly willing to have his own Resident Engineer.

Q.—But they would not pay for the man?

A.—No.

Q.—On page 19 you say: "The former"—that is the sea-wall—"is over 90 per cent. completed and the design has proved to be satisfactory. The latter is 16 per cent. completed, and, as I have endeavoured to show above, there does not appear to to be any physical reason why the remaining dredging should not be done with the plant available within the time estimated by the Development Directorate, namely, the summer of 1931." You say: "There is no physical reason." Yesterday Sir George Buchanan stated that you can bring the work to a triumphant conclusion if regard is not had to the cost. In both these cases you do not go into the question of cost at all?

A.—You mean as to whether the Government should spend the money in completing the work?

Q.—Yes?

A.—I do not express any opinion on that at all. From the figures I have given on another page in my statement I have endeavoured to show that, without any increase in the intensity of the work of the dredgers, that is to say, which would be obtained by the payment of proper bonuses to the men, in my opinion they can carry it out within that programme which they themselves have prepared ending in 1930-31.

Q.—You have assumed certain figures and made calculations and shown that, if I may say so without seeming discourteous, to your own satisfaction?

A.—I will not say to my own satisfaction at all. I myself would like to see them greatly improved upon; but I have taken the figures from the evidence for the working of the dredgers in 1926.

Q.—You have not taken account of the fact that you cannot dredge on the middle blocks. You cannot send the stuff to the middle blocks 1 and 2. You cannot pump that distance with the present plant.

A.—Really?

Q.—The Engineers on the spot say so, and everybody says that.

A.—I have not gone into that. I quite understood that the plant was provided for the whole work.

Sir M. Visvesvaraya.—Your statement is too optimistic almost to be discussed.

Chairman.—You cannot treat this seriously?

A.—Yes, I think so.

Q.—Are you treating it seriously?

A.—Yes. I should be sorry if it would not be treated seriously.

Q.—I am sorry to have to express the opinion, but it is so utterly optimistic, and flies in the face of all the evidence we have heard in Bombay, that it seems to me it is a mere academic hopeful opinion.

A.—I have taken the figures from the evidence which has been given.

Chairman.—I agree.

Sir Frederick Hopkinson.—In other words, you have done the dredging in this room, or in your own office.

Chairman.—As a practical proposition, it is no good.

A.—I have endeavoured to be fair by taking the figures from the evidence given. I have not put what I thought ought to be done. I have not even assumed that they could do more than 1,000 yards an hour, which they have been doing with the dredger. I have taken the figures they have given and divided it up into the work done.

Q.—Multiplying it by one or two things?

A.—I think not, only 24 hours against 16.

Sir M. Visvesvaraya.—Will you pass on to page 20, where you say: "The action to take would have been to refer the matter to the engineers for the work for their opinion and report"? Did your firm ever give anywhere a detailed estimate themselves? You say that they should have submitted for your consideration the working out of the estimate?

A.—Yes. I see what you mean. I understand this is the estimate of the Advisory Committee?

Q.—Yes. You say you wanted that estimate to be sent to you for criticism?

A.—I think they should have submitted it to Sir George.

Q.—There has been criticism enough. What they wanted was constructive work. Why did not you go there and prepare estimates and hand them over?

A.—This is historical so far as I am concerned. It is before 1923. I understand that Sir George did prepare an estimate.

Chairman.—There is only 5 per cent difference between them.

Sir M. Visvesvaraya.—We have no details of that.

Chairman.—It is 668 against 702; there is no real difference.

Sir M. Visvesvaraya.—He takes the figures and makes up a rough estimate. The totals are of his original quantities he picks out here and makes a general statement, but that is not a detailed estimate. What is required is a detailed estimate for guidance in the execution of the work. Such an estimate has not been given. If you can show me such an estimate I should be glad.

Chairman.— It is common ground that he has not. There is no estimate except the one appended to the report, accompanied with the fact that Sir George's estimate worked out at 668 lakhs. It was a very good estimate so far as it went. The project estimate which before us is only 702 lakhs, a difference of 5 per cent.

Sir Frederick Hopkinson.—The only thing I should object to in what you say is the use of the word "estimate."

Chairman.—Anyhow, there was no substantial difference in February 1922 between Sir George and Mr. Lewis as regards the ultimate price?

A.—There was no substantial difference.

Q.—668 in February 1922, and 702 in October 1922, which is a difference of about 5 per cent?

A.—Yes.

Q.—There is nothing in it?

A.—No.

Sir M. Visvesvaraya.—With regard to the dredgers, you have not given any concrete examples of other dredgers of similar design which have been working quite satisfactorily. You have not given any calculations for the "Hotspur," and on what basis you prepared your designs. To show the confidence placed in the present dredgers is not misplaced, you assume that the dredgers will work all right, then you assume the rates will be low, and then you make up the figure.

A.—On what they have actually done.

Q.—What would you expect to do hereafter—5 annas? That is what you expect hereafter as the rate?

A.—They give the actual cost at a rate of about 8 annas a cubic yard. I expect with the dredger working for 24 hours a day instead of 16 hours a day, and put on a system of payments by results, to get a much greater output, and the result would be, of course, that the cost per cubic yard would go down.

Sir M. Visvesvaraya.—You have overlooked what the plant has been able to do hitherto, and you have overlooked the fact that she has to dredge hard material. That comes into it. Then there is the distance. It cannot go into a certain area. All those things have not been taken into consideration, and I am afraid other important factors have not been taken into consideration.

Chairman.—There is no doubt that is so.

Sir Frederick Hopkinson.—Where was this pumping ashore dredging work that you have told us of?

A.—At Pria in the Straits Settlements.

Q.—What did that cost?

A.—I was not on that work myself. I was on a similar contract some miles away, and I visited that work periodically. Although it was being carried out by the same firm at the same time, I was not intimately acquainted with the cost of that dredging.

Q.—What was the similar work you carried out?

A.—That was on another contract, but that other contract did not include reclamation works.

Q.—You have had a lot of experience of dredging?

A.—I have had experience on the different contracts on which I have been.

Q.—Do you mind telling me one or two of them so that I may make a note, suction pump cutter dredging?

A.—No.

Q.—No experience?

A.—I have not worked a suction cutter dredger myself.

Q.—Therefore you cannot tell us what has been the cost of such works from your own experience?

A.—Not from my own experience except the Back Bay work.

Q.—From your own experience?

A.—Outside Back Bay?

Q.—Yes.

A.—Not outside of Back Bay.

Q.—Your experience of Back Bay was limited to seven weeks at the end of 1922?

A.—My visit there.

Q.—Was that when the dredgers were not working?

A.—Yes.

Q.—So that you do not know anything about the dredgers at Bombay except what you have read?

A.—What I have read and heard about it. I have endeavoured to make that clear from the statement.

Q.—I want to get it quite clearly?

A.—That is perfectly clear; that is quite right.

Q.—You have no personal knowledge of the dredging at Bombay?

A.—Except what I have been told by other people.

Q.—Just so yes or no. It is quite a simple question.

A.—No personal knowledge out in Bombay?

Q.—In Bombay?

A.—No.

Q.—And no other personal knowledge of any suction pump dredging?

A.—No.

Q.—Can you tell me what percentage one ought to expect to get from a pump dredger of solid material?

A.—You are doing well if you can get 15 per cent.

Q.—What material is that in?

A.—In mud.

Q—Anything else?

A.—Clay—good cutting clay.

Q.—You say you are doing well if you are doing that, but what I want to know is what could you reasonably expect to do as an average output?

A.—In those materials?

Q.—Yes, or in any material you like?

A.—I have not got any figures, but I could bring a lot up. You are asking me my opinion.

Q.—I ask you if you can tell me what one has a reasonable right to expect?

A.—12 to 15 per cent.

Q.—Do you know where you have ever got 15 per cent, or where it has ever been got?

A.—In this Back Bay work—I do not want to encroach on Mr. Settle's evidence. Mr. Settle has brought home a lot of his tests made out there.

Q.—We have got those; we will criticise those afterwards.

A.—Yes.

Q.—Can you tell me where 12 to 15 per cent. has ever been obtained?

A.—I think I could find that from my note; I could search.

Q.—You cannot tell from memory?

A.—I am afraid I cannot.

Q.—You have had no experience of it; therefore it will be only something which you have learnt somewhere?

A.—That is right.

Q.—The evidence that has been given before us has been consistently to the effect that if you get 10 per cent. average output you are getting quite a good result. Have you any objection to that, or do you agree with that?

A.—I think it could be improved upon.

Q.—You think it ought to be improved upon?

A.—I think it ought to be improved upon.

Q.—But you have no experience to go upon. I feel rather a difficulty as you have no experience in asking you any questions about it. Is not it the fact that there is curiously little known about the work of suction dredging?

A.—I do not think I could agree with that.

Q.—Can you point out to me anywhere where reliable information on the work of suction dredgers can be obtained? You do not seem to know?

A.—I am certain I could find many references.

Q.—But you do not happen to know them?

A.—Not offhand, but I think there are many of them.

Q.—I suggest to you that there is curiously little known about it?

A.—Really.

Chairman.—We must try to add to the knowledge.

Sir Frederick Hopkinson.—We must, but at the present moment there is hardly any information available; the people who have done the work have kept it to themselves.

A.—I have some records in my office of suction dredgers.

Q.—I would like you to bring them this afternoon?

A.—Yes.

Q.—You say you have got them in your office. Would you mind bringing those this afternoon?

A.—I shall certainly bring them if I can find them in that time. I am rather surprised at the question, because I should have said offhand I could have picked up two or three papers on the subject of suction dredging.

Q.—That is what one would say. I can give you records, but they have not been published.

A.—Quite so. I am talking about published records.

Q.—I mean records that anyone can get at?

A.—That is what I am talking about. I will endeavour to find them, and let you have any papers, or at least the reference to them.

Q.—If I can have them by 3 o'clock, when we meet again, I shall be greatly obliged.

A.—Certainly.

Sir H. Courthope-Munroe.—I think it was suggested that we should put in letters of complaints by Messrs. Buchanan with reference to the output of the "Sir George Lloyd." I have before me a letter written by the gentleman in the Chair, Mr. Halcrow, and the following correspondence. It might be as well that you should have it, and that he should deal with it. (Documents handed in.)

Chairman.—Thank you very much.

(Adjourned for a short time.)

Sir Frederick Hopkinson.—Have you got those figures that you were going to get me of the outputs of the dredgers?

A.—I have not been able to complete the statement. It is being prepared, and as soon as it is ready it will be handed to you.

Chairman.—The two matters are with regard to the "Kalu" and the Development Directorate staff. They are referring to pages 16 and 20 of your statement, are they not.

A.—Those are a further two matters to which I am also attending.

Q.—Will you let us have them in time to-morrow?

A.—I have given instructions for them to be searched for. Here is some correspondence which has been handed in. There is a letter dated 26th February, 1925, to the Chief Engineer through the Director of Development. In this letter we draw attention to the low average hourly output of the dredger in the first paragraph, and, after going through certain facts, we come to the foot of page 2 and say: "As the output of the dredger and auxiliary craft so largely depends upon the dredging staff, you have no doubt arranged to pay bonus on the output, and we shall be obliged if you will let us have a copy of the bonus conditions, also particulars of the method of measurements adopted as the basis of payment and for weekly progress.*

Sir Frederick Hopkinson.—In connection with that we were told that the scale of bonus had been settled by Sir George Buchanan.

A.—Do you know when? In this correspondence, which takes us up to September, 1925, apparently no bonus had been arranged, that is to say, during the second season of dredging. The Chief Engineer's reply to that is dated 20th March, 1925, on page 4: "No bonus on the output has been arranged for this season owing to the fact that only one of the Assistant Dredging Masters has had any previous training, and I consider it would be throwing money away to fix a bonus at a low rate of output at this stage of the operations to enable the men to earn any bonus."

* See Appendix XVIII.

Q.—After that a bonus must have been arranged, because one of the witnesses said that he did earn a small bonus, and although it was small it was acceptable. That was his phrase.

A.—Was not that in the third season?

Q.—I say that it was after that. With regard to the question you raised about the "Kalu," they answered that in this way: "With regard to a weekly progress return for the 'Kalu,' as this vessel is only able to work for an hour or two a day every other week and her output is so very small being only about 225 cubic yards per hour." That was terrible, was it not? 2,000 cubic yards per hour was her guaranteed output and 225 her actual?

A.—That was the "Kalu"?

Q.—Yes.

A.—Her designed output, I think, was less than that of the "Sir George Lloyd."?

Q.—No, 2,000 yards. The difference was that she was dredging down to 40 feet instead of 70 feet, and she was 2,700 H.P. as compared with the 3,000 H.P. of the "Sir George Lloyd." She had the same guaranteed output of 2,000 cubic yards per hour in soft clay, and when she went on to this Back Bay work she did 225 cubic yards per hour.

A.—On the 23rd April, reference is again made in a letter from my firm to the Chief Engineer through the Director of Development. In the last paragraph on page 2 we again express an opinion on it: "As a bonus on the output has not been arranged, we consider it should be arranged even at this late period of the season so as to give the men concerned the assurance that their better effort and skill in working the craft will be rewarded. We are strongly of the opinion that the best output will not be obtained until a bonus is given and we therefore suggest that a start should be made at once with a reasonably substantial bonus to the Dredging Master (Mr. Spiers) and downwards."

Q.—That was 23rd April? That letter would not get there for a fortnight and that would take them up to about the 7th May?

A.—Just about the end of the season. They could not do anything practically in that season but they could prepare for the next one.

Q.—Which apparently they did?

A.—Yes. We have no information other than what is in the evidence taken in Bombay. The next reference to bonus is in a letter of the 23rd July, 1925, in which we state: "Further to the correspondence re output of the 'Sir George Lloyd' last season, we have had long conversations with Mr. Brims and have formed the opinion that the main causes of low output are the lack of incentive to the men in the form of a bonus on output, and also that there would appear to have been too much time spent on obtaining hard material at the expense of output which we consider of greater importance."

Chairman.—Were you able to form any view of Mr. Brims?

A.—His ability, do you mean?

Q.—Yes, his ability, his energy and his driving force.

A.—On one occasion he worked under me when I was with contractors and I formed a high opinion of him. He was a good worker.

Q.—His experience as regards dredging was when he was about 22 years of age, was it not?

A.—Oh, no.

Q.—He said so?

A.—I know for a fact that he was engaged for years on the main dredging contract at Rosyth. The dredging contract started there, I think, in 1913.*

Q.—That would be bucket dredging?

A.—It was all bucket dredger work, but it was all dredging work.

Q.—Sir Frederick Hopkinson put some very pointed questions to him in Bombay at the conclusion of his evidence, and we got a very fair idea of Mr. Brims' previous experience.

A.—That is a case of which I know definitely, because I had something to do with that contract.

Sir Frederick Hopkinson.—At Rosyth?

A.—Yes, and Mr. Brims was engaged on it. Then, in reply to that, the Chief Engineer, in a letter dated 8th August, 1925, with reference to bonus, states: "My idea is that a monthly bonus should be paid on *actual pumping time* only, exclusive of time spent in pumping water only, provided that measurements show that the quantity pumped is not less than say 900 cubic yards per hour."

Sir Frederick Hopkinson.—That is putting it very low, is it not?

Chairman.—45 per cent.

* See Appendix XX.

Sir Frederick Hopkinson.—They ought to earn a very handsome bonus indeed starting from that as a basis?

A.—They should do.

Q.—I should be inclined to put the bonus figure at 2,000?

A.—That is not my idea of bonus on a vessel designed to do an average output of 2,000. I should begin below that so that the men would work up to it. In reply to that we said, in your letter of the 16th September, 1925: "We note your suggestion that bonus should be paid on the *actual pumping time* and have given it our careful consideration. The idea is new to us, and while we realise that a bonus on this basis would make for an increase in the number of hours' pumping (with reservations regarding the quantity of material pumped) we are of opinion that better results would be obtained by adopting the more usual system of bonus on the *actual quantity of material dredged per hour.*"

Q.—Is it not the same thing?

A.—It does not appeal to me as being the same thing.

Q.—But it is? Surely you would not pay the bonus when the dredger was not pumping?

A.—The difficulty, to my mind, is working it out on a basis of the actual quantity pumped.

Q.—Spread over the pumping hours?

A.—In my opinion the better thing is to take the quantity dredged and divide it by the pumping hours, which is the actual quantity of material shifted.

Q.—Is not that what he proposes?

A.—It did not strike me as being the same thing at all.

Chairman.—You say he puts actual pumping time in the letter of the 8th August?

A.—Yes, that is what he writes.

Chairman.—It might be pumping water and not material.

Sir Frederick Hopkinson.—But the bonus is paid not on the time the dredgers are pumping, but on the output of the dredgers. Therefore it is the same thing. You are talking about precisely the same thing. You may call it pumping time or pumping hours, or what you like; the whole thing is that you are paying them on the output?

A.—But what he says here is, "Provided that the quantity pumped is not less than 900 cubic yards per hour."

Q.—Pumping time?

A.—That is the output per hour.

Chairman.—They would have a bonus for every hour of actual pumping time, provided that the measurements showed that during that time they were doing 900 cubic yards per hour. You said, "No, no, put it this way: never mind the time, look at the result"?

A.—Yes.

Q.—"Pay them a bonus on the amount they dredge"?

A.—Yes.

Sir Frederick Hopkinson.—But it must be regulated by the time.

Chairman.—In a sense, yes.

Witness.—The point was this, if I may say so. If they pumped for 15 hours per day, for example, and just cleared the 900 yards per hour, they would be paid the bonus. On my system, if they did 1,500 or 2,000 or 2,500 an hour so the bonus would increase. That is the difference.

Sir Frederick Hopkinson.—The bonus is to begin, according to this, after they have pumped 900 cubic yards an hour?

A.—He says, "Provided that the quantity pumped is not less than." He makes that reservation.

Q.—There is no bonus unless they pump as much as 900 cubic yards an hour?

A.—Yes, and as long as they go on pumping at 900 or more than 900 cubic yards an hour, for every hour's pumping they do, with that quantity of material being passed, so they gain a bonus.

Q.—I cannot tell unless I see the details of the scheme, but I take it that what he is suggesting is that the minimum rate before any bonus should be applied is 900 yards an hour. If they pump 1,000 yards an hour they will get a bonus on the 100 yards?

A.—I do not read it in that way.

Q.—I cannot read it in any other way?

A.—"Bonus to be paid on the actual pumping time in excess of 80 hours per week." That is the difference between the two systems.

Sir Frederick Hopkinson.—I cannot see any difference.

Chairman.—Your point is that the bonus begins to run from the moment that they touch 900 cubic yards an hour?

A.—Yes.

Q.—And it was calculated upon time?

A.—Yes.

Q.—Their suggestion was time?

A.—Yes.

Q.—Your suggestion was output?

A.—Yes.

Sir Frederick Hopkinson.—I should think there is no real difference between them. Can you tell me whether, in your experience, you have every known of work done at five annas a cube yard, including the cost of the machinery, where there have been double dredgers employed?

A.—On suction dredgers? No, I cannot give you any figures for suction dredgers.

Q.—In the middle of page 3 you say, " The complete lay-out of the reclaimed area had not originally been contemplated." Surely that cannot be true. The original lay-out, was contemplated and included in all the original estimates?

A.—I was not aware of it.

Q.—But you see it in Sir George Buchanan's estimate of 1919. He has got 75 lakhs in for it?

A.—This lay-out to which I refer is the lay-out by the town planner.

Q.—You mean the details?

A.—The complete lay-out of the reclaimed area with roads and recreation grounds.

Q.—You mean the final plans had not been prepared; but you say that it had not originally been contemplated. Surely it was contemplated and included in the estimate?

A.—I do not understand that it was.

Q.—What was the 75 lakhs for.

A.—I have not read in this report that that referred to the making of a new town.

Q.—There is no making of a town. It is lay-out. Here are the roads and drains. That is what has been called the development. What is the 75 lakhs for?

A.—I understand that the 75 lakhs was to cover the following. I am now looking back to the time before I had anything to do with it; you quite understand; but you are asking me a question on that. I think I have made it clear in my statement that this information came to me from questions which I asked when I first became connected with the work.

Q.—You see, it is all given in Sir George Buchanan's report of 1919. He has included a sum of 75 lakhs for it?

A.—At the time I came in connection with the work I asked what this was for, and he told me that this was for such drains as had to be made in connection with the reclaiming of the land and a proposed few roads, which was all to be determined later.

Q.—You have only to read it. It says " Roads, drains, lighting ".

A.—Roads, drains and lighting; that is right.

Q.—That is the lay-out?

A.—Not the lay-out on the lines which were ultimately decided on.

Q.—Never mind the lines; the original lay-out?

A.—But it makes a very big difference.

Q.—What does?

A.—To practically double the area at the lower end of Bombay.

Q.—That does not touch the point. You say it had not been contemplated. I point out to you that it has been contemplated and provided for to the extent of 75 lakhs—roads, drains and lighting?

A.—I refer to the complete lay-out. I say that the complete lay-out of the reclaimed area had not originally been contemplated. Those are the words which I use, and I think they are correct.

Q.—What I think you mean to say now is that the details, the actual site of the roads, had not been laid out until Mr. Davidge came on the scene?

A.—The extent as well as the details.

Q.—The extent was the whole area?

A.—In reclaiming an area, in the way I visualise this reclamation scheme, they would make the land, but it would not at all follow that the Government would decide to complete the full system of roads and surface drains throughout the whole area.

Q.—What do you think they would make it for?

A.—They would do that as and when required.

Q.—You know how contractors work. With regard to your statement at the bottom of page 2, I would like you to tell me if you ever knew a contractor to have conferences with his sub-agents?

A.—Yes.

Q.—You have known of that?

A.—Yes.

Q.—At the middle of page 5 you say, " I mentioned also the necessity for using the run of the quarry to the rubble wall. They would thus have all sizes of stone ". Surely you realise that it is impossible to do anything else. Unless you have enormous storage ground up at the quarry you are bound to clear the quarry. If you are quarrying 2,000 tons a day, if you do not take it away where are you going to put it?

A.—You have to put it on one side if you cannot use it.

Q.—How many months' supply would you put on one side?

A.—In one very large quarry where the output ran up to 60,000 tons a month, none of that small stuff was allowed to go into the work at all.

Q.—It was kept for something else?

A.—No.

Q.—What then?

A.—It was simply put on one side. I quite agree with you it occupied a lot of space.

Q.—Obviously?

A.—And ultimately it was got rid of by selling to other people outside.

Q.—But here you wanted the whole quantity?

A.—But they were putting a lot of this small stuff on one side.

Q.—But they could not put it on one side I have seen the quarry, and it is physically impossible to put a lot on one side?

A.—They were putting it on one side at that time.

Sir Frederick Hopkinson.—They could not; there is no room for it. As the quarry exists to-day there is no room to put a large quantity aside.

Chairman.—Have you been to Khandivli quarry?

A.—Yes. This note was made at that time. The reason for bringing up that point at the time was that they were not sending all that down to the wall.

Sir Frederick Hopkinson.—Then they could not have been quarrying 2,000 tons a day and putting much of it aside. It is absolutely physically impossible?

A.—They were not quarrying anything like 2,000 tons a day.

Q.—That is the rate at which they are supposed to work and have the plant for. At the top of page 7 you say, " The increase of prices between 1912 and 1919 was from 10 to 20 per cent., and between the end of 1919 and 1921 from 50 to 100 per cent." What is that for—labour or material, plant and machinery from England?

A.—It does not include anything from England at all. It is local labour and plant. I do not know whether it was made quite clear this morning, but in my statement I distinctly say that this was an experience which I had in the tropics.

Q.—It does not apply to India; I had forgotten.

A.—But it is very near India, and I thought it was a suitable comparison to make.

Q.—As a matter of fact we were told that the cost of labour had doubled itself in India; that is the evidence. At the top of the page you say: " It is well known to all engineers or contractors who carried out public works during the years following the termination of the war that there was an enormous increase in all prices during 1920 and 1921 ". I suggest to you that that is entirely wrong. The large increase in prices was long before 1921?

A.—Between 1919 and 1921 my experience was that there was a very large increase in prices.

Q.—Over 1912?

O.—No, between 1919 and 1921.

Q.—Is that for machinery from England?

A.—Yes, that is for machinery from England.

Q.—Let me tell you that the absolute highest price for pig iron in September, 1920, was about £11 10s. a ton, and by the end of 1921 it had fallen to below £5 a ton?

A.—At the end of 1921?

Sir Frederick Hopkinson.—Yes.

Chairman.—What do you say to that?

A.—That is coming to the end of 1921. There is a difference between the end and the beginning of 1921.

Sir Frederick Hopkinson.—Take it in March, if you like. The price was then £6 a ton as against £11 10s. a ton in 1920.

Chairman.—What do you say to that?

A.—These figures are taken from my own experience during that time of plant which was arranged for in 1919 and had to be built and supplied up to the beginning of 1921.

Sir Frederick Hopkinson.—Crown bar iron, for instance, in September, 1920, was £30 a ton. By May, 1921, it had fallen to £16 a ton?

A.—It came down in 1921.

Q.—But you say it increased in 1921?

A.—No, to 1921.

Q.—In the early of part of 1920 it rose; the height was reached in September, 1920, and then it rapidly fell?

A.—It came down in 1921, yes. That should be 1922 as a matter of fact. I should have included in there 1919, 1920 to 1921 if I might alter it.

Chairman.—You must apply your mind to the date, Mr. Halcrow. The date on which Sir George Buchanan furnished his estimate of 668 lakhs was February, 1922, by which date there had been a great fall?

A.—I follow that, but by that time—(I am now going into Sir George's province; I would rather not, but I will make just one remark in reply to that)—very large expenditure had been incurred in connection with Bombay. That is the view I take. It had been incurred during the peak of the prices in 1920, which was the peak. That is admitted by all, I think.

Q.—That is quite right.

A.—And his estimate was based on actual cost of the plant during that period.

Sir M. Visvesvaraya.—Which estimate do you mean?

Chairman.—The 668 lakh estimate. He says that Sir George based his prices on the fact that expenditure had been incurred at the peak.

Witness.—Yes, quite right.

Sir Frederick Hopkinson.—But the statement that prices were rising up to 1922 is wrong, because we know that prices dropped away suddenly in 1921?

A.—They dropped away suddenly in 1921 and again in 1922, but that also coincides with my experience. 1920, I consider the critical year, but it began in 1919.

Q.—It began to rise in January, 1919. It went up from £14 to £30 a ton from January, 1919, to about the middle of 1920. Then it fell away equally rapidly until, at the end of 1922, it had gone down to about £10 or £11 a ton?

A.—In the manufacturing of machinery there is a time lag on the basis price.

Q.—We know that prices were falling, because they got a rebate from Messrs. Simons on account of prices having fallen during the time they were actually building the dredgers?

A.—In 1921?

Q.—Yes. At the middle of page 8 you say: "It has been revealed by the evidence taken by the Committee in Bombay that the revised dredging estimates were based on improper data, and are therefore of no value." The revised dredging estimates were based on what the work was actually costing, were they not?

A.—As I understand it, the revised dredging estimates were based on the amount of filling retained in either the first or second season, or both, and therefore I consider that that is improper data on which to base it. For dredging cost it should be based on the work the dredger does, and also one would expect the dredgers to be worked for the full time.

Chairman.—And you would expect that the sea wall and cross-bunds would retain the material pumped?

A.—Yes.

Sir Frederick Hopkinson.—You say it is an improper price, and I am inclined to agree with you. It is only five annas. The dredging price in the project estimate is five annas a cube yard?

A.—That is the project estimate for the dredging, five annas.

Q.—Yes. You say it is based on improper data?

A.—Oh, no.

Q.—That is what you say—" and are therefore of no value."

A.—That is not what I intended to say.

Q.—That is what you do say?

A.—I am referring here to the revised estimate.

Chairman.—That is the document?

A.—No, the revised estimate—not *this* revised estimate.

Q.—You mean the revised estimate of 1,100 lakhs?

A.—Yes.

Sir Frederick Hopkinson.—What is the price there for the dredging? What is the actual price per cube yard in that estimate of 1,100 lakhs?

A.—I do not know what the actual price is in that estimate.

Q.—You say it is of no value?

A.—I am talking about the totals here. In the revised estimate, as I understand the position, if I may put it briefly, they based it on the amount of filling that they had obtained in the first season, and they said: "The dredger has only done so much; therefore it will take 20 or 30 years to complete." I forget the exact figure.

Sir Frederick Hopkinson.—35 years.

Chairman.—Those were Sir George Buchanan's figures?

A.—Well, a very long period. Having started on that assumption of 30 years, or whatever the figure is, to complete, they built up an estimate on that. In my opinion that is not a proper way to make an estimate.

Sir Frederick Hopkinson.—I suppose they were afraid of making estimates. They wanted to go on something they knew, for a change.

Chairman.—They were working entirely on past experience, were they not?

A.—On their past experience.

Q.—They said "If the future is no better than the past, it is going to cost 1,100 lakhs." That is how they did it?

A.—My view is that they should have taken it on the quantity dredged and not on the quantity retained. That is one point.

Sir Frederick Hopkinson.—But did they take it on the quantity retained?

A.—I cannot say.

Sir Frederick Hopkinson.—We have no figures to tell us that. What I should like to know is what price was put in that estimate of 1,100 lakhs—what price per cube yard. Then we can thrash it out.

Sir M. Visvesvaraya.—It comes to 1·1 or 1·2. 360 lakhs is the cost of working the dredger.

Sir Frederick Hopkinson.—I would like to see that figure. I have 250 lakhs here. We can easily work it out.

Sir M. Visvesvaraya.—310 lakhs is the cost of the dredged filling.

Sir Frederick Hopkinson.—I have here the figure of 250·78 lakhs. That looks like about 1s. 6d. per yard.

Sir M. Visvesvaraya.—"Dredged filling, 310-22 lakhs" appears in the 1,000 lakh estimate.

Sir Frederick Hopkinson.—That is ridiculous. They are doing it for a little over half a rupee. (*To the witness.*) You realise that this eight annas spoken of on Page 8 is the cost of working only. It was eight annas three pice I think. That is only the cost of working. That does not include the machinery at all?

A.—No.

Sir M. Visvesvaraya.—This 1·10 rupees also does not include machinery.

Sir Frederick Hopkinson.—It is ridiculous; it is not worth consideration. (*To the witness.*) At the bottom of page 9 you say," "Having perused the weekly statement of progress." Did that include the quantities of dredging done?

A.—Yes.

Q.—We have been told over and over again that those quantities were never known. Did they send you the weekly quantities of dredging done?

A.—Yes.

Sir Frederick Hopkinson.—Can you make anything of that, Mr. Chairman?

Chairman.—Only the fact that this witness says he got it. It did not stimulate Sir George Buchanan, or anybody else, to protest.

Witness.—It was on the basis of those weekly reports that, when it fell to me to take action in the matter, I wrote the letters which have been handed in this afternoon. It was in the middle of the second season.

Sir Frederick Hopkinson.—We have been told over and over again that the quantities of dredging done were never known until the following July or August.

A.—That is true as regards the amount of filling.

Chairman.—Reclaimed material.

Sir Frederick Hopkinson.—No, dredged. I put the question several times, why they had not known every day what the dredger was putting out, and we were told there were no quantities available by anybody?

A.—Yes, the quantities were certainly available from the dredger.

Q.—That is the only important thing. The amount of land reclaimed has nothing whatever to do with the dredger.

A.—If I may refer for a moment to the letters which have been handed in to-day, we cite in *this* letter those weekly reports. We refer to the week ending 18 December, 1924, the 1st January, 1925, the 29th January, 1925, and the 6th February, 1925—the average hourly output per week. We have here 1222, 1133, 799 and 613. These have been taken out for the purposes of the letter. But there was no information as regards the amount measured as reclaimed land until the following summer; that is quite correct.

Chairman.—Sir Frederick is on soundings.

Sir Frederick Hopkinson.—I am on soundings—the only proper way to measure up the work done.

A.—They were taken.

Sir Frederick Hopkinson.—We have been told that the soundings were taken daily, handed into the office, and nothing done with them.

Chairman.—And sent to London week by week?

A.—Week by week.

Sir Frederick Hopkinson.—That they actually took out the quantities there and sent them to London?

A.—That was the basis of taking this matter up here.

Q.—How can you test a dredger's working unless you take soundings? It is the only proper way to do it, is it not?

A.—That, in addition to taking the tests in the pipes.

Q.—That is for casual reference, if you want to know at 10 o'clock in the morning what percentage you are getting; but at the end of the week you would not be satisfied with that, would you?

A.—No; you want block measurements. Measurements in the pipe, in my opinion, should be taken frequently as a guide.

Q.—They are a comparative guide, but you would not accept them as final? You would not pay on them? You do not accept them as final? You would not pay on them as Resident Engineer, would you?

A.—Certainly not. We would pay on the actual sectional measurement.

Q.—Did you realise that when you were complaining about their taking the hard clay to the moorum that they had to get all that it was possible for them to get owing to the restrictions put on by the Indian Marine and the Port Authorities, and that there was no spare material available?

A.—That is not as I have understood the position.

Q.—There are 36 millions. If you deduct from that 15 million that leaves only 21 million yards available. Is not that so?

A.—21 million from the harbour. When I became connected with the work (this is outside my province altogether) they had decided to obtain material from Back Bay.

Q.—They were talking of it?

A.—They had made up their minds, I think, then. I am speaking from memory. The Resident Engineer, when he had completed his borings, wrote that there were over 25 millions yards of material available in Back Bay. I think I am right?

Q.—Yes. You are quite right. Twenty-five million was the quantity given.

A.—Therefore, between the two sections there did not seem to me to be any necessity for scraping up that last cubic yard of rock from the bottom.

Q.—It is all a question of time. On page 13 you give some general remarks about how machinery should be bought, and you say: "The plant is tested against the specification before being taken over from the builder." That is all a question of arrangement, is it not, and what you put in the contract? If you put in the contract that it is to be tested in Bombay on the actual work it has to do, that is the proper place to do it, as was done in the case of the "Kalu" and "Jinga"?

A.—That is all a matter of arrangement, as I understand it, but, as I mentioned here, I have not come across a case of that kind in my experience.

Sir Frederick Hopkinson.—You are the first man I have come across in connection with this enquiry who has entirely agreed with the view I put forward, that you cannot move clay without increasing its bulk. I put that as a proposition to them in Bombay, and it seemed to surprise them all. I notice you agree with me?

Chairman.—It is a fact, is it not?

A.—It is a fact, that is to say, briefly, that the quantity of filling required in the reclaimed area will be less—No, let me put it the other way.

Q.—That you cannot move solid material without increasing its bulk?

A.—Yes.

Chairman.—Material which has been under compression for centuries, when dredged out, increases in bulk.

A.—Which means that the quantity of material to be dredged is less than the quantity of filling required.

Chairman.—If you are dealing with clay, and clay alone?

Sir Frederick Hopkinson.—In the last paragraph, on page 15, you say: "In order to help the Department we looked into the question of the best way to put the "Kalu" to work in Back Bay. I suggested that the "Kalu" should cut a flotation channel, pumping the material through a short pipe-line, say, 100 yards, to one side." Is this the plan that you sent out giving those views? (indicating same to the witness).

A.—I do not know that a plan was ever sent out. My connection with it was when I discussed it with Mr. Brims.

Q.—What is the stamp on it?

A.—That is the office stamp, 2nd May, 1923. That would be about the time.

Q.—Was that your idea at the time?

A.—This was my idea, subject to the information which at that time was being asked for regarding the cables coming across *here*, which would necessitate moving the channel to this point *here*, when the position of the Eastern Telegraph Company's cables had been determined. My idea was that rather than go in and dig a hole, a channel should be dug in so that the vessel should be free to come out, and, always being afloat, that she would dredge all the time.

Q.—*This* is the plan which illustrates the instruction or the idea?

A.—The idea.

Q.—This channel is 3,200 feet long and 800 feet wide?

A.—My intention was not take it as wide as that. That is diagramatic only.

Q.—What width did you intend to take it?

A.—Perhaps 50 yards.

Q.—What about the depth? *This* would be for the "Kalu" to float in at low water?

A.—Yes.

Q.—Do you know anything about the soundings on *this*?

A.—*That* is the 2-fathom line, and *that* is the 1-fathom line.

Sir Frederick Hopkinson.—So that the depth of water *here* would be about 3 feet, I suppose—about half a fathom? You would want to float the "Kalu" in about 3 fathoms. Twelve feet would not float the "Kalu." Did not she draw about 14 feet?

Chairman.—No, her mean draught was 8 feet.

Witness.—I cannot say from memory, but my recollection is that the two fathoms suggested here left comfortable margin.

Chairman.—"Mean draught, with 150 tons coal in bunkers and 820 tons water in tanks, about 8 feet."

Sir Frederick Hopkinson.—In the middle of page 17 you say: "The Government of Bombay placed the execution of the works in the hands of the Development Directorate, who took the same position as contractors and rightly assumed full control." Why do you say that? All the time we were in Bombay the Development Directorate absolutely refused to take that position, and said that they never had taken that position.

A.—I have never understood any other position but that they were carrying out the work. They were the executive. That has always been perfectly clear in my mind since I became connected with the work.

Sir Frederick Hopkinson.—Why did not you settle the matter with Sir Lawless Hepper. You were out there? He said most positively that he never occupied that position; he never interfered in the carrying out of the work, except on one occasion, and that was the occasion of sealing the sea wall. That is the only occasion on which he said he ever interfered with the carrying out of the work. Is not that so, Mr. Chairman?

Chairman.—Yes.

Witness.—I have always always looked upon Sir Lawless Hepper as the manager in charge of the work. I might just mention one or two points which have been brought

to my notice. I think they were before my time. They sent home a requisition for additional plant, and the firm had to express the opinion that they thought the plant (wagons, cranes, or whatever it was) was rather excessive for the quantities with which they were working, and they wrote back to that effect. They received instructions from the Director of Development to order the plant.

Sir Frederick Hopkinson.—My recollection of that is that Sir George Buchanan wrote saying that he did not like to interfere with the liberty of the man on the spot. Is not that so?

Chairman.—But that at the same time, all expenditure did increase the capital cost of the work. The letter of request for the plant was the 17th March, and Sir George Buchanan wrote a very excellent reply suggesting to them that some considerable portion of this plant was not necessary, and he asked Mr. Lewis to communicate with the Development Director and cable his opinion. The Director of Development cabled his opinion that the plant was necessary with the exception of one crane; and that plant was ordered, but it was ordered unquestionably in the belief of Sir George Buchanan that the whole of it was not necessary and was an extravagance.

Witness.—That is one instance which proved to me that the Directorate assumed full control as regards the execution of the work.

Sir Frederick Hopkinson.—Were there any other instances?

A.—I have no doubt I could find one or two more.

Chairman.—We asked Sir George whether he would tell us of any other instances in which he put the brake on. He was putting the brake on there, and saying "Look here, you are ordering plant which I think is excessive, and although a great deal must be left to the man on the spot, nevertheless this is going to cost a great deal of money." That was an instance of his putting the brake on. We have asked him to give us any other instances, and no doubt he will, if they occurred. At the moment I do not know of any other except that. It was greatly to Sir George Buchanan's credit to do that. It was quite proper and quite right.

Sir Frederick Hopkinson.—But is it not most extraordinary that in a matter of this major importance, nobody seems to have thought to have had the matter settled as to who was really controlling this work? You thought Sir Lawless Hepper was doing it. Sir Lawless Hepper says positively that he never intended to do it and that he never did do it.

A.—As far as I am concerned in giving evidence here, I never knew, until I read some of the evidence taken in Bombay, that Sir Lawless Hepper did not consider himself in complete charge of the work.

Chairman.—Sir Lawless Hepper preserved an air of the greatest detachment. He disclaimed all association with the slightest technical knowledge; he was merely the administrative head.

Sir Frederick Hopkinson.—He said himself that he was not competent to do it.

A.—Then why was the work put in his hands?

Q.—He says it was not?

A.—But surely he was the Director of Development, and they were carrying out the work? He had full control of all the accounts, and everything?

Q.—Accounts?

A.—When I say accounts, I mean the purchase of materials and plant, and everything else. His word was law. If Sir Lawless Hepper had said to his staff, "These dredgers must work 24 hours a day," they would have worked 24 hours a day.

Q.—I am not so sure about that, but I think Sir Lawless Hepper was afraid of encroaching upon the privilege of Sir George Buchanan.

A.—It was very unfortunate that he did not say so a long time before.

Chairman.—I think the real position was that Sir Lawless Hepper left it to Sir George Buchanan, and Sir George Buchanan left it to Sir Lawless Hepper, and therefore, relatively, nothing was done.

Sir M. Visvesvaraya.—But what becomes of your responsibility according to the terms of the contract? It is said in the first clause "They shall perform all work and duties devolving upon engineers of large works." "All work and duties." You did not disclaim that responsibility for all that time, and now, when trouble comes, you say, "We had nothing at all to do with it" etc.?

A.—No; I would not like to think that.

Chairman.—First of all you would say that this agreement was entered into nearly a couple of years before you joined the firm?

A.—Yes. I have nothing whatever to do with that agreement. It was entered into long before my time.

Q.—It is " all work and duties devolving upon engineers of large works "?

A.—I would like to say something about that, because I am the engineer for various works, and large works, at the present time. I am now talking about my position as engineer—not consulting engineer, which is another position I occupy with regard to certain other clients.

Q.—Nor contractor?

A.—And I am not a contractor. I am glad to say I have been a contractor for a number of years, and I value that experience very highly indeed, but I am not now; I am back again where I started on the consulting engineer staff. As consulting engineer I have tried to explain briefly in my statement what my duties are. Work is actually being carried out at the present time in Europe, in connection with which I act as the consulting engineer. I do not go near those works unless I am invited to do so by the Board of Directors. They have their own staff out there; they have their own machinery, and they carry out the work. They ask my advice when they want it. In other cases I am the engineer responsible for carrying out the works. In those cases I have prepared the plans, or the designs, the specifications and the schedules of quantities. Those works have been let by contract and are being carried out by contractors. I have my own staff of resident engineers and assistants on the work who look after things for me locally, and I visit the works periodically. I have no executive control over those works. The contractors are responsible for the speed of the work, and they are under penalty if they take longer than the contract time.

Q.—The contractor has bound himself to produce a given result for a given price within a given time?

A.—Yes. If he does not make the requisite progress and I am not satisfied, what can I do? I have three courses open to me. First, I complain. If it is not put right and still goes wrong it is then open to me to refuse interim payments on certificates. If that does not bring the requisite progress, and things are still going badly, under my conditions of contract I can determine the contract and take it out of his hands altogether. That is a very serious matter. That is the position of the engineer responsible for the work, but he has no control over the payment of the men or anything else. All those are matters for the contractor to deal with.

Sir M. Visvesaraya.—That again, is due to Sir George Buchanan's position, because Sir George Buchanan has no staff out there.

A.—May I just go on to the analogy in Back Bay?

Chairman.—Please do.

A.—In Back Bay the work is being carried out without a signed contract, as it were, between the Government and itself, because the client, the Government, is carrying out its own work. Therefore the engineer unfortunately does not have the same control. In this case it was apparently arranged that the chief engineer responsible under the Director of Development for the execution of the Back Bay works should act as resident engineer, and the firm should have his nomination. I did not like the arrangement, but there it was. Let us take it as it stood. His duties as resident engineer would be to report to Sir George Buchanan or to the firm, as the case may be, on all matters concerning permanent work. If there were any work still remaining to be designed, which is quite an ordinary feature of large works, he would send him the local data on which the firm could build up their designs and further specifications. But in all matters relating to execution he was responsible to the Director of Development. I have indicated in my statement that I once occupied a somewhat similar position. That was 16 or 17 years ago—and a small work; I was sent abroad by Mr. Meik as resident engineer on the reconstruction of a pier in Europe. It was intended that the work should be carried out by contract. It was in the early days of reinforced concrete, and the design included the handling of what were then very large piles running to about 60 feet in length. Tenders were invited from contractors locally, but they were unsatisfactory. They were rather afraid of the work—it was beyond them—and I received instructions to carry out the work myself for Mr. Meik's clients, and I did so. In all matters relating to the designs or to Mr. Meik's specification, to the tests of materials and workmanship, if there were any little alteration which local conditions required, I referred those matters and reported progress, to Mr. Meik, any questions as to what labour was to be paid, where I was to obtain my materials and buy them, and so on, I dealt with his clients out there. That is a somewhat similar position, although I say it was a small job and not of the magnitude of Back Bay. That is as I understand the position.

Sir Frederick Hopkinson.—But circumstances are not quite the same in that case and in Bombay. Take the dredging, for instance, which is the major part of the scheme in Bombay. There is no designing there, having once bought your dredger?

A.—The actual designing required for the Back Bay work is very small.

Q.—Is there any in the dredging work in Bombay?

A.—No actual designing.

Q.—Is there any engineering in it beyond buying the dredger—there are no plans to make?

A.—There are no plans to make

Q.—There is nothing to supervise. All you have to do is to get your output?

A.—All you have to do is to get your output.

Q.—There is no engineering about it at all.

A.—It is in the wall that there is engineering.

Q.—Leave the wall out. I am speaking of the dredging. There is nothing for an engineer to do in connection with that?

A.—No. Actual practical engineering matters crop up in connection with these engineering schemes. In one which I was connected with it transpired that quite a lot had to be done in connection with engineering. The material was so fine in suspension that a great deal of it was carried away in the overflow. Instead of the surface water running clean away from the reclaimed area it was carrying quite a lot of pumped material in suspension, the material was fine silt and mud. It eventually required the dividing up of the reclaimed area into a very large number of small compartments for pumping and repumping, and changing from one to the other.

Q.—That had been done here. It was separated into compartments by cross-bunds. There is no engineering, is there. Why should an engineer be paid 2 per cent. on the cost of dredging here, because he had absolutely nothing to do for it?

A.—If one starts to subdivide up what an engineer should be paid for on a scheme, and what he should not be paid for, it would be rather a difficult matter, I think.

Q.—I am suggesting that as there is no engineering, that 2 per cent. covers the control of the work. But that is a matter of the construction of the document.

A.—I would disagree with that.

Sir M. Visvesvaraya.—There is one point you have not answered. You had no representative on the spot. You yourself are 5,000 miles away from the works. Why did you not make arrengements to see that your share of responsibility according to the contract was properly fulfilled? You have not done so.

A.—We are going back now and I do not want to step out of my province; but briefly, I say that the resident engineer was the firm's representative. Later on, I think early in 1923, that question was discussed by Sir George Buchanan with the Government of having a separate representative, and it was not agreed to.

Q.—If it was not agreed to, then you ought to have given notice according to the contract, and said: " Something has got to be done. Some proper arrangements will have to be organised ".

A.—I must leave that to Sir George, because it is really outside my province.

Q.—You are arguing by analogy.

A.—I was trying to explain to those members of the Committee who are not in the same profession, who are not dealing with work as we are in Westminister, what the relative position of engineer, consulting engineer and contractor is.

Q.—I want to apply your principles to this case, but you do not want to go into that, I understand?

A.—I have tried to do it.

Sir Frederick Hopkinson.—On page 20 you say: " The dredger ' Sir George Lloyd,' if properly handled, can give her designed output in the material in the harbour." You make that as a statement.

A.—I take it from the evidence given in Bombay.

Q.—" The Development Department staff have admitted this to the Committee."

A.—I am looking for that reference which was mentioned this morning to send it on to you. I am going to let you have that reference.

Q.—I thought you were making that first statement on your own authority?

A.—No.

Q.—On page 21 you take as the basis of your cost 5 annas per cubic yard. You are unable to point out to me any work that has ever been done at anything like that price?

A.—You are talking about suction dredgers, are you not?

Q.—Yes.

A.—Not about bucket dredgers?

Q.—Suction dredgers?

A.—I have taken those figures from the evidence.

Q.—But we have no evidence that it can be done at that price—none at all, but quite the contrary.

A.—You can take that paragraph as I put it there " on the basis of 5 annas per cubic yard." That is taking the assumption, to begin with, that it would require 6·06.

Q.—It is only an assumption.

A.—We go on from that in the same paragraph to refer back again to some figures on a previous page, where we take 8 annas, which they gave in evidence, as the cost of operating the dredging plant.

Q.—If you take a different assumption, it might cost as much, or only one-fifth as much, and, therefore, it does not help you at all?

A.—No; these figures are taken from the evidence.

Q.—We have no evidence of a price of four annas for pumping.

A.—8 annas.

Q.—This says: "On the basis of 5 annas."

A.—I think the paragraph is clear as it stands, taken as a whole, is not it?

Q.—If you say it is an assumption, it is clear.

A.—Yes.

Q.—But an assumption does not help us. A little further down the page you say: "When investigating the scheme, I found there was no intention of covering the whole area with moorum 1 foot deep." Where did you get that from?

A.—I got that in my conversation with Sir George Buchanan.

Q.—But there has been an intention right away from 1919 to cover it, first of all 1 foot deep and subsequently 2 feet deep. The quantities have been given as 1,810,000 yards and 3,620,000 yards.

A.—Quite so. That is the basis on which quantities have been taken out. I asked the question: "Is it intended to put a carpet of moorum so to speak."

Q.—When you were out there?

A.—Yes.

Q.—There was nothing to put it on there then?

A.—I wanted to know what the intention was with regard to the moorum: was it intended to put a carpet over the whole area; and I was told "No."

Q.—By whom?

A.—By Sir George.

Q.—Out there?

A.—Yes.

Q.—But he has provided for it?

A.—That was taken as the quantity of moorum which would be required to make up the roads and other areas, because where the clay was taken from the Harbour it would be good ground on which you could walk straight away. Where the mud was it would have to dry out on the surface, and then receive moorum on the top. That is what I meant by that.

Q.—But this quantity has been taken over the whole area?

A.—As an average.

Q.—The only alteration made to it has been to double it—to increase it to 2 feet?

A.—When was that increase to 2 feet made?

Q.—I cannot put my finger on it, but I have the figures here. One of the estimates was 3,620,000 cubic yards.

A.—I do not know that figure.

Mr. Billimoria.—You have in your note in several paragraphs expressed your personal opinions?

A.—Yes.

Q.—If you do not mind, might we have briefly what your qualifications are as an engineer?

A.—I have had between 25 and 30 years' experience as an engineer.

Q.—Have you qualifications by examination or practical experience, or membership of any institution?

A.—Yes; I am a Member of the Institution of Civil Engineers, a Member of Water Engineers, a Fellow of the Royal Meteorological Society, and I have a great deal of practical experience all over the world, both at home and abroad.

Q.—You will agree with me that membership of the Institute of Civil Engineers is considered a great honour and privilege by members of your profession? Is not that so?

A.—I am quite pleased to be a Member of the Institution of Civil Engineers.

Q.—How long have you been in this profession of Civil Engineer?

A.—About 27 or 28 years.

Q.—It is recognised all over the world as a special qualification to be a member of the Institution of Civil Engineers?

A.—All Civil Engineers are not Members of the Institution of Civil Engineers.

Q.—But those that are would put it forward as one of the qualifications to secure work, or to secure a job? It is considered a qualification?

A.—It is in some cases, not in all.

Q.—Had you had any personal experience of the local conditions in Bombay before you went out to Bombay in connection with this reclamation work?

A.—Not in India.

Q.—Have you any intimate or personal knowledge of the Back Bay reclamation, beyond your visit to Bombay which you have referred to?

A.—That was my only visit to Bombay.

Q.—If you will kindly turn to page 2 of your note, you say in the first paragraph: "Also, in the case of staff or other employees which the Department required from this country, the firm assisted the High Commissioner in the selection of suitable men." You were, therefore, satisfied as to the men who were employed by the High Commissioner being perfectly suitable for the job they were employed on?

A.—Yes.

Q.—May I trouble you to turn back to page 1, where you say: "When orders were placed by the India Stores Department the firm carried out the necessary inspections and tests and reported progress to the Development Department"?

A.—Yes.

Q.—You were the engineers responsible, and had to advise the Government and the Stores Department with regard to the suitability of the plant, and you inspected and tested the plant?

A.—When the Development Directorate sent home requisitions for a crane, they specified they wanted perhaps a 5-ton crane, or whatever it was, and we then had to invite tenders and specify generally what was required. The tenders were inspected and one recommended and forwarded to the India Stores Department; and then after that we had to see that the crane was properly built and inspected, and advise the Development Directorate.

Q.—The High Commissioner, therefore, evidently relied on your advice on such matters?

A.—As regards the purchase of plant.

Q.—You must have very carefully studied Sir George Buchanan's report, being intimately connected with his firm as one of the members thereof.

A.—I have read the report.

Q.—I suppose before you came here to give evidence you again had an opportunity of going over it very carefully?

A.—I have not gone over the report very carefully before coming here. I think I have explained my position with regard to the work as briefly as possible in my statement.

Q.—Even being connected with the firm on a project of such magnitude, you must naturally have taken some interest in it?

A.—Undoubtedly, I have taken an interest in it.

Q.—You have used this document, the report which has given birth to this scheme?

A.—I have read this report.

Q.—Before I go on to the details of the report, will you agree with me that the prices of commodities all the world over before the war were normal—what we call normal prices—and during the war and thereafter the prices had advanced substantially all round?

A.—Prices advanced in a greater or less degree in different countries. That is my experience.

Q.—I want to take India and England; let us confine ourselves to these two countries.

A.—I cannot give you details for India.

Q.—You have no personal experience of Indian conditions at all?

A.—No.

Q.—Taking the prices in this country of both labour and materials, it is well known that during the war and thereafter they advanced until they reached the peak in 1920?

A.—Yes.

Q.—If that was the position, taking a figure in 1913 for an article that would cost, say, £100, what would be the approximate cost in the year 1919 or 1920?

A.—In England, you mean?

Q.—Yes.

A.—In the year 1919, as I think I have already said, perhaps two to two-and-a-half times.

Q.—Therefore supposing an engineer had submitted an estimate in the year 1913 at a certain figure, you would, if you were called upon to submit an estimate in 1919, make your estimate two-and-a-half times the original figure?

A.—No, not necessarily.

Q.—How would you qualify your answer?

A.—If the estimate had been made by myself, I might be prepared to say yes.

Q.—That is what I want.

A.—Not if the estimate were prepared by another person.

Q.—I am not asking for any other person; I am asking you as an engineer of 25 years' standing and repute as you have stated, would you have put down the figure in the estimate of 1919 at two-and-a-half times the original figure?

A.—My own estimate?

Q.—Yes.

A.—If it were based on a previous estimate of my own?

Q.—Yes.

A.—That, of course, is important.

Q.—You are comparing your own figures of 1913 with 1919?

A.—That is what I mean.

Chairman.—Mr. Halcrow says: "If in 1912 I have given an estimate for so much, then in 1919 I would have multiplied it by two or two and a-half times, but if somebody else in 1912 had given an estimate, I am not prepared to say I should multiply that by two or two and a-half times."

Mr. Billimoria.—Very well.

A.—Just to give you an instance of the variation that one meets with in preparing estimates for civil engineering works, I do not think I exaggerate when I say that in all the tenders which I received for works during the last three or four years, the difference between the lowest tender and the highest tender prepared by experienced contractors has varied up to 100 per cent. Therefore contractors differ in their estimate of works by perhaps 100 per cent.

Chairman.—Some are in a hurry to get rich.

A.—I thought that might help you.

Mr. Billimoria.—I am quite prepared to accept your answer so far as it goes, but what I am suggesting is this: Suppose an engineer of very great repute had prepared an estimate whose figures had been considered to be thoroughly reliable, whose estimate had undergone scrutiny and examination from another independent expert, if those figures had been submitted to you thereafter, having regard to the circumstance that prices had advanced beween 1913 and 1919, would you not have proportionately increased your figures in the estimate which you submitted in 1919?

A.—No. I would accept no figures of any other estimate until I examined them in detail myself.

Sir Frederick Hopkinson.—Hear, hear.

Mr. Billimoria.—In order to examine the figures in detail, how long would it take you to inspect the estimate on a project of such a magnitude as this?

A.—I do not know whether it has been brought before the Committee at all, but the preparation of estimates by engineers or by contractors is an entirely different matter; there is a very big difference. I can speak with some authority because, as I have already explained, I have been on both sides of the house.

Chairman.—It has been explained to us quite clearly.

A.—On the point of taking the estimate on schedule prices, I should be prepared to criticise it on the information given here, because they give the schedule rates annas 5, 6 or 8, and so on, whatever it may be for the cubic yard; but in a contractor's estimate it is quite different. If it has been explained, I need not do it.

Sir Frederick Hopkinson.—You could not criticise it unless you knew a great deal more about it.

Chairman.—As a contractor you could not give a price for a work on the information contained in that report only?

A.—To base a tender on this—no, I do not think so. One would base it on the contract drawings specification and schedule, on which to prepare a tender.

Sir Frederick Hopkinson.—And, moreover, the conditions of the site?

A.—An examination of the conditions of the site to prepare the tender is wise, though one has heard of cases where contractors take on large works without having seen the place at all.

Q.—They are not wise contractors?

A.—I would agree with you there; but that is not an unknown case.

Mr. Billimoria.—Your answers are not answers to my question at all. What I want to get from you is this: If you were not relying on somebody else's estimate, and you were called upon to submit an estimate on a work of such vast magnitude as this, where you say you would not do it without a thorough investigation on your own account, how long would it take you to do it? That is my question to you.

A.—To make a report and estimate on a work of the magnitude of Back Bay I should personally like something in the region of six months, if I could get it. That is speaking for myself.

Chairman.—Six months' personal investigation on the site and going all over the place?

A.—Not necessarily stopping there for six months.

Q.—But collecting information in great detail from there?

A.—Collecting information might only take a few weeks. I can give you an instance where my services were borrowed by a firm of contractors to go abroad and report to them on all the local conditions, and I was in that country, I think, for five or six weeks. On my report they based a firm tender running into millions of sterling before the war on pre-war prices. That was considered by the contractors sufficient time for me to remain there and make my report.

Sir Frederick Hopkinson.—That is on the assumption, and is bound to be on the assumption, that they had confidence in you.

A.—Well, I must assume that from the fact that they specially asked me to go from my firm and go out and do that work. That was a period of five to six weeks in the country. Of course I worked very hard, and I got all the information, and then I wrote my report.

Mr. Billimoria.—If you had done it in a lesser period, that report would be simply perfunctory or superficial?

A.—No; I think it depends a good deal on who is doing it. One engineer might do it very quickly and grasp the facts quickly—he might be very quick at grasping the principal points and assembling his facts; whereas another engineer might take very much longer. I do not think one could definitely state the time to be allowed for making that report.

Q.—How long would the most brilliant head in your profession take? You say there is an engineer and an engineer, and I quite admit that. But how long would the most brilliant head take?

A.—I am afraid that would be pure guessing on my part.

Q.—You have given us a period as six months with your vast experience of 25 years.

A.—I have given you a definite case which I thought perhaps might help you, of a much larger work than the Bombay Back Bay reclamation scheme. I am talking about 17 years ago, 1909. The figure there was something like £4,500,000, which represented work of a magnitude of about £9,000,000 to-day. For the contractors to put in their firm tender on that I was some five or six weeks in the country concerned. Is that a guide to you of what I mean? That is what I myself would do.

Q.—If you were called upon as an expert engineer with your vast experience, having done work of such magnitude, to report upon a report of another skilled engineer, how long would you take to do it and to criticise his report, go into details, and thoroughly investigate it for the purpose of advising your employer?

A.—May I take a recent case again? I have recently reported on a scheme got out by another engineer on the Continent of a magnitude of about £2,000,000 sterling. All the plans, all the papers and all the documents were put before me. I think that from the time they reached my office to the time that I sent out my report—and during that period I was engaged on many other works at the same time—it would be about five weeks.

Q.—During those five weeks would you exhaustively go through all the matters? Would you test the figures, or would you superficially glance through them and accept them as correct?

A.—The information placed before me was very full; it was not all that I wanted, and I had to delay once or twice to obtain further information. Having got that, I had all that I required.

Q.—Assuming that you were in the position of an independent expert advising your employer, no matter what materials are placed before you, would you rely on those materials?

A.—I understand your question to be that if a report and facts and plans were placed before me, how long would I take to go through them?

Q.—As an independent expert advising your employer?

A.—As an independent engineer reporting on them—I tried to give you a recent instance.

Q.—You said you would take about five to six weeks?

A.—That is what I took on this occasion.

Sir Frederick Hopkinson.—Did that include a visit to the site?

A.—That did not include a visit to the site.

Mr. Billimoria.—If you were not to accept the various plans, estimates and figures therein, and thought it would be necessary to modify them in a certain measure, and not accept everything in the data, how long would it take?

A.—Well!

Q.—An attempt has been made to say that on certain matters the report has been accepted, and on other matters the report has not been accepted. I want to make myself perfectly clear to you. I do not want to keep back any cards; I am placing all the cards on the table.

A.—I am not suggesting that. I simply say it depends so much on the individual. I have tried to give one or two cases of my own experience. I do not know that I can say very much more to that.

Chairman.—It is rather like Counsel's opinion in a very voluminous case. Some Counsel might work the greater part of each day for six or seven weeks, and then give an opinion. A Counsel with a quicker brain and able to retain the facts might give an opinion in three weeks. There may be some Counsel who would never be able to give any opinion of any value at all in six months.

Mr. Billimoria.—I quite appreciate your point. But where the report has to be digested, and a part of that report has to be accepted as correct, and the other part is to be challenged, would not it make a difference in arriving at the conclusions in the sense that it would require some greater length of time? If I was reading this document and I accepted it as correct I could express an opinion, as you say, within a certain specified time. But if I agree with two pages of the report and disagree with the remaining portion of it, in order to arrive at my conclusions and make definite recommendations it must necessarily take some time, because it would mean a matter of working out the details, would not it?

A.—On the question of time, at the risk of repeating myself, I am afraid I must again say that it depends almost entirely on the individual and his individual experience.

Sir Frederick Hopkinson.—There is another point which cropped up a day or two ago. That report included an estimate. There are two kinds of estimate, as Mr. Halcrow knows quite well. One is that which is made by a contractor under which he is compelled to carry out the work; and the other is made by an engineer under which he can get supplementary estimates. They are totally different things, are not they?

A.—Yes; they are totally different things, because an engineer as you so well know, if I may say so, always handles schedule rates.

Q.—He always knows that a supplementary estimate can be obtained. I am pointing out that is the difference between his estimate and that of a contractor.

A.—But apart from the question of supplementary estimates, we have known cases of contractors getting extras on their contract.

Q.—No; not if they are finally able to carry them out—I do not agree with you at all.

A.—I am able to speak of the handling of schedule rates from experience. If an engineer goes to a new country one of the first things he does is to make enquiries as to the cost of work locally. He does not ascertain, first of all, the price of labour and how many yards of excavation a man can do per hour. He deals with the finished schedule rates which include everything; but a contractor who has to put in a firm contract——

Q.—A clinching document?

A.—Yes—he starts off, if I may suggest it, with the postage stamps he is going to pay for in his office.

Q.—Precisely.

A.—Tenders for works which I have been engaged on may run to 150 pages of foolscap, taking the details right the way through. Whether the results which he obtains at the end is of greater value than the engineering estimate, is another matter.

Q.—Do you say it is another matter?

A.—Because the contractors vary so much in their tenders, as I have already said this afternoon. The tenders vary very much from the lowest to the highest.

Mr. Billimoria.—In answer to Sir M. Visvesvaraya's question you said while you were in Bombay a specimen of clay was exhibited to you?

A.—Yes.

Q.—You found that material was quite suitable, did not you, when you examined it?

A.—Yes.

Q.—It was suitable material?

A.—Yes.

Q.—When did you first know that the material was unsuitable?

A.—I do not know that I know that now.

Chairman.—He was away before the dredging commenced.

Mr. Billimoria.—But he takes a sample of clay that was shown to him from the bed of the sea.

Chairman.—Quite so.

Mr. Billimoria.—You thought that material suitable?

A.—I considered it suitable.

Q.—When did you know that the material that was dredged from the harbour was unsuitable.

A.—I do not know that I know it now.

Q.—You do not know it now?

A.—No.

Sir M. Visvesvaraya.—Mr. Settle knew, because he has stated it in his statement.

A.—That comes in Mr. Settle's evidence. He has seen the pumping taking place. I have not seen it.

Chairman.—Anyhow, you say you do not know.

Mr. Billimoria.—So that the various conclusions you have arrived at in your report are based upon something that you have heard, and of which you do not personally know?

A.—I saw a sample of the mud, as I say, and I have also had experience of reclamation which was carried out by pumping mud and silt on shore; and that reclamation was successful.

Q.—Which reclamation are you referring to?

A.—The one I was connected with in the Straits Settlements.

Q.—Here, when you are arriving at certain calculations and expressing a definite opinion, you do so on certain information, not on your own personal experience and knowledge?

A.—I have said that I have seen a sample of it—a small sample, it is true.

Q.—I am not asking you about the clay, but generally. If you do not know anything about the unsuitability of the clay, it necessarily follows that all the various opinions that you have expressed in this document before us now are based upon hearsay information, and not on your own personal knowledge?

A.—You mean it is not based upon seeing the material in the reclamation? I have not seen that. I have not been in Bombay since the pumping commenced.

Q.—You have not been very closely associated with the progress of the work?

A.—No. This Back Bay scheme is essentially Sir George Buchanan's scheme. In a firm like ours each partner has his own work and his own clients to deal with.

Q.—That is right.

A.—In this case I have discussed matters with Sir George Buchanan frequently. The only occasion on which I had to step in and take action was in the spring of 1925, and I have tried to show what I did in the matter of speeding up the dredging.

Q.—If you were not specially connected with the scheme, but were occasionally consulted on certain matters, what prompted you to come before this Committee with this document and give evidence to-day? What is the reason of your presence here to-day?

A.—I was invited to come. I was asked if I would give evidence, or give any information as to what I knew about the work.

Q.—By whom?

A.—By Sir George Buchanan.

Chairman.—About the visit to Bombay?

A.—About the visit to Bombay.

Mr. Billimoria.—You have gone far beyond your visit to Bombay. You have not confined yourself to Bombay. You have expressed an opinion on things on which you have no personal knowledge.

A.—Can you give me a case?

Q.—Everywhere you have expressed opinions, and now you say that you know nothing about it.

A.—No; I think not. Can you give me a case where I am expressing an opinion?

Q.—In the course of your evidence to-day you have stated several matters of opinion which you arrive at which are based upon information, and on which you had no personal knowledge of the things.

A.—It depends upon exactly what you mean by " personal knowledge." If personal knowledge is to be confined to being in Bombay, that is limiting the expression very much. One may have personal knowledge by being in close touch with the people who are engaged on the work, and seeing the papers about it.

Q.—What I want to find out is, if you were confining yourself merely to your visit to Bombay, I can appreciate the trouble you have taken in coming before the Committee; but if you are going beyond that and expressing certain views, I want to know where you get that information from, as it is not from personal knowledge.

A.—It is my personal knowledge in this way, that I have had frequent conversations with Sir George Buchanan.

Q.—That is, I think, hearsay. That is one thing. I hear from my clerk something, and I base my conclusions on that. That is what it comes to?

A.—No; I do not think I could agree with that.

Q.—Very well. We will leave it at that. In the course of your conversations and your perusal of documents you may have known that the whole of the reclamation was anticipated to be completed by the end of 1926?

A.—That, I think, was the original report which has been revised to 1930-31 by the Development Department.

Q.—If your recommendations are followed perhaps we may not see the end of it till 1954; but that is not our concern. You anticipated that the whole of the reclamation was to be completed by the end of 1926 originally?

A.—That is in Sir George Buchanan's report. It was all before my time.

Q.—Although we are at the end of the year 1926, you know also from hearsay knowledge, which is not your personal knowledge, that not even 25 per cent. of the work has been completed?

A.—Of the dredging?

Chairman.—It is as 4 is to 25.

A.—Yes; it is about 16 per cent.—I have that figure in my statement—as against the estimate here of 30 per cent.

Mr. Billimoria.—On page 18 of your note you say Sir George Buchanan remained in Bombay for a longer period than was necessary in your opinion, and certainly much longer than you have ever known an engineer for large works to stay. On what authority do you make that particular statement?

A.—My experience.

Q.—Do you know what the contract between Sir George Buchanan and the Secretary of State was?

A.—I have read it.

Q.—The words used therein are " several months." Would you call a couple of months " several months "?

A.—I have not got a copy of it before me, but I do not think it says that.

Mr. Billimoria.—It says so in Sir George Buchanan's own note of his interview with Mr. Montague.

Chairman.—But not in the contract.

Mr. Billimoria.—The basis of the contract was the informal interview with Mr. Montagu, Secretary of State for India.

A.—I have no knowledge of those interviews.

Chairman.—The contract said for such period during the working season as he or the Government of Bombay should think necessary.

A.—Those are the words I remember.

Sir M. Visvesvaraya.—That is generally: but in the understanding with the Governor it was put as much longer. " Several months " are stated in his own statement.

A.—But not embodied in the contract.

Mr. Billimoria.—" Undertook to spend a few months every year in Bombay."

A.—But that does not appear in the contract.

Sir Frederick Hopkinson.—I have found the reference to moorum. In Sir George Buchanan's estimate of 1919 he gave 1,830,000 yards, and in his report of February 11th he gave 3,360,000 yards.

A.—Thank you.

Mr. Billimoria.—You are referring to the agreement. I shall read one other clause: " Work in India. During the whole period the execution of the work shall be closely supervised by the firm, and Sir George Buchanan shall devote the greater part of his time to this particular work." Does that mean that he had to devote a longer time, and that

your opinion, which may be worth a good deal in your own sphere, does not count having regard to that agreement?

A.—I do not read the agreement to mean that he had to spend the greater part of his time in Bombay. After all he had a lot of work to do, and he was engaged on the Back Bay work in this country.

Q.—After the reclamation work had started, what was he doing in this country?

A.—He had a great deal to do. There was all this question of ordering the plant, and matters of that kind—there was a lot of work entailed in that—and all the correspondence with the Department.

Q.—You have no knowledge of the interview with the Secretary of State?

A.—None.

Q.—Turning to page 19, you state : " There are ample quantities of filling material in the Harbour and Back Bay."

A.—Yes.

Q.—Where do you get that information from?

A.—From the evidence.

Q.—That is also hearsay?

A.—I am taking it from the evidence.

Q.—I ask you to give instances of what you base your conclusions on, and I say you base your conclusions on hearsay—nothing from your personal knowledge or experience?

A.—One gets one's knowledge from reading.

Q.—That is hearsay; that is not personal knowledge.

A.—Well, am I to understand that I should not believe anything I hear with regard to the quantities of material in the Harbour and Back Bay unless I went there and bored the site myself and took all the sections? Is that what you infer?

Q.—No; but what you are suggesting here is that there are ample quantities. I want to know where you get that from, from your own knowledge, or from what somebody has told you about it?

A.—From what I have read. There are all the original quantities which have been taken out from Bombay, both in the Harbour and Back Bay. This afternoon the quantities have been mentioned here as being 21,000,000 yards and 25,000,000 yards as the material available in the Harbour and Back Bay, which makes 46,000,000 yards. Apart from the bulking of the material in the reclamation, the figure usually given as the required amount to dredge is 25,000,000, which is only about half the quantity which is available. So on those figures I do base this statement, " There are ample quantities of filling material in the Harbour and Back Bay."

Q.—So that you honestly believe there are ample quantities of material?

A.—This information has been sent home by the Engineer out there. Why should I doubt it?

Q.—Could you then explain the cause of the failure of the scheme?

A.—I do not admit that there was a failure of the scheme.

Q.—This was a scheme that was expected to be completed in 1926. We are at the end of the year 1926, and there is no sight of the end of it at all. This was a scheme that was expected to be completed on an estimated figure of 367 lakhs; and now it could not be completed, irrespective of interest and depreciation, for anything less than 1,000 lakhs. Should you not call that a failure?

A.—I do not admit those figures.

Q.—What figures would you admit?

A.—The nearest figures that I should take from the evidence—that is all that I have to go on—are the figures I have put down.

Q.—Do you mean the figures on page 21?

A.—Yes.

Q.—How do you base your calculations there? Where do you get the figure from of 470 lakhs, and so forth?

A.—I take that from the evidence.

Q.—How do you arrive at 606 lakhs?

A.—By adding thereto the Development Department's estimate to complete the works, amounting to 39 lakhs, and to that again the dredging, at a working cost of 7 annas, which shows an improvement of 1 anna per cubic yard for a part on what they state in the evidence it has cost. Multiplying 21,000,000 yards by 7 annas gives you 93 lakhs; and the total comes to 606 lakhs.

Q.—In reply to Sir Frederick Hopkinson you have already admitted you have assumed certain things. It is on a certain assumption that that data has been based. What is the value of the assumption and the estimate based on it?

A.—It is taken from the evidence. It is stated in the evidence that the cost of dredging was 8 annas.

Q.—Not all round?

A.—That is how I understood it when I read it.

Sir Frederick Hopkinson.—It is harbour dredging only?

A.—Is this harbour dredging only?

Q.—Yes, 8·3.

A.—8 annas 3 pies.

Q.—That is all. That is harbour dredging only?

A—On that, on their own statement in the evidence that they can improve the output by 50 per cent., I am right in assuming that if the output is improved, the unit cost will come down.

Q.—Assuming their assumption is realised?

A.—On the evidence given that they are working 15 hours a day instead of 24.

Q.—They had no intention of working 24 hours a day when they made that assumption?

A.—I gather you have recommended it.

Q.—That is subsequently?

A.—Yes. That shows that my view coincides with yours, that 24 hours should be worked. That is 50 per cent. increase in time.

Q.—No, it is not.

A.—And if they state that the dredging is costing 8 annas 3 pies, and if they are to improve the output by 50 per cent.——

Sir Frederick Hopkinson.—No, they are not. They do not expect to; they do not hope to. I should not expect them to.

Sir M. Visvesvaraya.—They have already said that they worked longer hours than 15, but all they can pump is for 15 hours?

A.—Clearly if they worked the whole day round instead of working 16 hours only, there must be an improvement. I also see they stop for meals.

Sir Frederick Hopkinson.—You would not expect to get the same results at night that you get in the daylight, as a practical man?

A.—Then you would not, perhaps, get the same efficiency at night.

Q.—Of course you would not.

A.—But you can get over the great drop in efficiency, which I understand Mr. Settle is going to produce evidence of, by making it worth while for the men to do their best. That is a point which I consider very important indeed. That helps to level up the difference between efficiency at night time and during the day time.

Mr. Billimoria.—I will ask you one simple question. If your figures are based upon something which has been assumed, and that assumption is not correct, the results that you arrived at are absolutely incorrect, is not that so? If you have assumed something and that assumption turns out to be incorrect, your conclusions are incorrect?

A.—It depends to what extent they are incorrect. If there is only a slight difference, the difference in the total will be small, but if there is a great difference between 606 lakhs, which I suggest here, and the estimate for the engineering works of 1,000 lakhs, which you put——

Q.—You think by dredging the whole work is completed; but there are overhead charges and various other expenses which you have not taken into consideration. There are various other things to be done before you can complete the work. None of those figures have you taken into account in arriving at your figure of 606?

A.—Have not I taken that from the Development Department estimate?

Q.—The cost of dredging does not include the entire cost of the reclamation. Even assuming the 7 annas, it is only the cost of the dredging. That does not mean the whole reclamation expenditure?

A.—It does not include everything, as I think I have made quite clear in my statement.

Q.—You say the total cost of completing the reclaimed area?

A.—It is only for the items which are in my statement. That is only for the filling.

Q.—You say: " The total cost of the reclamation at about 606 lakhs of rupees and without allowing credit for the sale of plant "?

A.—That is excluding moorum, filling, and the town planning. I think I have made that quite clear in my statement.

Q.—Your statement speaks for itself. These figures are merely assumed figures and have no bearing on the question. On page 20 you take exception to the action

taken by the Bombay Government with regard to the Advisory Committee being appointed to investigate the activities of the Development Department with its Chairman, the Director of Development. Why should you take exception to that?

A.—It seemed to me to be a curious thing if the Bombay Government appointed, as I understand it, an Advisory Committee to investigate the activities of the Development Department, that they should appoint as its Chairman the Director of the Development Department. That is all. It seems to me to be rather curious.

Q.—He would help the Committee a good deal with his personal knowledge of the inner working of the Department. He would place the facts and the materials before the Committee so that it could come to a definite conclusion. It is usually done by the Government of India in all Departments. When the Legislative Council brings forward a proposal in the House it is always the General Member or the Member in charge of the particular Department who presides over the deliberations of that Committee so that he can help them.

A.—The idea is somewhat strange to me. I would have thought that the Director of Development should have given his assistance in giving evidence before that Advisory Committee, and not been its Chairman. That is the only point. It struck me as being rather curious.

Q.—It is not unusual.

A.—You tell me it is not unusual in India.

Q.—At the conclusion of your note on page 21 you say: "The area to be reclaimed is 1,145 acres, or 5,541,800 square yards," and you base your calculation on 20 rupees a square yard on the whole area. You must be aware that the area available for building sites, after providing for roads and open spaces, is only 22 lakhs, and therefore your figure of 11 crores has no bearing whatever on the scheme being commercially successful?

A.—I have taken this from the evidence. I had a doubt whether I should go into this at all, because it is outside my province, but I could not help putting it in as I was rather impressed by the figures. Is not it the case that they are getting 20 rupees per square yard for the military area?

Q.—It is quite true, but not for the whole of the area.

A.—That is a large part.

Q.—That shows how imperfect your knowledge of the whole case is, that you have based your calculations upon something of which you have no personal knowledge. Then you have forgotten one of the principal items, namely interest and depreciation. Does not interest form a very important factor for consideration with regard to making a project profitable or otherwise?

A.—I state here I have excluded interest, in the last line.

Q.—That is so. If you were to take interest into account when you know that the project is going to take years and years for completion, that project can never be a success commercially if interest piles up year after year. You will agree with me that no such project could ever be a success under such circumstances?

A.—Well, as you say, it is rather outside my province, this question of land values, so that it would not be right for me to say that I agree with that without going into it in detail.

(The Witness withdrew.)

57th Witness, Mr. J. Risley Settle, M.Inst.C.E.

Written Statement.

1. My experience in the design and construction of large civil engineering works has been obtained, as follows:—

The Manchester Ship Canal, from inception to completion, 1882 to 1894;

The Admiralty and H.M. Gibraltar Dockyard Extension Works, inception to completion, 1894 to 1908;

Messrs. Topham, Jones and Railton, Ltd., Public Works Contractors, 1908 to 1916;

Director of Naval Works to the Commonwealth Government of Australia, 1916 to 1922;

and since 1890 or 1891, when the two small bucket dredgers, "Medlock" and "Irk," I believe they were named, were erected ready for work in the bottom of Salford Dock, up till 1922 I have been more or less closely connected with bucket and cutter suction dredgers and dredging operations.

2. In accordance with instructions received from Messrs. C. S. Meik and Buchanan, I proceeded to Bombay to look into the question of the dredging in connection with the reclamation of Back Bay.

3. I arrived in Bombay on 8th November, 1925, and left there on 5th December, 1925, on my return to London.

4. On Monday, 9th November, in company with the Chief Engineer (Mr. Elgee) and the Deputy Chief Engineer Dredging (Mr. Brims), I inspected the intermediate pumping vessel " Colaba," which was working in tandem with the " Sir George Lloyd," pumping dredged material into area No. 8 of the reclamation at Colaba. On approaching the vessel, when at some little distance from it, I noticed a movement of the outer casing of the fore funnel and an agitation of the water around the vessel which extended for some considerable distance fore and aft, due to the excessive vibration when pumping. Shortly after arrival on deck, at the invitation of the Chief Engineer of the dredger, and under his guidance, I examined closely the defects in sight, caused by the vibration, on deck, in the engine and boiler rooms, including the engine seating, the plating of the oil tanks, and some parts of the bilges. After the inspection Mr. Brims asked me what I thought of it. As he had told me previously that the matter had been referred to the local experts of the Royal Indian Marine Dockyard, and as I had no executive authority but was merely inspecting on behalf of my firm, I did not feel at liberty to state more than that; as the defects were under the consideration of the Royal Marine officers, it was for them to give their views. Had I been vested with authority I should not have permitted the vessel to work, and it was a matter of surprise to me that Mr. Brims permitted work. That Mr. Brims was uneasy was clear, for he asked me for my views more than once. Ultimately, the Chief Engineer (Mr. Elgee) decided that the vessel was to be put out of commission for repair on the termination of the second shift, or at midnight of that day.

5. Pumping operations for season 1924-25 finished at midnight on 15th May, 1925, and were resumed at the end of October, 1925, for season 1925-26. On the 9th November, after pumping for only 178¾ hours, or not for more than two weeks, following a lay-up period of about 5½ months, the " Colaba " was again laid up for repairs which should have been done during the previous lay-up period, as, in so short a time, the defects due to the vibration of the vessel could not have become worse than they were on 15th May, 1925.

6. If the local expert opinion had been obtained in May, 1925, it would most probably have recommended, in addition to the lattice stiffening of the deck sent out by Messrs. Wm. Simons and Co., the same work for remedying the effects of the vibration, as they recommended in the November following, and thus the loss of at least 17 days' dredging would have been saved.

7. The " Kalu," after dredging fruitlessly through the season 1924-25 at a spot in Back Bay, resumed dredging operations on 15th November, 1925, at a different spot from that of the last season, though Mr. Brims informed me that she was dredging the sand which had accumulated in the hole dredged the previous season. On the resumption of these operations, the material was pumped into Area I at Marine Lines. Up to the time of my last visit to the " Kalu " the material pumped was being taken out to sea by the ebb tide. The facts above stated indicated to me that there was no proper supervision, and that no interest was taken in the work.

8. No tests whatever of the pipe-line discharge had been taken prior to those taken during my visit. It is usual to make periodical tests where suction-dredging operations are being carried out, even when the work is known to be satisfactory, but it is imperative to take tests when the operations are not satisfactory, as they are the only true day to day guide as to what is taking place and what is the cause of it. Intelligent direction and supervision of dredging operations such as these are impossible without the guidance of periodical tests of the discharge, as, no matter how frequently made, mere mechanical visits to the pipe line and dredger do not help to solve the problem involved in unsatisfactory operations. Suggestions for the taking of tests and the arrangement for the payment of a bonus to the men of the dredger were made in our letter dated 23rd April, 1925, and further in connection with the bonus in our letter dated 26th February, 23rd July, and 16th September, 1925.

9. I formed the opinion during my visit that Mr. Brims and Mr. Speirs, Senior, were spending far more time at Mazagon Dock, four miles away, in connection with the reconditioning of the " Jinga " than was good for the dredging. During a visit to Mazagon Dock with Mr. Brims, he told me that he and Mr. Speirs, Senior, spent much of their time there, and that he had the privilege of going into the shop at any time, day or night, and of giving the shop workmen his own dredging work to do, whatever they might be working on at the time. My reply was that his work would have to pay for the privilege. During discussions with Mr. Brims on the dredging operations he repeatedly informed me that so much of his time was taken up with the filling up of forms of one sort or another required by the Department that he could not possibly give as much time to dredging as he would like. He stressed this so much on one occasion that I asked him which he considered the most vital—successful dredging

operations or filling up forms. As he replied dredging operations, I advised him to give his whole time to the operations and leave his personal assistant to deal with the forms. The dredging section had no workshop ashore at Colaba for dealing with the usual minor and moderately large dredging repairs, nor was the workshop at Colaba belonging to the reclamation section, which was well equipped with suitable machinery and power, availed of by the dredging section, the reason given being that it was under the charge of the reclamation section.

10. I spoke to Mr. Brims about working the dredger in shifts for the full time daily, but he replied, " It cannot be done," and when I asked " Why," he replied that it is against the Factory Acts, and also that three shifts could not be accommodated on board the dredger. I replied that it would pay to hire a vessel with the necessary accommodation to lie off near the dredger.

11. During my visit I remarked to Mr. Brims and Mr. Billington (the then Deputy Chief Engineer Reclamation at Colaba) on the apparent lack of co-ordination between the various sections, when I was given to understand there was none. On the occasion of Mr. Brims introducing me, on the works, to Mr. Billington, he told me that he had not seen Mr. Billington to speak to for 18 months.

12. I append hereto copy of my report, dated 30th December, 1925, to Messrs. C. S. Meik and Buchanan on my visit to Bombay in connection with the dredging and reclamation of Back Bay.

13. As questions have been raised before the Committee on the practice of proceeding with the lay-out for and construction of large civil engineering works, such as the Back Bay Reclamation, it might be helpful if I state what has been my experience on this point, and therefore I give the following particulars of the procedure adopted in the cases of the Manchester Ship Canal and H.M. Gibraltar Dockyard extension works.

14 *The Manchester Ship Canal.*—This work was let by contract in 1888 to the late Mr. T. A. Walker. At the time of the letting of the contract the only details of the canal that had been prepared were :—

(*a*) The trigonometrical, detailed and geological surveys, including levels of the canal route and five main line deviation railways;

(*b*) the staking out of the centre line of the canal and its cross-section widths for excavation purposes, and similarly for the deviation railways.

I believe I am correct in stating that only part of (*b*) was completed on the date of the contract.

Consequently the designs and working details of the locks and sluices, docks, wharves, jetties, river sluices, railway bridges and viaducts, road bridges, opening and fixed, including high-level bridges, the Mersey Estuary embankments forming the north side of canal, road, storm water and sewer diversions caused by the interception of the canal, and other subsidiary works, were prepared subsequent to the signing of the contract. The additional information of the sites required for the designing of the above items of work was obtained on the ground during the period of the contract.

The estimated cost of the canal and its subsidiary work was, I believe, about £6,000,000 at the time of signing the contract, and its cost in 1894 about £12,000,000, including purchase of land, compensation for severance, &c., and its total cost, £15,000,000.

It is my considered opinion that had even a portion of these works been designed and the usual contract plans and documents been prepared before inviting tenders, the canal would not now be in existence, for the time required to design the works and prepare the contract documents would have been so great that not only the public interest in, but also the enthusiasm for, the scheme, which had been kept alive during the period 1882 to 1887, would not have survived.

15. *His Majesty's Gibraltar Dockyard Extension Scheme.*—The works comprising this scheme, with the exception of a 300 feet extension of the existing mole, which was let by contract, was started in 1885 by Admiralty departmental labour and continued till December, 1898. The scheme at that time included only one dry dock with the necessary reclamation, a further extension beyond the contract length of the existing mole and a detached breakwater. The designs and details for these works were prepared by the staff in Gibraltar and submitted to Admiralty for approval.

Some of the plant and temporary works for the carrying out of the permanent works were considered in London by the Senior Officer and an assistant, who ordered the plant and sundry materials before proceeding to Gibraltar to take up their posts in charge of the work. Other plant and materials found necessary as the work developed were ordered as required from Gibraltar. These works were estimated to cost, I believe, 1¼ million sterling.

The increasing requirements of the Admiralty demanded increased naval accommodation at Gibraltar and as it was considered that Government procedure was not

sufficiently elastic to permit of the enlarged scheme to be carried out departmentally, it was decided to let the works to contract. Consequently, contract drawings and documents were prepared, tenders invited, and contract was let in December, 1898. The contract drawings did not cover all the subsidiary works required, and consequently special provision for them had to be made for their execution; the designs and working details of some of them were prepared by the local staff during the period of the contract and submitted to Admiralty for approval. The works were completed in 1907 at a cost of about 5½ millions sterling.

In connection with the questions raised before the Committee on the horse-power of the " Sir George Lloyd " as being a factor in its output, it was stated that the cause of the low output lay in the difference of the horse-power between the horse-power of the American dredger proposed by Mr. Kidd and the horse-power of the " Sir George Lloyd." The true reason for the difference of the respective horse-powers will be found most probably to be that in American practice the horse-power is the total horse-power of the vessel, that is, of the propelling engine, pumping engine, winches and ladder engines and the various auxiliary steam units which together make up the complete steam unit, or, in other words, the horse-power of the boilers. In the case of the " Sir George Lloyd," the horse-power given was that of the pumping engine only.

27th October, 1926.

Report of Mr. Risley Settle on his Visit to Bombay, 1925.

16, Victoria Street,
Westminster, S.W.1.
30th December, 1925.

Messrs. Meik and Buchanan,
16, Victoria Street,
London, S.W.1.

Dear Sirs,

Further to my report of 12th November, 1925, the Chief Engineer decided, on Monday afternoon, 9th November, to cease work with the I.P.S. " Colaba," on the completion of the second shift at midnight on that date, and consequently to move the dredger " Sir George Lloyd " to the dredging area west of Oyster Rock, where it was expected dredging operations would be resumed towards the end of the following week. Arrangements therefore were made at once to move the dredger and so much of the pipe-line as was required immediately to the west side of Oyster Rock, and dredging operations were resumed on Wednesday afternoon, 18th November, but efficient work was not done till Saturday, 21st idem.

As the object of my visit to Bombay was to get a grip of the fundamentals of the dredging position and problem, it was impossible to obtain these owing to the temporary cessation of dredging, except to note generally the operations of moving the dredger and assembling and reconnecting the pipe-line for work in the new position. I therefore used the major portion of this interim to inspect the construction works and quarry and to try to obtain as much information as possible of the material in the dredging area lying to the east of Oyster Rock. My object in obtaining this latter information was particularly great, because I found from time to time, when generally discussing the dredging question, that the admittedly unsatisfactory position of the dredging was due to one or all of the following three causes :—

(*a*) The unsuitability of the material.

(*b*) The difficulty of obtaining the material owing to the uneven level of hard material, moorum, which the dredger cannot deal with, and consequent loss of much time in lifting and lowering the cutter.

(*c*) The unsuitability of the men, assistant dredging masters, &c., sent out from London.

When generally discussing the dredging and its unsatisfactory conditions with the Chief Engineer on Tuesday, 10th November, he told me that he thought everything had been done that could be done to improve the position, and it had only to be considered that the work was being directed by two experienced men like Brims and Speirs, especially Speirs, and he himself was not without dredging experience, to realise what had been done with regard to dredging the material in the dredging area. I told him that, if possible, I would like to obtain a sample of the mud of the dredging area without its coming in contact with the water and have it analysed for its physical characteristics.

After discussing the difficulties which he said stood in the way of obtaining this information, and my mentioning that the material might be referred to Mr. Mitchell for analysis, he said he thought that there was no need to refer it to Mr. Mitchell as it could be done in his office. I have brought back with me two samples of the material obtained by Mr. Speirs, Senr., and myself for physical analysis, if it be considered desirable. The samples are in two cigarette tins, hermetically sealed with solder, so that the material might be kept as far as possible in its natural condition. I have also

brought samples of the clay as obtained from the solid material discharged and heaped up around the discharge pipe ends.

I told him that I had read a letter in the office file of correspondence from Mr. Lewis, his predecessor, to Sir George, in which Mr. Lewis stated, in reference to the material in the dredging area, that " it had been reported on unfavourably by technical experts," and I asked him if he knew anything of the report or who the technical experts were. He replied that he did not and he could not say whether or not it was Mr. Mitchell. In the afternoon (Tuesday) Mr. Brims and I called on Mr. Mitchell at his laboratory and we had a long discussion with him on the suitability of the material, for dredging and reclamation, which is being dredged in the harbour. I explained to him the difficulty, as represented by the Chief Engineer and Mr. Brims, there would be in obtaining Government sanction to the expenditure of funds necessary to refer the sample of the materials to him for analysis, when Mr. Brims said : " To do so would undoubtedly raise very awkward questions at the present time and generally affect the works politically, and it would probably be asked why it is now considered necessary at this late stage to analyse the materials, which, if necessary at all, should have been done at the commencement." I told Mr. Mitchell that as the unsuitability of the material from the dredging point of view is being repeatedly put forward as an explanation or cause of the unsatisfactory output, and particularly as Speirs, Sr., asserts " that the first 10 feet below the surface of the ground is all silt, very largely organic, which, when dried out, is blown away by the wind," it is very desirable to obtain some definite physical information or tests of the material, and I asked him if he could help, under the circumstances, by giving in general terms his opinion on the matter. Mr. Mitchell said he had not tested the material in the area of the harbour being dredged over by us, but he considered there should not be any material difference in the nature of the materials from those in the area tested by him for the Bombay Port Trust, and he would be pleased, if the Engineer to the Bombay Port Trust had no objection, to let us read his (Mr. Mitchell's) report, or perhaps the Engineer himself might give us a copy of the report. Mr. Mitchell, in further explanation, said that all the material in the harbour had been brought down by the same creek or creeks, so that the material in our dredging area would be similar to but finer than that in the Bombay Port Trust area, as it is farther down stream than the latter. He therefore believed that the mud or silt was extremely fine sand and in a more or less buttery condition, and consequently, he thought, could not be considered the best material for reclamation purposes. It had a great affinity for water and could not under its natural condition of lying in the reclamation, be made to give up its water content. He stated very definitely that he did not agree with Speirs' opinion, as the material in the harbour was of trap rock. I told him about Mr. Lewis's remarks with reference to the unsuitability of the material, and asked him if he had tested and reported on the material. He said he had not, and he thought that if the material had been tested he would have been asked to do it, or he would have known something about it.

As the result of the interview with Mr. Mitchell, Mr. Elgee arranged an interview with Mr. Maclure, the Engineer to the Bombay Port Trust, for Thursday, 12th November. After introducing me to Mr. Maclure, the Chief Engineer returned to his office, and Mr. Maclure and I fully discussed the material in the dredging area. He generally confirmed Mr. Mitchell's opinion, and in reply to my request for a copy of Mr. Mitchell's report, or failing this to give his approval to Mr. Mitchell letting me read or take a copy of the report, he agreed to the latter, and said he would notify Mr. Mitchell accordingly. Mr. Mitchell later on lent me his unsigned copy of the report, and he ultimately agreed conditionally to my retaining the copy I made of the report for our office use only. A copy of the report is appended hereto. Mr. Maclure during my interview with him showed me the tabulated and graphed results of extensive experiments which, under the direction of the Port Trust, had been carried out to ascertain the bearing power of the material in the reclamation at Sewri. He said the material itself was unstable and always would be, owing to its water content, but if topped with good moorum filling, not less than 3 feet 6 inches in thickness, he considered any light loading would be well spread and safely borne. This thickness, however, he considered quite insufficient for roadways intended for fast motor traffic or moderately heavy weights. He knew instances of the moorum topping disappearing out of sight shortly after it had been deposited, without leaving a trace of what had occurred.

The southernmost area of the Colaba reclamation is being surfaced with moorum to the finished level of the reclamation. The work was commenced on Thursday, 13th November, by tipping wagons of moorum, 100 daily, from the wall, the material being spread by contract coolie labour.

The construction plant is being assembled for repair and overhaul preparatory to being sold.

The Chief Engineer and I visited the quarry at Kandivlee on Saturday, 14th November. We were met at the station by Mr. O'Rorke, who drove us to the quarry by car, and we then walked over the quarry and through the workshops. Quarrying opera-

tions have ceased, but the excavation of moorum and filling it into wagons was in progress by contract coolie labour.

I inspected the various grades of hardness of moorum, and am of opinion that the two or three softer varieties overlying the harder moorum, if the moorum within the dredging area is similar, should be dealt with without much difficulty by the " Sir George Lloyd." Mr. O'Rorke informed me that the estimated quantity of suitable moorum filling available in the quarry is about one-seventh of the total required to complete the reclamation assuming the dredging is stopped, and that the remaining six-sevenths can be obtained without difficulty on land adjoining the quarry for which a royalty of one anna per ton would have to be paid.

The contract rate for excavating and loading the moorum into wagons at the quarry is 4½ annas per ton as weighed on the weighbridge.

The Chief Engineer, as soon as he joined me in the train at Marine Lines Station on our way to the quarry, informed me that he had received instructions to attend with me and Sir Lawless Hepper a conference with Mr. Cowasji Jehangir, at 2.30 p.m., at the Treasury Office, on our return from Kandivlee.

After being introduced to Mr. Jehangir, he spoke about the very unsatisfactory position and the heavy cost of the dredging. He was very pessimistic as to its success, and asked me what I thought of it. I told him that owing to the temporary stoppage of dredging operations due to the " Colaba " being put out of commission for the present, I had had no opportunity of observing the working of the dredger except for a short time on Monday last. He said the dredger had been working now for two seasons, and had failed to give the output she should have given and as was expected, and we were responsible. I replied, the dredger had only worked two seasons or equivalent to an actual dredging period of at most 10 months in all, with scratch crews at the commencement of the work. The 10 months' work was done in two periods of only about five months each, with a lay-up period of about seven months between them, thus breaking the continuity of the work and, therefore, the best results could not be expected as such a method of procedure is not helpful to efficient team work in the early stages of each period of the work. He said, " Well, you knew of these conditions." I further stated that as the dredger was not designed by us but by Sir John Biles, the Naval Architect to the Government of India, we were not responsible for any failure in connection with the dredger itself. That she was not only designed, but inspected during construction and tested by, and the trials conducted under the supervision of, Sir John Biles, who also, on the completion of satisfactory trials, issued the necessary certificate for the taking over of the dredger by the Government of Bombay. He then asked, " What did you, Sir George Buchanan do in connection with the design." I replied " Gave the class of material to be dealt with and the hourly output required." This at the moment seemed to satisfy him. He then asked, " why has she not given the output." I replied that, assuming the material to be dredged is suitable and in sufficient depths, I saw no reason why she should not repeat the output obtained during her trials provided she were properly handled and fed. He asked, " why was she not fed properly." I replied that a large and powerful machine, like the " Sir George Lloyd," can only be efficiently worked by good team work led by an able dredging master. He then wanted to know why they had not got them, i.e., good masters, and said Meik & Buchanan are responsible for the appointments of the masters. I replied, " No, as the men were advertised for by the High Commissioner for India." I then fully explain to him the arrangements—the appointment of a selection committee—made by the High Commissioner with the object of interviewing and selecting the most suitable applicants for the appointments. The Selection Committee comprised Sir Edward M. Cook, the late Secretary to the High Commissioner, the Assistant Secretary and myself representing Messrs. Meik & Buchanan, who were requested by the High Commissioner to nominate a representative to advise on the technical merits of the respective applicants. I emphasised the fact that the Selection Committee of three comprised two high officials of the Government of India and also that, speaking from memory, only one of the applicants had had in a small way actual suction dredging experience. He then asked, "Why could we not get better men." I replied they were probably not available. One reason might possibly be that the salaries offered were insufficient to attract the best men. He said with some surprise, " Then why was not more money offered and why did you not raise the question? " I replied we had nothing whatever to do with the question, the salaries and conditions of appointments were dealt with entirely by the High Commissioner for India. He then asked, " Why was not the matter referred to us? We would not have raised any objection to giving a substantial increase and will do it now if we can only get the men to give us the output and reduce the very high cost of dredging." He asked, " What salary would you recommend and what salary would be paid in England? Could any of the experienced men in dredging at Liverpool be obtained? " I replied the salary paid in England would be considerably less than paid here owing to the work being at home and not abroad, where probably the expense of another home

would be necessary. I also said I considered it would be much better to adhere to the present salaries and encourage the men to give better team work service by letting them feel that they were directly and liberally concerned in the output by being paid a good bonus. He said, I thought a little excitedly, " We are quite prepared to give then the bonus that has been recommended." Turning to Mr. Elgee he asked him to make it known that a bonus would be paid and to arrange accordingly.

He then referred to the " Colaba," and asked if I knew about the " Colaba " and what I thought about the report received from the Naval Architect and Engineer. I replied I knew about the " Colaba," but I did not know anything about the report. He said, " Have you not seen it? " I said, " No," as I understood it had only just been received. (Mr. Elgee here said the report had only been received in time to have a copy made to send to London.) He then asked me if I thought the " Colaba " could be put right in a fortnight. I replied I did not think it could. He then asked, " Can it be done in a month? " I replied it might possibly, but whatever is done it should be carefully considered.

He and Sir Lawless Hepper then discussed what they should do, and it was decided to send off a telegram on the matter.

Mr. Cowagsee Jehangir finally asked me when I was returning to London, and I replied in a fortnight's time after the resumption of dredging operations. He said, " But that is too short a time for any purpose." I replied I should not leave until the purpose for which I came out was completed.

Sir Lawless Hepper made some remark to him which I did not hear, but Mr. Jehangir replied that he was going away and would not return till (I believe he said) the 5th December. He then shook hands with me, and, bidding me good-bye, the conference closed.

As I heard that the Chief Engineer of the I.P.S. " Colaba " (Mr. Smith), during his recent visit home on leave, had been approached by Messrs. Simons on the matter of the " Colaba," I visited the " Colaba " again on Wednesday, 11th November, and tried to get from him what took place between him and Simons. He was very reticent and I got nothing definite from him. I told him that it appeared to me, from his replies to my questions, that Messrs. Simons must have got very little, if any, help from him. He said in reply, " I did not know how any information I gave might affect the position." I said, " Do you mean your position here? " He said, " No, generally." He told me, however, that a Mr. MacGreggor, an official of Messrs. Simons, sent a message to him through his (Smith's) brother, who was an employee of Messrs. Simons, asking him (Smith) to go to see him (Mr. MacGreggor). When Smith went to the works, there were with Mr. MacGreggor the chief draughtsman and another official. I inferred from his general or evasive answers to the questions I put to him, that he was well questioned as to the conditions of the " Colaba " and that they, Messrs. Simons, were much concerned about her.

When going round the construction works at Marine Lines on Monday, 16th November, with Mr. Abdulla, the Assistant Engineer, I noticed that the ebb-tide running out under the wall was carrying with it a large amount of pumped material, as the water on the sea side of the wall was very discoloured and heavily loaded with material in suspension for a considerable distance out from the wall and for a distance of about 400 feet on either side of the discharge pipe. I later on informed the Chief Engineer about this, who made some remark that I understood to refer to material pumped in the reclamation last year. I said material is being pumped in the reclamation now, and I thought it was necessary to retain all that was pumped. I also informed Mr. Brims of this, who, I believe, verified it, and after discussing it with the Chief Engineer, obtained, so Mr. Brims informed me afterwards, his approval to the tipping of a dozen wagons of moorum from the wall on the inside of the rubble mound. This quantity I considered wholly insufficient to cover the mound even with a thin layer.

Material, excavated from a site or sites in the town, was being tipped by motor lorry in the reclamation at two points—one near Marine Lines Depot, and the other immediately north of the cross bunds at Church Gate Railway Station—by a contractor. Mr. Abdulla informed me that he thought the material was costing about Rs. 4 per ton deposited in the reclamation.

On Tuesday, 17th November, I accompanied Mr. Brims to the Mazagaon Dock Company's works to inspect the " Jinga," which is being reconditioned and fitted out as the intermediate pumping station to the " Kalu," in the Company's dock at their dockyard. A large number of men were employed on the work, and the Company's works manager in reply to Mr. Brim's question stated that he thought they would finish the work on the " Jinga " in about three months.

The Works Manager (Mr. Rasmadden, I believe, is his name) pointed out to me the broken cutter of the " Sir George Lloyd." As I saw there was only one rib broken I suggested to him that the broken rib should be burnt on and built up by the quasiarc process, as it was a valuable piece of machinery and when repaired would provide a spare

cutter in case of further accident. He made no reply. Later on I spoke to Mr. Brims about it, but he said. "It can't be done." I told him I differed, as it is a very frequent occurrence at other places, as I have many times seen, and no reason is apparent why it should not be done here and save the expensive cutter from being sold for scrap value. I would suggest this matter be referred to Messrs. Simons for an opinion.

As dredging operations were expected to be resumed on Wednesday, 18th November, I accompanied Mr. Brims to Colaba to commence the discharge tests. On arrival we found that pumping had not commenced, and after waiting some time at the end of the discharge pipe-line, we left for the "Sir George Lloyd" to ascertain the position. We found the laying out of the moorings had not been completed, so we decided to visit the "Kalu" in Back Bay, as, owing to the tide, she would be unable to continue dredging after 2 p.m. On arrival, we found Mr. Speirs on the bridge and, whilst we were on board, he directed the operations. I understood from Mr. Brims that the "Kalu" was dredging the sand, which had accumulated during the last monsoon, from the hole she made during last season's work, the material in which, also according to Speirs, was sand. I told Mr. Brims that Mr. Abdulla informed me on Monday last that the "Kalu" was working in a new position about 1,000 feet out from her position of last year. He made no reply. When on board the "Kalu" on 2nd December, the Marine Surveyor came on board to take her position by sextant bearings. After he had plotted her position on the Chart I asked him what her present position was in relation to her position of last year, and he told me that as she was dredging a cut about 200 feet wide her position was 800 to 1,000 feet away from her position of last year.

Pumping operations by the "Sir George Lloyd" were resumed on the afternoon of the 18th November, though only clear water was pumped whilst the dredger was getting up to the old face of the previous dredging. On visiting the pipe line at Colaba early on Thursday morning, 19th idem, it was found that clear water was still being pumped, but as the afternoon advanced, the discharge became more heavily loaded. Mr. Brims said it would be Monday before a good working face was obtained.

As full bore could not be obtained even with clear water, due probably to the pipe line being 5,900 feet long and not 5,000 feet, the two gauges of the pitot tube would not register, as they were not sufficiently sensitive.

The pitot tube was fixed again on Friday morning for the taking of tests, but before a reading could be taken the tube was badly bent and put out of action by solid material in the discharge striking it. It was removed for repair and strengthening and for the fitting of a gauge glass to the tube instead of the pressure gauges. In the meantime the jet was very carefully measured and the results are included in the attached tabulated statement of tests.

Mr. Cole, who had arrived from Bhuj, Kutch, on Saturday last, and I had an interview with His Highness, The Maharao of Kutch, at His Highness' request, at the Taj Mahal Hotel at 3 p.m. on Friday, 20th November. The proceedings of the interview were reported in my letter dated 20th idem.

After the interview I returned to Colaba to watch the discharge from the dredger.

On Saturday morning, 21st idem, I went to the pipe line at Colaba, where I stayed some little time watching the discharge of material before going off to the dredger. The discharge was well loaded with material and a large quantity of clay had accumulated around the end of the branch pipe used during the second shift yesterday. The clay had been delivered in more or less round balls from 18 inches diameter and downwards. It was of a stiff consistency, as walking over it and even jumping on to it from the top of the pipes made only a very slight impression upon it. I then left for the dredger, where I arrived about 11 o'clock and remained on board to the end of the shift, finally leaving about 3.30 p.m. and returned to the pipe line to see the result of the day's dredging. The result was, I considered, very satisfactory, as there was a considerable quantity of solid material, clay, heaped up for some distance around the pipe end, and there was ample evidence that a very considerable amount of disintegrated material had been carried in suspension into the water area of the reclamation. The whole of the material being pumped into this area No. 8 is being retained, the clear water flowing to sea over the top of the eastern return end of Drain No. 1.

As dredging, on its resumption, was now considered to be in full operation, it was decided to commence the definite tests of discharge on Monday, 23rd November, and arrangements were made accordingly. The tests were taken on alternate days—four days in all—two tests per day, one of the day shift and one of the night shift, making a total of eight tests. These are shown in the tabulated statement. From this day till the completion of the taking of the tests on Tuesday, 1st December, nearly the whole of my time was spent on the tests and on the dredger.

As a telephone service was not provided between the end of the discharge pipe line and the dredger I pressed that one should be installed at least during the tests. As difficulty after difficulty was raised against the installation of a telephone service I suggested that it would pay to lay a submarine cable from the shore to the ship, but the usual reply that "it can't be done" was received. I replied again that it has been done

at other places, in two cases less favoured than Bombay, and it can be done here. Ultimately a line was laid along the discharge pipe and it was found useful during the tests.

The results of the tests are given in the tabulated statement from which it will be seen that of 9 No. tests, 5 No. gave an absolute minimum discharge of over 1,000 cubic yards per hour, the maximum being 1,552 cubic yards, with a pipe line 6,410 feet long.

This result, considering the length of the pipe line, was very satisfactory, and given a reasonable working face and proper feeding it shows that the dredger is generally capable of giving satisfactory output in accordance with the designed capacity.

Precipitation tests were also taken of the discharge of the day and night shifts which showed that the efficiency of the night shift output was only approximately 69 per cent. of that of the day, though the greatest individual percentage output (91·90) was obtained during a night shift, the greatest during the day shift was 79·64. These tests were relative only.

During a temporary stoppage of pumping at Colaba on Friday, 27th November, due to increasing the length of the floating pipe line, Mr. Brims and I ran up by car to Marine Lines to see the material, at low water, which had been pumped into the reclamation area by the " Kalu." We arrived there about 3 p.m., it was about low water, approaching springs, but the tide was still ebbing. In the enclosed area between Main Drains 8 and 9, which was nearly clear of water, comparatively wide and deep channels were scoured out in the surface, presumably the original foreshore, by the water flowing out of the area to sea through the rubble mound of the wall as the tide ebbed, clearly indicating the large percentage of voids in the rubble of the mound and the total inadequacy of the small quantity, 10 or 12 wagons, I believe, of moorum which had been tipped on the inside slope of the mound a few days previously with the object of preventing the escape to sea of the pumped material. On this date there was very little trace of moorum on the lower portion of the mound, any that had been there must undoubtedly have been carried out to sea on the ebb tide. I called Mr. Brims' attention to the discoloured and apparently heavily loaded state of the water on the sea side of the wall over an area of about 800-900 feet along the face of the wall and nearly the same distance out from it. When I saw the Chief Engineer on Monday afternoon I told him of this and again suggested that every effort should be made to retain every ounce of the pumped material. He said he had already given instructions for more moorum to be tipped.

On visiting the " Kalu " again on Wednesday morning, 2nd December, I found the same state of affairs existing, and on returning to the office after lunch I mentioned it again to Mr. Brims and Mr. Elgee, when the latter said he gave orders last week for the tipping of moorum along the wall. Mr. Brims gave me to understand that he had had some little difficulty in getting the Chief Engineer's approval to the tipping of the 10 or 12 wagons of moorum.

On Thursday afternoon, 3rd December, I discussed, as previously arranged, on the completion of the tests, the general question of dredging with Mr. Elgee and Mr. Brims in Mr. Elgee's office. I generally explained the tests that had been made and the inference to be drawn from them. And though the pitot tube had failed us, reliance having been placed on one tube only, without spares, we had fortunately been able to measure carefully, and with accuracy, the discharge jets at the end of the pipe-line. I said that though no dredging test had been carried out under actual specification conditions owing to the discharge pipe varying in length from 5,900 feet to 6,640 feet, instead of 5,000 feet, I nevertheless considered that, judging from the tests, the dredger was quite equal to the designed duty. Mr. Elgee and Mr. Brims said that was their opinion also. With regard to the material to be dredged from the dredging area on the east side of Oyster Rock, I related the particulars about the sample of the mud Mr. Speirs, Sen., and I obtained on Tuesday evening last, and, as the result, I stated definitely that the views generally expressed about the material, particularly by Messrs. Brims and Speirs, were not supported by the sample of the material then obtained, and that I considered the materials, except moorum, and their extent almost ideal for suction-pump dredging. Further, Speirs' oft-repeated statement that the first 10 feet layer of mud over that area was no good for pumping was, in my opinion, exploded by the sample obtained. Speirs admitted that the sample of the material was better than that at Sewri, his remark being: " I could not have believed it." The Chief Engineer asked how many samples were obtained. I replied one..

I then submitted the following suggestions, which were generally discussed:—

(*a*) Working the dredger continuously without stopping for meals.

Mr. Brims argued that this was quite unworkable, and he was generally supported by Mr. Elgee.

(*b*) Fixing telephone and maintaining it in working order between the dredger and the end of the pipe-line.

Mr. Brims argued against this, and said that they had found it better to work with arranged signals between the dredger and I.P.S. " Colaba " than to use the telephone which had been provided.

(*c*) Foreman in charge of pipe-line to keep a log book, and enter therein all advices to the dredger.

Mr. Brims argued against this, and stated that he did not think it necessary.

(*d*) Foreman in charge of pipe-line to take samples daily of the discharge, say one during the morning shift and one during the night shift, at varying times from day to day, for the purpose of testing the proportion of solids in the graduated gauge glasses. Relative tests only.

(*e*) Mr. Surveyor to take, say twice weekly, systematic tests of the discharge to obtain the velocity, percentage, and hourly discharge of solid materials (Mr. Surveyor is fully competent to carry on these tests). Absolute tests.

(*d*) and (*e*) Very little non-committal comment was made.

(*f*) To raise, by means of sand or moorum in bags, a weir on the top of the shore-end part of Drain No. 1 or, by other means, to trap all the solid materials being pumped into Area No. 8 at Colaba.

Mr. Elgee said this would require to be carefully looked into, otherwise the southernmost portion of the reclamation, where moorum is now being tipped, would be under water. I learnt before I left Bombay that it had been decided to tip moorum on the remainder, the eastern end, of the inside slope of the cross bund between Areas 7 and 8.

(*g*) The employment of an engineering inspector to supervise the work of reconditioning the " Jinga " and so relieve Mr. Brims and Mr. Speirs, Sen., from this work to enable them to give their whole attention to dredging. Mr. Brims had previously informed me that much of his and Speirs' time was taken up with this work.

Mr. Brims strongly argued against this, and quoted some decision on a similar matter in Mr. Lewis' time.

(*h*) The percentage of solids discharged during the night shifts was only about 70 per cent. of that of the day shift.

When I first informed Mr. Brims of this some few days previously he expressed surprise. He now said that Speirs said it was generally found to be the case.

I then asked if they had any other matters or points in connection with the dredging on which I might possibly be able to assist. Mr. Elgee and Mr. Brims replied they thought not.

I informed them that the greater part, if not the whole, of the water area of reclamation, Area No. 8, into which the dredgings are being discharged, was very heavily loaded with material from the dredger, for on Tuesday, 1st instant, I obtained the loan of the " Mosquito " punt and men to take me as far as possible over the water area, when it was found that, owing to the density of the water, the men were only able to paddle the punt about 50 feet away from the landing place.

The water or, more correctly, liquid mud level was 87·20 feet.

Mr. Surveyor, who ably assisted in taking the tests, asked me to recommend him to the Chief Engineer for an increase of salary, and, in accordance with my promise to do so, I took advantage of this interview to recommend Mr. Surveyor for the consideration of an increase of salary. The Chief Engineer replied that Mr. Brims, who was present, had some time ago recommended Mr. Surveyor for an increase, but nothing could be done at the time. After a little reflection he added, " If Messrs. Meik & Buchanan will recommend him for an increase, I will see what can be done."

If this procedure is in order, I would recommend Mr. Surveyor's request for an increase of salary for favourable consideration.

As much has been said about the unsuitableness of the men, assistant dredging masters, &c., sent out from London, or, as Speirs, Senior, told me, by Messrs. Meik & Buchanan, I have had ample opportunity of watching the dredging masters, Roberts and Speirs, Junior, of the " Sir George Lloyd," during dredging operations between Saturday, 21st November, to 1st December, inclusive.

During the frequent visits I paid to the dredger between those dates, Roberts showed himself alert, intelligent and fully capable as a dredging master of the " Sir George Lloyd." On the occasions of my calling his attention to the vacuum gauge he has at once given the reason for its low indication. Whatever may be the cause of his unsuitableness—and his name is the only name which has been mentioned in this connection, though when reference to unsuitableness has been made it has been connected with the words " of the men sent out from London or by Meik & Buchanan " —it cannot, in his case, include incapacity as a dredging master of the " Sir George Lloyd." I was reliably informed of one occasion, after completing his dredging shift, of his visiting the pipe-line to see, as I understood he said, the progress made.

I told the Chief Engineer on Monday, 30th November, that I had watched Roberts carefully during dredging operations and I considered him a good dredging master. His only comment was, " What do you think of young Speirs? " I said there was a difference between the two men; Speirs did not handle the dredger with the same ability as Roberts. Subsequently, on my next visit to the dredger, I asked Speirs for how long he had been out in Bombay; he said two years, and in reply to further questions said he came out straight from the bench and had had no previous dredging experience. He has had, therefore, prior to this season's work, at most 10 months' actual dredging experience, spread over two periods of five months. He is now one of the two dredging masters alternatively responsible for the day and night shift working of probably the most powerful suction cutter dredger afloat.

The Chief Engineer, in his letter No. 854 of 20th March, 1925, stated that " it takes 10 years at least to train a man to work a suction dredger satisfactorily . . ."

Roberts is a 1st class Board of Trade Certificated Engineer, and was one of a number of applicants carefully selected by a Selection Committee, whereas the only qualification of Speirs, Jr., is that of having been at the bench as a fitter.

My visits to the " Kalu " were altogether too short to enable an opinion to be formed of the ability of the two dredging masters, Wallace and Brown, of this vessel owing to her working for only short periods of time daily during the days the tides were favourable.

When in the engine room of the " Kalu " I called the Chief Engineer's (Mr. Carr's) attention to a " knock " of the engine, when he said, " Yes, but it's not bad; it just wants lining up." I said, " Well, why not put a liner in and prevent its getting worse? " He replied, looking round the engine room, " We have no means of doing these things." I said, " You mean you have no workshop." He said, " Yes."

On a previous occasion I called Mr. Rutherford's (the Chief Engineer of the " Sir George Lloyd ") attention to a somewhat worse " knock " of the dredger's engine (Pump engine). He said, " It is not too bad." I said, " I suppose it will have to go ashore." I did not hear his reply.

It is not creditable to the ship's engineering staff that these small but important working defects should not be adjusted before the next week's running of the engines.

At noon on Friday, 4th December, I had, as previously arranged, a final interview with Sir Lawless Hepper. It had been arranged between the Chief Engineer and myself that he should be present at the interview, but at the last moment he said he thought it would be better if I had the interview alone with Sir Lawless.

After a few introductory remarks Sir Lawless asked me if I was satisfied with the dredging. I replied as the results of the tests, " Yes."

No further question in connection with dredging was asked, and the remainder of the interview was taken up by Sir Lawless in giving me interesting incidents of Indian life as he had experienced it.

Before leaving and on my bidding him goodbye he asked me if Sir George had not been for some time in Australia. I replied that he had been in Australia. He finally said, " Well, please remember me to him," after which I bade him goodbye and withdrew.

I embarked at 11 o'clock on Saturday, 5th December, on board the P. & O. " Ranpura " on my return to London, where I arrived on Saturday afternoon, 19th inst.

Recommendations.

As there seemed to me during my visit to Bombay to be a settled feeling that the dredging problem presented some inherent difficulty or difficulties, as exemplified by the remarks of the Chief Engineer quoted on page 2, supra, and that the direction and super-

vision seemed to lack intelligent direction and " life," I beg to submit the following recommendations for consideration as I feel sure that if a well-directed and reasonably energetic trial be made of some or all they would in a short time improve the tone and atmosphere of the work and lead to an improvement in the dredging output :—

1. That belief in the dredger's ability to do work at least equal to her designed capacity to be encouraged.

2. That the material to be dredged over the larger dredging area, east side of Oyster Rock, should be considered to be very much better than it is or has been believed to be, and that it is almost ideal for dredging.

3. That where hard moorum crops up, it should be left to be dealt with by blasting or other means if it is necessary to dredge it to obtain the quantity of material required for filling.

4. Provision of telephone between the dredger (Bridge) and the end of the pipe line.

5. Foreman in charge of pipe line should keep a log book and note therein advices made to the dredging master in connection with the condition of discharge.

6. The taking of absolute tests of the discharge, say, twice weekly, to obtain the velocity, percentage (absolute) and hourly discharge of solid materials. Mr. Surveyor is fully competent to take these tests.

7. That percentage of solids discharged during the day and night shifts should be obtained for comparison.

These tests are very simple and take very little time to carry through and should be taken daily and recorded. The results from time to time tactfully told to the respective dredging masters, day and night shifts, unconsciously cultivates a spirit of emulation. I know this has been a considerable factor in increasing the output.

Mr. Surveyor and Brooks, foreman of pipe line, fully understand all the little that is required to carry out these tests, which are relative only.

8. The employment of an able Marine Engineer, solely responsible under the Chief Engineer, to the Engineer in charge of dredging, to take charge of the whole of the maintenance work of the plant and so relieve Mr. Brims and Mr. Spiers, Sr., of this work to enable them to give the whole of their time to dredging proper.

Yours faithfully,

(Sgd.) J. Risley Settle.

Precipitation tests of the day and night shifts' discharges giving the relative percentages of solids in the discharge.

Day Shift. *Percentage.*	*Night Shift.* *Pencentage.*
—	22·41
15·84	18·27
—	14·38
40·75	12·92
22·50	14·91
79·64	14·63
18·60	91·90
23·03	26·75
71·95	24·25
7)272·31	9)240·42
38·90	26·71
100	68·66

The efficiency of the night shift during the period of these tests was only 68·66 per cent. of that of the day shift.

Day.	Date.	Time.	Tide.		Revolutions of pump per minute.	Pressure in lbs. per square inch at pump.	Equivalent head in feet at pump.	Vacuum in inches.	Depth of cutter in feet.	Total length of pipe line.	Velocity of discharge in feet per second.	Equivalent head in feet.	Discharge.				
			Spring.	Neap.									Total per hour.	Solids.		Specific gravity.	General nature.
													cube yards.	Per cent.	cube yards per hour.		
Thursday ...	19.11.25	3.30 p.m.	⅓ ebb	—	—	—	—	—	—	5,900	10·75	1·82	9,192	11·93	1,097	2·28	clay and sand.
Friday ...	20.11.25	11 a.m.	—	—	—	—	—	—	—	5,900	10·60	1·75	—	—	—	—	—
		,,	—	—	—	—	—	—	—	5,900	10·87	1·85	—	—	—	—	—
		12.30 p.m.	—	—	—	—	—	—	—	5,900	11·49	2·03	—	—	—	—	—
		,,	—	—	—	—	—	—	—	5,900	11·22	1·97	—	—	—	—	—
Monday ...	23.11.25	12 noon	—	low water	144	36	81·00	—	—	6,070	8·92	1·24	7,628	5·77	440	2·28	—
		4 p.m.	—	⅔ flood	145	34	76·40	—	46	6,070	11·22	1·97	9,594	11·03	1,058	2·23	clay and sand.
Wednesday	25.11.25	12 noon	—	⅔ ebb	146	34	76·40	13	30	6,210	11·41	2·02	9,757	15·03	1,466	2·22	,,
		5 p.m.	—	½ flood	143	34	76·40	12	35	6,210	10·54	1·74	9,013	5·83	525	2·26	,,
Friday ...	27.11.25	11 a.m.	⅛ ebb	—	144	31	69·60	11	45	6,350	11·09	1·92	9,483	9·12	865	2·17	,,
		5.30 p.m.	¼ flood	—	145	36	81·00	9½	31	6,410	11·34	2·01	9,697	16·01	1,552	2·21	,,
Tuesday ...	1.12.25	12 noon	high water	—	143	36	81·00	12	52	6,580	11·81	2·18	10,097	12·33	1,246	2·18	,,
		4 p.m.	⅔ ebb	—	146	37	83·20	11	40	6,640	13·18	2·71	11,269	6·44	725	2·29	,,

NOTE.—As the samples of the discharge were taken from approximately the centre of the jet, only material in suspension was obtained and consequently no account was taken (or could be taken) of the solids being discharged with lower velocity along the invert of the pipe. It is, therefore, reasonable to assume that the quantities of solids discharged given above under "Cube yards per hour" might be increased by 10 per cent.

The percentage of solids discharged were obtained after "drying out" over a spirit lamp the residue of solids measured in a graduated test glasss; and, therefore, the "cube yards per hour" of solids discharged is the absolute minimum quantity of solids discharged at each test.

Chairman.—I think you went to Bombay in 1925?
A.—Yes.

Q.—And eventually you made two reports to your firm, Messrs. Meik and Buchanan?
A.—Yes.

Q.—In the second document which has been placed before us, dated the 30th of December, 1925, you say: " My object in obtaining this latter information was particularly great because I found from time to time, when generally discussing the dredging question, that the admittedly unsatisfactory position of the dredging was due to one or all of the following three causes ". Then you set out, as the first cause, the unsuitability of the material?
A.—Yes.

Q.—That must mean, must it not, the unsuitability of the dredger to deal with the material?
A.—I beg your pardon. It was the unsuitability of the material to be dealt with by the dredger.

Q.—Is not that, as Mr. Kidd says, putting the cart before the horse, because the material is an eternal factor, is it not?
A.—It is.

Q.—You cannot alter the material. Whatever it is, there it is?
A.—Yes.

Q.—Therefore you have to adapt your dredger to your particular material?
A.—Yes.

Q.—So be it. The second cause, you say, is: " The difficulty of obtaining the material owing to the uneven level of hard material, moorum, which the dredger cannot deal with, and consequent loss of much time in lifting and lowering the cutter "?
A.—Yes.

Q.—You have got a certain depth of mud, below the mud a certain depth of clay, and below the clay, moorum and rocks. No matter how carefully borings are taken, you cannot guarantee that in any particular place you will have a perfectly level bed beneath the mud and clay?
A.—That is so: it is uneven.

Q.—It is always uneven, and the most skilful dredging master in the world will suddenly come upon a piece of rock?
A.—That is so.

Q.—And if, by chance, he injures the blades of the cutter it is no fault of his?
A.—No.

Q.—It is due to the fact that, however carefully borings are taken, owing to the irregularity of the moorum and rock, you may suddenly come upon rock?
A.—That is so.

Q.—And then the skilful dredging master passes over it. He has got to lift up?
A.—He has got to lift up, or else he breaks his machine.

Q.—He has to lift up because his cutter cannot go into this hard stuff?
A.—Yes.

Q.—Therefore he lifts the ladder, and gets it again on to dredgable material, and goes on dredging until he comes on to harder material. When he gets into the harder material he lifts again?
A.—Yes.

Q.—I notice in your report that you say that the breaking of the cutter is not a matter of unusual occurrence?
A.—Not at all. I did not wish to infer that it was.

Q.—I notice that, and that you wanted them in Bombay to have it repaired by the quasi-arc process?
A.—That is my point.

Q.—And that if they did have that one blade of the cutter repaired they would have had a spare cutter?
A.—Exactly.

Q.—You do not suggest that because you find one blade of a cutter broken that therefore there has been a careless or a negligent dredging master?
A.—No. I am sorry if I have given that impression.

Q.—You have not given that impression in any way.
A.—No.

Q.—The first point that you found them insisting upon was the unsuitability of the material?

A.—That is so.

Q.—The second point was that they found that the depth of dredgable material was uncertain?

A.—Yes, uneven.

Q.—Then the third matter, what has been called the human element?

A.—Yes.

Q.—That is when you have got to get together a crew to work a machine like a dredger sometimes you have got to train the crew?

A.—Yes.

Q.—It may take a little time. Sometimes you have bad luck in not getting a good dredging master.

A.—Yes.

Q.—Sometimes you have good luck in getting one. Do you know anything about Mr. Speirs? He was a very good man, was he not?

A.—Well, he may have been.

Q.—He was recommended, and strongly supported by the firm of Meik & Buchanan, was he not?

A.—I believe he was.

Q.—And strongly supported by Messrs Simons & Co.?

A.—Yes, I believe he was.

Q.—That is right. The only quarrel that you have with Mr. Speirs is his old age, is it not; he is getting on in years?

A.—Yes, and I think also his mentality. He has got his own ways of doing things, and no one else knows anything at all about them.

Q.—After all he was a dredging master who all his life had been doing that job and nothing else?

A.—That is so.

Q.—Have you any doubt but that he was wanting to get the best results out of the Sir George Lloyd "? He was very proud of the " Sir George Lloyd," was he not?

A.—I do not know about that I am sure; I never asked him.

Q.—We have seen him?

A.—He took pride in it, I admit.

Q.—We asked him if she was not a very good ship, and he said she was the finest dredger he had ever seen. Have you any reason to doubt that Mr. Speirs did his very best to get the best result?

A.—In coming into contact with these men and discussing points with them one forms an idea as to whether they are the right men for the position. It is not always possible to find definite circumstances or definite details upon which one can take action.

Q.—We know what the position was with regard to him. Then you had a certain conversation with Mr. Brims, and Mr. Brims wanted some of the material analysed; you remember that?

A.—No, I wanted it analysed.

Q.—You wanted it analysed?

A.—Yes.

Q.—Did Mr. Brims say something like this in reply: " Well, if we have this analysed now it will raise all sorts of awkward questions, because people will say, ' Why have you not done this years ago?' "

A.—Yes. Mr. Brims made that statement when I was speaking to Mr. Mitchell.

Q.—That is right?

A.—I was trying to get information.

Q.—And a very sage remark, was it not?

A.—I believe so now, but of course I could not realise the importance of it at the time.

Q.—Had there been a little more attention paid to the quality of the material from October, 1919, to May, 1920, the result might have been very different to-day?

A.—I do not follow that.

Q.—The report of Sir George Buchanan was in September, 1919. There were calm conditions of weather in Bombay in October, November, December, January, February, March and April. The dredger was ordered in May. Sir George Buchanan has told us that it would have been perfectly easy to have taken check borings in October, November

and December, and have ascertained exactly the nature of the material; do you follow that?

A.—Yes.

Q.—Would not that have been an eminently wise thing to have done?

A.—It would in a sense, but I think the information given in Mr. Kidd's plan was quite sufficient. In my opinion it is sufficient for forming an opinion as to the material.

Q.—Are there other methods of boring which give definite information of the materials?

A.—Yes, core borings.

Q.—Core borings bring up samples of the materials bored through, do they not?

A.—Yes.

Q.—Exactly, and core borings could have been taken in one month, in the month of October or in the month of November, which would have shown you exactly the quality of the mud. You would have brought the mud out?

A.—Exactly.

Q.—You would have brought the clay out?

A.—Yes.

Q.—You would have known whether you were dealing with soft clay or stiff clay. You would have known exactly what you were dealing with. You would have known exactly when you were coming on to the moorum, and as regards the consistency of the mud and the consistency of the clay, core borings would have told you exactly what you wanted to know?

A.—They would, yes.

Q.—And then in addition to that, borings of that character would have shown you the nature of the silt, and whether Mr. Mitchell and Mr. Maclure, and all these other people were right when they anticipated that it would never dry out. You would have been able to find that out too, would you not?

A.—Yes, but there is no question about the drying out below water level. I have seen acres and acres of reclamations formed of bad material, and I have dealt with reclamations where the material has been extremely bad, and it has been dried out in the process of reclaiming.

Q.—Yes. At the Sewri reclamation they were not able to dry it out at all because they were pumping landwards?

A.—Yes.

Q.—Have you noticed in the evidence that Mr. Maclure, speaking of the Sewri reclamation, says that even to-day the land in parts is like a blanc-mange? Have you been on the Sewri reclamation?

A.—No, I have not.

Q.—Did Mr. Maclure tell you himself that the land at Sewri was unstable?

A.—Yes, I mentioned that in my report.

Q.—Did he tell you that it always would be unstable.

A.—Yes, it would always be unstable; that is where it is below the hydraulic gradient.

Q.—And that as regards moorum you wanted no less than 3 feet 6 inches in thickness?

A.—That is what Mr. Maclure told me, and that was based on experiments they carried out under the Bombay Port Trust.

Q.—And that even with 3 feet 6 inches of moorum it would not carry more than a light load?

A.—That is so.

Q.—That is not a business proposition, is it, to reclaim land that is like a blanc-mange, on which you have to put 3 feet 6 inches of expensive moorum. Moorum is very expensive, is it not?

A.—I believe so.

Q.—You have to put on it expensive moorum and then that reclaimed land will carry only a light load?

A.—Then the question arises, in considering a pumping and reclamation scheme, as to whether there is cheaper process. I know of reclamations in Australia where the mud is infinitely worse; I use the word "infinitely" because I cannot conceive anything worse for reclamation purposes than the mud in the top or north end of Hobson's Bay. The whole of the West Melbourne swamp was reclaimed with this mud. Victoria Dock is built on part of it.

Sir Frederick Hopkinson.—Can you conceive of any worse mud than that in that tin below the table?

A.—I have not seen the tin, but I have samples myself.

Q.—Will you look at that and stir it up?

A.—This has passed through the dredger?

Q.—It has?

A.—Of course that is more solid at the bottom. I went out in the " Mosquito " punt . . . . . .

Q.—You could not have any worse stuff than that?

A.—I have never seen anything else come through for reclamations.

Q.—You could not have anything wore than that, could you?

A.—Yes.

Q.—What could it be?

A.—The Melbourne silt is worse than that.

Q.—Has it any sand in it?

A.—It has particles of sand.

Q.—Then it could not be worse than that because sand is an improvement. There is practically no sand in that?

A.—I understand that the silt is impalpable sand; it is all washings down.

Q.—The water will run out of sand, but it will not run out of mud? Sand is granular but that is not?

A.—That is its first condition, of course. It would be in the form of clay.

Q.—I do not suppose there is one per cent. of granular matter in that?

A.—I have seen worse than that. The whole of West Melbourne swamp is made up of worse than that. I also know a suburb of Melbourne, a place called Elwood, lying between South St. Kilda and North Brighton, made of worse than that, and it has very fine palatial buildings erected on it.

Sir M. Visvesvaraya.—Is that due to salt efflorescence?

A.—Salt efflorescence?

Q.—Yes. Is the soil to which you refer impregnated with salts?

A.—Yes, it is sea water.

Q.—That must be the reason.

A.—They topped it and they drained it. In reclaiming they had weirs, and they drained off the water and allowed it to precipitate, and then after it had dried out in the hot Australian sun they topped it with hard material. I have seen much worse material than that.

Chairman.—Do you remember going up to Marine Lines with Mr. Brims to see what the " Kalu " was doing?

A.—Yes.

Q.—Did you notice for 800 or 900 feet along the face of the wall, and nearly the same distance out, that pumped material was escaping?

A.—Yes, I did.

Q.—Was not it evident to you that a very large percentage of the pumped material was escaping through what was an extremely porous wall?

A.—Naturally that is the case, and that is why I called attention to it. I could not understand the condition of the wall.

Q.—Exactly. One of the objects of the wall is to retain the material that is pumped into it?

A.—Yes. I should certainly blame the Resident Engineer for that. It shows that he did not know his job.

Q.—The Resident Engineer has to work to specification?

A.—He had the specification. Of course that brings in a very large question. One wants to go back and to inquire what was the arrangement at that quarry. Were they quarrying for small stone or were they quarrying for large stone.

Sir Frederick Hopkinson.—No amount of mixing will make a loose stone rubble mound watertight?

A.—I have seen it done.

Q.—Have you?

A.—I have; with core; with run of quarry core.

Q.—It is a miracle if you have.

Chairman.—We are much indebted to you for your statement, which we will incorporated in your evidence. Those are the only questions which appear to me to be material as far as I am concerned.

Sir M. Visvesvaraya.—In the last paragraph, on page 5 of your statement, you say: "It is my considered opinion that had even a portion of these works been designed and the usual contract plans and documents been prepared before inviting tenders, the canal would not now be in existence, for the time required to design the works and prepare the contract documents would have been so great that not only the public interest, but also the enthusiasm for, the scheme, which had been kept alive during the period 1882 to 1887, would not have survived." You say "the enthusiasm for the scheme which had been kept alive." Of course you do not lauch such schemes on a wave of enthusiasm, do you?

A.—I cannot conceive of the Manchester Ship Canal ever materialising without that enthusiasm. I passed through the whole of that period.

Q.—Again, in the very last page of your statement you have made some remarks about the horse-power of the dredgers. Have you made any comparisions and deduced that the horse-power in this case was sufficient to pump 2,000 cubic yards per hour?

A.—I have not really, although I have a specification here of two 2,000 tons dredgers for which Messrs. Lobnitz got the contract in 1916 for the Commonwealth of Australia. They give the boiler horse-power there.

Q.—You have not gone into the question of the horse-power?

A.—Except, of course, when I was in Bombay I just ran it out from a 44lb. pump pressure. I ought to say that in taking these tests I got readings. I got the Chief Engineer of the dredger to take readings of the revolutions and the pressure at the engine, and also the vacuum. The highest pressure at the pump was 44 lbs. That is practically equal to 70 feet head. As a matter of fact it is just over 70 feet head. 70 feet head would give you a velocity of clear water of 12 feet per second at the end of 5,000 feet of pipe line. No, I am wrong in that. 44 lbs. is equal to 100 feet lift. 70 feet head at the engine would give you a terminal velocity at the end of the 5,000 feet length of pipe line of 12 feet per second.

Q.—Have you provided for the horse-power for the cutter?

A.—I am dealing with the pump engine. They are detached. If you add 50 per cent. for friction head to the 70 feet it would give you, say, 105 feet head. Here 44 lbs. pressure at the engine gives you about 100 feet head. That satisfied me, at all events, as to the sufficiency of the horse-power.

Q.—The suction pipe?

A.—Yes.

Q.—What about the cutter?

A.—There is ample power.

Sir Frederick Hopkinson.—That is a separate engine?

A.—That is a separate engine.

Sir M. Visvesvaraya.—Have you seen that the horse-power is sufficient for that.

A.—Yes, more than sufficient. Of course, she has an automatic cut-off. When the cutter comes up against anything hard the steam is automatically cut off.

Q.—The allegation is that the cutter does not cut the hard clay fast enough?

A.—I was on board. Of course, I cannot speak as regards the East side of Oyster Rock, but I spent a very large amount of my time on the dredger during the time that she was cutting in what was considered to be hard material on the West side of Oyster Rock, and I never saw the cutter brought up once. She cut everything before her, except moorum, when she was brought up.

Q.—She may cut, but at what rate?

A.—Of course, I cannot say, because no tests were taken at the time that I was on board.

Q.—You have not got definite figures?

A.—No. Naturally, if you get into hard material your output will decrease.

Q.—If you get into stiff material such as clay?

A.—No, the moorum. There was no hard material there except the moorum.

Q.—We have been told that the clay has been giving all the trouble, and not the moorum. They do not go into moorum except, perhaps, by accident, and then they at once shift their position?

A.—All round the end of the pipe on every shift I saw that there were balls of clay. I measured many of them. They were 18 inches in diameter and downwards, and that was extremely soft material. If it had been in the sun for three hours you could jump on it from the top of the pipe without making an impression.

Sir Frederick Hopkinson.—In the table at the end of your statement you gave the discharges on Thursday, Friday, Monday, Wednesday, Friday, and Tuseday, with certain

percentages of solid material. There are nine totals. At that time was the dredger working well?

A.—I can only form an opinion from the statements that I got from the dredger.

Q.—Were you on board at the time?

A.—Not at the time when the tests were taken.

Q.—You were not on board at the time?

A.—No, I was at the end of the pipe line.

Q.—Had you anyone to tell you if the dredger was working well?

A.—Only these statements; that is what I got. I got the Chief Engineer of the dredger to take them every half-hour, and give me the readings.

Q.—Do you think that the dredger was then doing as well as she could?

A.—I would not like to say. It is not so much the dredger doing as well as she could, but was she being fed properly?

Q.—Quite. That is part of her doing as well as she could. If she is not fed she could not do well?

A.—One wants to differentiate between a dredger doing well as a tool and a dredger being handled as a tool.

Q.—We are not interested in a dredger doing well as a tool. We are interested in her turning out 2,000 cubic yards an hour?

A.—If you get a good tool, and it is handled badly, you cannot get your output.

Q.—I notice that the average discharge on your figures is 997 cubic yards per hour?

A.—Yes.

Q.—That is what we complain of.

A.—I wanted to know why we could not get 1,552 cubic yards every time. If you can get it once, why not always?

Q.—This was taken by the samples, was it not?

A.—Yes, at the discharge.

Q.—That is the same as you use if you are pumping sand, is it not? What size tube was it?

A.—It was a graduated glass for measuring the precipitation of the solids. The jet at the end of the pipe line was measured.

Q.—Of what diameter?

A.—1½ inches diameter.

Q. It is very useful if you are pumping sand?

A.—Yes.

Q.—It is entirely useless if you are pumping lumps of clay 18 inches in diameter?

A.—You cannot take the clay at all.

Q.—Therefore this is absolutely unreliable and useless?

A.—Not so far as material in suspension is concerned.

Q.—That is no good. You want the clay?

A.—You cannot get the clay. There are no practical means of getting it.

Q.—It is impossible to test it in that way. The only real test is by cross sectional measurements of the dredging done, is it not?

A.—And that only over a long time.

Q.—Not a very long time; a week, say?

A.—No, you cannot get it in a week.

Q.—A month?

A.—No, you cannot get it in a month.

Q.—Why not?

A.—Simply because you have got the settlement to take account of. How can you take the settlement?

Q.—There is no settlement at all. You measure the cross sectional area of the work done, not the reclamation work, but the dredging work done?

A.—Yes.

Q.—Is it not possible to measure up accurately each day or two exactly what material has been dredged?

A.—Hardly, under the conditions that are obtaining out there. For instance, we used to run up behind the dredger and trace out the lines by means of sinkered barrels or buoys, and then set our wires across, and know exactly what we were doing.

Q.—The head chain on your dredger is absolutely taut, is it not?

A.—Yes.

Q.—Cannot you measure on that every time you go ahead, and cannot you, from the ship's deck, take your soundings as close as you like of the work accomplished behind you?

A.—Then what about the settlement.

Q.—Never mind about the settlement. I do not care about it. There is no settlement. You have got the level of the surface of the mud or clay before you touch it, and you have got the level after you have dredged it?

A.—Yes. I think if you took soundings a short time after the dredger had passed over the area your lead would probably sink in 18 inches to 2 feet.

Q.—Why.

A.—Because that has always been my experience.

Q.—Why should it?

A.—You have dredged the mud away, even with bucket dredgers.

Q.—You have dredged the mud away?

A.—That has always been my experience.

Q.—That would give a more favourable result. It would show that you had dredged more than you actually had?

A.—Of course, you know as well as I do that soundings, under those circumstances, would have to be taken very carefully.

Q.—Quite. I am assuming, of course, that they are done properly?

A.—You do not want to drop the lead over by the bridge.

Q.—I am speaking of proper soundings?

A.—If systematic soundings are taken properly then you can arrive at it, and it is the way of arriving at it.

Q.—It is the only way, is it not?

A.—Yes.

Q.—The speed of the effluent, I gather, was about 10 to 11 feet per second?

A.—Yes.

Q.—That gives a maximum output on a 42 inch pipe of about 13,468 cubic yards per hour, does it not?

A.—Yes, I believe it was about that.

Q.—Your table shows that your discharge varied between 5.77 per cent and 16.01 per cent?

A.—Yes.

Q.—I suggest to you that anyone doing pump dredging work is doing quite good work if he is getting 10 per cent., is he not?

A.—Yes, 10 per cent to 12 per cent.

Q.—10 per cent?

A.—10 per cent. to 12 per cent.

Q.—10 per cent. on 13,468 cubic yards an hour is 1,346 cubic yards an hour of solids?

A.—Yes.

Q.—And that is the maximum that your dredger can do?

A.—No, I would not like to say that. 1,552 cubic yards is given in the statement attached to my report dated 30th December, 1925.

Q.—Those are your figures?

A.—Yes, so far as they go.

Q.—Those are your figures. Turning back to the page before that, you have some precipitation tests of the day and nights shifts. You show there that the percentage of the night shift was 68·66 per cent. of the day shift?

A.—Yes.

Q.—That is about what you would expect, is it not?

A.—I do not know. I think I should expect a little more.

Q.—You would expect a little more?

A.—About 75 per cent.

Q.—You would expect about 75 per cent?

A.—Yes, properly worked.

Mr. Billimoria.—I have nothing to ask you.

Chairman.—We are much obliged to you, Mr. Settle.

(The Witness withdrew.)

(Adjourned to to-morrow at 11 o'clock.)

The Committee assembled at 11 a.m. on the 4th November, 1926, all members being present.

Sir H. Courthope-Munroe.—I regret keeping the Committee waiting a few moments Sir, but I have just heard from my client, Sir George Buchanan—or rather from his family—that he is seriously ill in bed. Under those conditions, it is impossible for him to attend. I need hardly say that he is most anxious that he should attend before this Committee, because there are a good many matters, which have not yet been dealt with in London, which were dealt with in Bombay at the time—when he had no opportunity of dealing with them, and which, in his own interests, he is most anxious to deal with before this Committee. Two questions remain. One is whether I should address you, as you have been good enough to permit me to do, on the construction of the agreement. I cannot help thinking that that is a matter which had better be dealt with at the close of the enquiry rather than in the course of it.

Chairman.—When you have the whole of the material before you and the result of your re-examination?

Sir H. Courthope-Munroe.—Quite. That is a very material matter, and one, I think, which must be dealt with at the close of the enquiry. The second question is this: I think it is essential that Sir George should be here to deal with those matters which are referred to in the shorthand notes, and the only point is when he will be sufficiently recovered to deal with them. I shall be seeing his doctor to-day, and I will ascertain what he thinks will be the earliest time at which Sir George can attend. I need hardly say that he is most anxious to attend, because, apart from what has taken place in London, there are numerous matters in Bombay which must be cleared up.

Chairman.—It would be a matter of great regret if Sir George left the examination in this truncated form. It is very important that he should be re-examined by you—most important. The Committee regret very much to hear that Sir George is ill, and we will meet his convenience in every possible way. I suggest, Sir Harry, that if Sir George's solicitors will give Mr. Ewbank 24 hours' notice we will attend here on any day next week it will suit Sir George's convenience. There will be a few more questions which Sir Frederick Hopkinson wishes to put, and a few questions which Mr. Billimoria wishes to put, and your re-examination, and then your view of the construction of the agreement. That can all be done within a day?

Sir H. Courthope-Munroe.—I think so.

Chairman.—Quite easily. We must arrange that it is done within a day; we cannot give any more time.

Sir H. Courthope-Munroe.—That is what I should myself wish.

Chairman.—Will you convey to Sir George Buchanan the real regret of the Committee at his having broken down. I think you might say that we noticed that he was under very severe strain on Monday and Tuesday.

Sir H. Courthope-Munroe.—That is why you were good enough to give him a day's rest?

Chairman.—Yes. Indeed, we noticed on Tuesday that he was under an increasing strain, and in our view that made it very desirable that Mr. Halcrow and Mr. Settle should be interposed. Now, Sir Harry, we had better leave it like that, I think?

Sir H. Courthope-Munroe.—If you please, Sir. I will convey your remarks to Sir George.

Chairman.—Your solicitors will give Mr. Ewbank 24 hours' notice—if they can give more, so much the better—of Sir George Buchanan's intention to attend; and I do suggest that, even if he attends under very considerable difficulty, he should nevertheless attend, because it is very important. His evidence is being no doubt regarded with great care in Bombay, and they will wish to have the whole story from him. We wish also to have such help from him as we can get, and also help from you in the re-examination.

Sir H. Courthope-Munroe.—If you please, Sir. I am obliged to the Committee.

Chairman.—Then the Committee adjourns until we hear from your solicitors as to the day on which Sir George will attend?

Sir H. Courthope-Munroe.—If you please, Sir. At the last meeting Sir George promised to give some information with reference to one of the pipe-lines for which you asked. He has put it on paper, and I will hand it in. (The document was handed in.)

(The Committee then adjourned *sine die*.)

The Committee assembled at 11 a.m. on the 12th November, 1926, all members being present.

The examination of Sir George Buchanan was continued.

Sir H. Courthope-Munroe.—Before you start the proceedings, Sir, may I call your attention to the fact that there is a clerical error in the shorthand notes on Thursday, October 28th, and as these are matters of record it had better be put right. It is on the last page, page 103, in the last observation that you made. After Sir George Buchanan had made that little sketch, giving the three divisions, you said, " This No. 3 is stiff unctuous clay. The other is the clay from No. 3 on the sketch of Sir George Buchanan ". That should be No. 2.

Chairman.—I have already crossed out " No. 3 ". That is obviously wrong. It should be " No. 2 ".

Sir H. Courthope-Munroe.—It is on record as No. 3, and, in years to come, it might be said, " What is the meaning of this? " It should be No. 2.

Chairman.—It will be corrected in the final proof. It is No. 2. This is clay from No. 2. Thank you, very much.

Sir Frederick Hopkinson.—(to the Witness) Simons' original quotation for the dredger was dated September 12th, 1919, I think.

Chairman.—Page 29 of your report, Sir George?

A.—Yes.

Sir Frederick Hopkinson.—You recommended the Bombay Government to place an order with Simons on February 26th, 1920, I think?

A.—Yes.

Q.—In your note of the same date you say, " No. 1 declined to tender ". That is Ferguson Brothers. " No. 2 wished for a great deal of information not available ". That is Fleming & Ferguson. Is that so?

A.—I have not got the papers by me, and I cannot tell you.

Sir H. Courthope-Munroe.—What page are you on?

Witness.—I do not know; I have not got the papers.

Chairman.—I suppose you will assume that that is so?

A.—I will assume that that is so.

Chairman.—It shall be handed to you afterwards.

Sir Frederick Hopkinson.—It is an extract from a letter of Mr. Mackie. You say that information was not available. The information they asked for is contained in their letter of the 22nd January, 1920, and the points are these: they wanted to know, first, the average working output; second, the length of pipeline; third, head against the pump; fourth, revolutions and diameter of pump impeller; fifth, velocity of material through piping. That was all essential information, was it not?

A.—We did not give that information, no.

Chairman.—The question is, " That was all essential information? That is the only question for the moment.

A.—They wanted to know that information, yes.

Q.—" Essential information "; that is the only question for the moment?

A.—Yes.

Sir Frederick Hopkinson.—They could not possibly give you a tender for the dredging plant without that information, could they?

A.—They would have to get it themselves.

Q.—No, no. They wanted to know how much an hour you wanted pumping. They could not tell. It must come from you, and, as a matter of fact, that is the information you gave the other tenderers.

A.—We gave the same to all tenderers. I cannot remember all these details now, because I was in Bombay.

Q.—Just follow it through with me. They were asking for information on the 22nd January—essential information which they had not got in their possession; and until they got that information they could not possibly quote, could they?

A.—I suppose not, no.

Q.—That information had been given to other tenderers. I want to ask you now whether you can explain why that information was not given to Fleming & Ferguson?

A.—I have not the faintest idea. I was not here at the time. I was in Bombay. It was conducted by Mr. Meik.

Q.—The fact appears to be that three of the tenderers were given information and that it was withheld from Fleming & Ferguson. Messrs. Lobnitz were given certain

information. The information which Messrs. Meik & Buchanan gave to Lobnitz was as follows. You sent to Messrs. Lobnitz: " Particulars, 2,000 cube yards an hour; discharge from dredger 5,000 feet; maximum length of discharge pipe 14,000 feet." Then depth, and so on, is all the same. " Character of material, soft clay."

A.—Yes.

Q.—Can you tell me why you gave them the maximum length of discharge pipe as 14,000 feet, whereas in fact Messrs. Simons' tender of September only provided for 8,500 feet?

A.—I think you are mistaken. It is 14,000 feet altogether.

Q.—No—" maximum length of discharge pipe 14,000 feet."

A.—14,000 feet from the dredger.

Q.—No. " Discharge from dredger 5,000 feet; maximum length of discharge pipe 14,000 feet," and on that information Messrs Lobnitz quoted for 19,000 feet of pipe, whereas Simons had only quoted for 13,500 feet. So there is a difference of 5,500 feet of pipe between the two. On the same note of 26th February, you say: " With regard to No. 3 tender, I have no details of Lobnitz's tender, nor is any time for delivery given; but I do not in any case see the necessity for two dredgers, and I recommend that Simons' tender be accepted "?

A.—Yes.

Q.—At that time did you know the amount of Simons' tender?

A.—Yes, certainly.

Q.—What was it?

A.—£451,000.

Q.—That was September. The Lobnitz tender is February?

A.—Yes, and Simons' firm offer terminated in March, I think.

Q.—Their firm offer was September. It was subsequently extended for three months on an additional allowance of 10 per cent.?

A.—Yes.

Q.—Therefore the price would not be £458,000? It would be 10 per cent. on top of that, would it not?

A.—Well, take it so.

Q.—That would only take you up to December. As you know, and as we all know, prices then were bounding upwards?

A.—They were, yes.

Q.—My suggestion to you is that on 26th February, 1920, when you recommended the acceptance of Simons' tender, you did not know the amount of their tender, nor did you know what Lobnitz were offering? As a matter of fact, Lobnitz were offering a totally different machine, or set of machines, from those quoted by Simons. Lobnitz's tender was for two dredgers capable of pumping 19,000 feet, each of the dredgers being capable of forcing 8,000 feet—19,500 feet in all. Therefore I want to see on what ground you recommended the Bombay Government to accept Simons' tender, which was totally different from Lobnitz's, and which you did not know how much it was?

A.—I would not like to say I did not know how much it was. In September they quoted that, and there was a three months' extension.

Q.—Not in September?

A.—The firm offer lasted until March.

Sir Frederick Hopkinson.—Can you refer me to that document?

Chairman.—I am looking for that. Would you turn to page 18 of your report? It says: " If ordered within three months from this date we will have the dredger ready for trials on the Clyde ". That might be construed as being an offer to remain in existence for three months. Is there any other passage there with regard to the extension of that up to March?

A.—I feel quite certain it was extended up to March.

Q.—I think you are right about that, but when it was, and how it was, we do not know. As I say, I think you are right about that, because there is a letter of yours in which you mention the fact that there had been an extension to March, but whether there was on this date to which Sir Frederick Hopkinson is referring, is a matter which at present is not clear.

A.—I feel confident that at that time the firm offer went on to March, because naturally we wanted to take advantage of a firm offer of that description.

Sir Frederick Hopkinson.—But was not that subsequently altered by a letter in which they said they would require 10 per cent. extra?

A.—Yes, but even 10 per cent. extra at that time would have been a great bargain. Here is a letter. This all took place when I was in India. The three months was up in December. We wrote in London and asked them if they would keep the tender open.

We knew it was a favourable tender, and they said that they would keep it open for three months for 10 per cent. That is the 11th December. It was March.

Q.—How did you know it was a favourable tender?

A.—Well, we have a modicum of common sense, and Mr. Meik looked into it very carefully, and I still say it was a very favourable tender.

Q.—Had you any competitive prices?

A.—We had Lobnitz's.

Q.—No, no. This is before Lobnitz's case is seen at all. You say it was a favourable price in September, I am asking you the authority for that—any time from September to December?

A.—This was an estimate. Before we accepted this estimate we took in tenders.

Q.—No, no. That is not my question at all. You said just now that you knew it was a favourable price. I want to ask you why you considered it a favourable price?

A.—We knew it was a favourable price when we recommended——

Q.—No, no; that is going into next year. I am speaking of some time between September and December. How did you know it was a favourable price without competitive quotations?

A.—When did we recommend that it should be accepted?

Q.—February; but I am going on the statement you made just now. You said that before December you knew it was a favourable tender?

A.—I did not say that.

Q.—Yes, you did.

A.—Well, look here, let us get it plain. We took in this estimate as an ordinary estimate. We took an estimate from Simons for a dredger in the ordinary way in which engineers do every day of their lives. It was not binding; it was not an acceptance. It was an ordinary estimate. Before we recommended this tender for acceptance we took in prices from other dredger builders. When we had got the prices from the other dredger builders, Mr. Meik, who is now dead, cabled me out his opinion and the results. He did the whole of the work in taking out the tenders, and when we had got the tenders it was then that we recommended Simons. We did not recommend the acceptance of Simons's tender before.

Q.—Can you give us a copy of that cable which Mr. Meik sent out to you?

A.—I do not know.

Q.—Because it does not appear in any of the documents we have got. According to Mr. Mackie this is a note made by you on the 26th February, "No. 1 declined to tender." That is Ferguson Brothers?

A.—Yes.

Q.—"No. 2 wished for a great deal of information which was not available." I say that that was absolutely essential information and was given to the other tenderers. "I received a cable yesterday from my firm about No. 3"—that is Lobnitz—as follows: "Lobnitz tender of £840,000 for two complete dredgers each of 2,000 cubic yards capacity and pipeline, one dredger being used for intermediate station." Is that the whole of the information which you had from your office in London?

A.—If that is the cable, yes, I suppose it is.

Q.—There is nothing there about telling you what Lobnitz had quoted for, except that they quoted for two dredgers?

A.—Yes.

Q.—Before we go away from that I want an answer to my earlier question. You said just now that in December you knew Simons's was a favourable tender. I want to know how you arrived at that?

A.—I take that back. I say that we did nothing until we had taken in tenders.

Q.—Then that is withdrawn. The point is this——

A.—I see the point.

Q.— —that the tender of Simons's of 1919 was about four times the price of the "Kalu," and one is very nearly as big as the other.

A.—I am perfectly aware of that. Later on the matter was taken out of my hands. It went to the India Office. I actually did not know what price had been arranged for the dredger until it was all settled, and then the India Office wrote me a note saying, "We have arranged this and that and the other."

Q.—You could have no possible idea of what the dredger was going to cost? Surely the India Office and the Director-General of Stores would not accept a quotation for dredgers costing three quarters of a million without consulting you, would they?

A.—Yes, they did.

Q.—Another wonderful method of doing business, is it not? There is a letter from Messrs. Meik & Buchanan saying they cannot answer Fleming & Ferguson's question

about the quantity of material to be dredged, but they are sending a copy to you in India. Can you give me any idea why they could not answer that question, seeing that they had told the other people?

A.—I absolutely cannot tell you at this time.

Q.—It seems an extraordinary thing.

A.—It took place in 1919, and it was all done by Mr. Meik. If we could resuscitate Mr. Meik from the grave we could get a lot of information.

Q.—I suggest to you it is an extraordinary letter to write—that they could not tell Fleming & Ferguson what the dredger was expected to do on 23rd January, 1920. Now apparently the only information you had in Bombay on 26th February, 1920, was that cable from your firm in London?

A.—Yes.

Q.—They did not tell you there that Lobnitz's dredgers were 3,750 h.p. each, did they?

A.—No.

Q.—They did not tell you that Lobnitz's price included 19,000 feet of pipe? They did not tell you that Lobnitz's provided for double stage pumps, two engines on each boat, and that their pumps would deliver to 8,000 feet. They did not tell you any of that information?

A.—They did not tell me any of that. There was a memorandum made by Mr. Meik which came out at a later date.

Q.—That was after it was settled?

A.—Yes. I suppose it was after it was settled, but I still think that if we could have got Simons's tender accepted before the end of March it was an extraordinarily good offer indeed. If their tender had been accepted, even with it carried on for three months, they would probably have lost a great deal of money.

Q.—Actually their price was about £260,000, was it not, and of that they returned part to the Bombay Government, so there is very little difference between that and their price of September?

A.—There is a good deal of difference.

Q.—Their price in September was £249,000, and the cost price was £268,000, I think. That is about 10 per cent.?

A.—It is £182,000.

Q.—What, the dredger?

A.—The price in September for the dredger was £182,000—page 17.

Q.—£182,000 plus £17,000; that is £200,000?

A.—If I may say so, these questions about the increase in price of the dredger might very well have been addressed to Sir John Biles.

Q.—He had nothing to do with placing the order, with advising the Government of Bombay to accept the tender?

A.—I am talking of a later date when the firm offer of Simons had run out. When the time had run out, and we could not get the plant for that amount, it was then put into the hands of the India Office and Sir John Biles, and I take it that Sir John Biles had certainly been consulted about the price.

Sir Frederick Hopkinson.—We have no evidence that he was.

Chairman.—He has not said anything about that.

Sir M. Visvesvaraya.—He referred us to Sir George Buchanan.

Sir Frederick Hopkinson.—Before recommending the rejection of Lobnitz's tender in February, 1920, why did not you ask Simons what their price was in February, because, as you state, and as all we know, prices were bounding up at that time?

A.—We had got in prices in February.

Q.— No; you had only their price five months earlier?

A.—Yes, and we got their price in February. Their time did not run out till March.

Q.—Yes, their time ran out on December 11th?

A.—No, we got the extension.

Q.—Yes, for three months. We have no reference to that.

A.—I have just given the Chairman a letter.

Q.—That is to December?

A.—That is to March.

Chairman.—The letter is the 11th December, signed by Mr. MacMurray and extending the three months' time limit on an increase of 10 per cent.

A.—To March.

Q.—So that on an increase of 10 per cent. there was the option up to March, 1920?

A.—That was it, yes.

Sir Frederick Hopkinson.—Had you gone into the figures at all carefully you would have found that Lobnitz's tender was an actually cheaper tender per horse power than Simons' tender. Including the two dredgers and the 19,000 feet of pipe Lobnitz's price was £112 per horse power. Simons' price, as paid, and including 18,000 feet of pipe-line was £129 per horse power. If you take the dredgers alone without the pipe-line, Simons' price was £88 10s. 0d. per horse power, whereas Lobnitz's was £83 10s. 0d. per horse power with an effective radius of 8,000 feet, and had those two dredgers been there it looks as if none of this trouble would have arisen?

A.—Well, I have not got the figures.

Q.—I have worked them out from the actual prices paid and the estimates given?

A.—Very well. All I have to say is that in perfect good faith we recommended Messrs. Simons' tender.

Q.—I am not suggesting anything against your good faith?

A.—I see I have a note here " I have never seen the contract for dredger "—that is the " Sir George Lloyd "—" and I do not think I knew the total cost plus freights until long after the dredger had arrived at Bombay, and then I had to ask specially for information."

Sir Frederick Hopkinson.—I suggest you ought to have known that—that you could not properly fulfil you duties until you did have that information. How could you supervise it if you did not know what the dredgers were going to cost?

Chairman.—You say that Sir John Biles, as the consulting naval architect, made the final financial arrangements?

Sir Frederick Hopkinson.—No, I think not. I think Sir John Biles had nothing whatever to do with it.

Chairman.—That is what Sir George states.

Witness.—I only make the suggestion. I do not say it was the fact.

Sir Frederick Hopkinson.—We have no evidence that he had anything whatever to do with the financial arrangements.

Chairman.— At all events, Sir George, let us get it right. You say that you did not finally settle, on behalf of the Bombay Government, the price that should be paid for the dredger?

A.—Certainly not.

Q.—Then leave it at that. Never mind who else did it; you did not do it?

A.—I did not do it.

Q.—Nor your firm.

A.—Nor my firm.

Chairman.—Then leave it in that way.

Sir Frederick Hopkinson.—While I am on the question of dredging, there are one or two things I would like to clear up. We have been told that you had weekly reports of the dredging done and the position of the dredgers. Is that true?

A.—Yes, there were weekly reports.

Q.—And the chief engineer, Mr. Elgee, has stated that the scale of bonus which was laid down by you personally made no marked difference in the output?

A.—My recollection is that they did not give the bonus on the lines that we recommended.

Q.—That is Mr. Elgee's statement?

A.—We have no record, but there is correspondence on the subject of the bonus. They proposed a bonus in a certain way, and we protested. We said, " That is not the way to arrange the bonus."

Q.—With regard to the dredger trials, did you attend them?

A.—I did not.

Q.—Did you have your representative there?

A.—Mr. Meik was there personally.

Q.—Did you ever examine the results?

A.—I must have examined them. I did not examine them critically I suppose. After all, Sir John Biles was there, and Mr. Meik.

Q.—Of course the tests were not carried out under anything approaching working conditions, and they have been described as valueless. They gave a percentage of 39 to 41, solid matter, which, as we all know, is absurd, is it not?

A.—I was not present, as I say.

Q.—Your firm were represented there, and you accepted the dredgers, of course in conjunction with Sir John Biles, because, after all, your firm and Sir John Biles were in double harness in the matter. You accepted them?

A.—Sir John Biles was the naval architect and naturally was skilled in these matters.

Q.—But you had equal responsibilitites?

A.—I do not say equal responsibilities. Sir John Biles was the naval architect. We are not naval architects.

Q.—I suggest, further, that Sir John Biles had very little to do with the design of the dredger—that the dredger was designed before September, 1919, in all essential particulars. He may have made slight alterations, but the dredger was designed before you got the price of September, 1919; and it is really Simons' design. It is almost a copy of the "Kalu." The framing is identical. There is really very little designing about it by anybody— that is, original designing?

A.—Well, Sir John Biles might be asked about that.

Q.—You have recognised and your firm have recognised and it has been spoken of over and over again throughout the documents that the dredging is the absolute crux of the whole scheme?

A.—Yes.

Q.—That is so, is it not?

A.—That is so.

Q.—I want to ask you whether you did not think it personally encumbent upon you to be absolutely sure that the trials were certain to ensure success, and that they should have been carried out in the same conditions as they would have to work under in Bombay, including material?

A.—I was quite satisfied with the trials as carried out by Sir John Biles and Mr. Meik.

Q.—But the material in which the dredger was tried is nothing like the Bombay material. It was only passed through the ship, and not delivered 5,000 feet. Those conditions could have been reproduced on the Clyde had it been decided to do so.

A.—We are still going on the assumption that the dredger cannot do the work?

Q.—We are going on the assumption that the dredger never has done the work. It has had three years to prove it.

A.—Then we are going round the old circle that it has not done the work because of the human element.

Q.—I am coming back to my old view, namely, that as you had arranged for the dredger to do 2,000 yards an hour you ought to have stayed on that dredger until you had proved absolutely that it could, or could not, do it.

A.—And I say I am not a dredger master and I have never had any experience in handling dredgers.

Q.—But you are responsible for it?

A.—I am not a dredger master.

Sir Frederick Hopkinson.—But you are responsible for the work of the dredger.

Chairman.—I suppose you would say, Sir George Buchanan, that it having been agreed that there was to be a Clyde test, that the test was carried out on the Clyde with the known material at the bottom of the Clyde, whatever it was, and that it was carried out in accordance with the usual practice?

A.—Yes.

Q.—It may not be a good practice, or it may be a good practice, but the contract being for a Clyde test, the way in which you would put it I suppose is that the test was made in accordance with the ordinary conditions prevailing on the Clyde?

Sir Frederick Hopkinson.—Yes, so far as material is concerned, but not so far as length of delivery is concerned.

Chairman.—Then we get into the other point—whether when you are talking about a Clyde test, in practice they ever put 5,000 feet of pipeline on the Clyde on to the dredger?

A.—No.

Sir Frederick Hopkinson.—But the conditions can be reproduced in another way.

A.—I have had experience in dredging propositions, although I am not a dredging master, and I have been collecting some figures of cost of dredging, which I should like to have an opportunity of putting before you.

Chairman.—You certainly shall have that opportunity. Would you like to do it now?

Sir Frederick Hopkinson.—That is not quite finishing the point. The point is that the ordinary working conditions were not complied with at the trials on the Clyde. It did not pump to any distance at all, and therefore any result they got was valueless.

A.—Well, as the Chairman has said, it was done in accordance with the usage on the Clyde.

Q.—No, no. The usage, so far as the material is concerned, but not so far as the distance is concerned. If you specify for a dredger to deliver 5,000 feet it is a totally different machine from one to deliver into a hopper barge?

A.—Yes.

Q.—The conditions are entirely different.

A.—You could not put 5,000 feet of pipeline out in the Clyde.

Q.—You could put a vertical pipe and reproduce the condition, or you could have put out the 5,000 feet. There is plenty of room on the Clyde?

A.—This is not the only pipeline dredger that has ever been built, and in regard to the numerous dredgers which are built on the Clyde, I take it that the same tests prevail.

Q.—But do not you see that a dredger to deliver into a hopper barge is a totally different machine from one to deliver 5,000 feet, and the tests of the two boats would be entirely different?

A.—Yes. May I respectfully suggest that these questions might appropriately have been put to Mr. MacMurray? I do not know whether they were or not.

Sir Frederick Hopkinson.—We put plenty of questions to him.

Chairman.—This point was put to him, and Mr. MacMurray said it would not have been practicable to have put 5,000 feet of pipe-line on the Clyde, and it was not done.

Witness.—And Sir John Biles?

Chairman.—Sir John Biles's evidence undoubtedly suggests that this trial was carried out in the ordinary way in which trials are carried out on the Clyde.

Sir Frederick Hopkinson.—I want you to realise the difference. A dredger may be designed to pump into a boat alongside, and therefore has not got the extra power required to force it 5,000 feet in a pipe. Therefore it is a totally different thing.

Chairman.—I am only on the difficulty of a contract which specifies trials on the Clyde. Once you have bound yourself to a trial on the Clyde——

Sir Frederick Hopkinson.—You are bound to that material.

Chairman.—You are certainly bound to the Clyde material.

Witness.—Yes, and further I think you are bound, if there is anything like general usage, to have your trial in accordance with that usage.

Sir Frederick Hopkinson.—No. If you specify that it is to deliver 5,000 feet, you cannot say it has fulfilled its trial until it has delivered 5,000 feet.

Chairman.—Or the equivalent as calculated in trials on the Clyde?

Sir Frederick Hopkinson.—That is right.

Chairman.—You and I are not disagreeing on these matters but it is a little out of Sir George Buchanan's range.

Witness.—This is not the first suction pipeline dredger that Simons have built. They have built dozens of dredgers. Either they know their business or they do not.

Sir Frederick Hopkinson.—Was it not their business to get it passed? Was not that their principal business at this time?

A.—No.

Q.—I should say that they did understand their business well?

A.—I do not agree with you because a firm of Simons' standing obviously would not be so short-sighted as to want to get a bad tool passed.

Q.—Well, I would rather not go into that. The fact is that they got it passed without a test of pumping 5,000 feet. Now, in your original report you spoke of having a pontoon for the second station?

A.—Yes.

Q.—Why was that changed to the " Colaba "?

A.—It was changed to the " Colaba " because the electrical people in Bombay, after telling us that we could have electrical power, said we could not, as far as I remember.

Q.—But could not you put a steam plant on a pontoon equally well?

A.—Could we not have put a steam plant on a pontoon?

Chairman.—That is the question.

Sir Frederick Hopkinson.—There is no difficulty about it, is there?

A.—I canont remember now all the points, but I do remember that the intermediate stage dredger was gone into very carefully by Sir John Biles. I think I have got a letter somewhere to that effect.

Q.—The point I want to get at is why did you have a sea-going ship with twin screw propelling engines for your second ship, when all she had to do was to take up her

station on the first day of the season and go back into dock at the end of the season? I suggest it was an unnecessary extravagance?

A.—Well, I should like you to have asked Sir John Biles about that.

Q.—We did?

A.—What did he say?

Q.—You had better read it up in the evidence. I am asking you because I take it that you were chief engineer to the whole scheme, and that nothing of that kind would have been done without consulting you?

A.—As far as I remember I was not consulted at all on that point. As I say the thing was taken over by the India Office. I was consulted on certain special points. They asked me about the details, but I did not give a specific opinion about this, as far as I can remember.

Q.—Can you enlighten us at all about the reason for the great vibration on the "Colaba"?

A.—No. I confess that that is not a matter on which I can give you any information at all. Even Sir John Biles, who is, I suppose, one of the greatest naval architects, said a great deal about it, but I am not a naval architect and I cannot tell you anything about the vibration.

Q.—On the other hand, there is nothing new in a dredger of this kind. There must have been dozens of them built before I should say?

A.—I think Sir John Biles said it had something to do with the working out there. Did you examine Sir John Biles on the subject?

Chairman.—Yes.

Sir Frederick Hopkinson.—But the working out there is simply starting the engine. I do not see how it can be possibly put on the people out there?

A.—At all events, I am sorry. I do not know anything about the vibration.

Chairman.—Sir John Biles seemed to think it was the unevenness of the load, but unevenness of load must happen on every occasion when you are pumping. The question really is whether the "Colaba" was sufficiently structurally stiff.

Sir Frederick Hopkinson.—And moreover whether, if the "Colaba" had been properly tried in this country under the conditions prevailing in Bombay, its structural weakness would not have been found out at the trials; but as far as I can see the trials of the "Colaba" were even more perfunctory than those of the "Sir George Lloyd."

Witness.—Well, I was not present at the trials either of the "Colaba" or the "Sir George Lloyd" and, as I say, I believe there were a number of different opinions about the vibration.

Q.—Whilst on the subject of dredging, can you tell me who decided to send out the dredging crews—who decided that question?

A.—So far as I can remember it was decided in Bombay.

Q.—No, who decided in this country to send them out—who selected the men?

A.—The High Commissioner.

Q.—Advised by you?

A.—With the Board.

Q.—Therefore you would know every man who was sent out to Bombay?

A.—I would not know him personally.

Q.—You would know of every man who was sent out to take charge to work the dredgers?

A.—Certainly, I think we should.

Q.—Consequently you would know as to whether a single or a double or a treble crew had been sent out?

A.—Yes.

Q.—For working single, double or treble shifts?

A.—Yes.

Sir Frederick Hopkinson.—Therefore you would be fully advised in London as to how it was proposed and intended to work the dredgers?

Sir H. Courthope-Munroe.—Do you accept that statement, Sir George?

A.—I accept the statement that we advised.

Chairman.—No, no—that you would know whether one crew or two crews or three crews were being engaged. That is the only question?

A.—I suppose yes, we should know.

Chairman.—The answer to that must be yes.

A.—I do not know that the answer to that question must be yes, because there were a number of men who were engaged in Bombay.

Sir Frederick Hopkinson.—Not dredging masters?
A.—Not dredging masters.

Q.—The subordinates, but not the dredging masters?
A.—Not the actual dredging masters.

Q.—Or the chief engineers?
A.—Or the chief engineers.

Q.—Coming back to another subject, namely, the dredging programme, I have read through all the programmes, and I want to ask you if you can explain some things which appear to me to be very extraordinary. For instance, the first programme of dredging was made on April 25th, 1921, in a letter from you or your firm to Bombay. That is in document 11, page 5. Have you got that?
A.—No, I have not got it.

Chairman.—Let me give you my copy (handing same to witness).

Sir H. Courthope-Munroe.—What document is that, Sir?

Chairman.—It is the big volume of correspondence.

Sir Frederick Hopkinson.—I want you carefully to note the date. It is 25th April, 1921, which was before the dredgers arrived in Bombay?
A.—Yes.

Q.—The programme had apparently been considered, and this was sent out in advance of the dredgers. It says: "In December, 1922, or January, 1923, the 'Sir George Lloyd' alone was to fill up section 1 through pipe-line No. 1, 715,000 cube yards, or one month's dredging. The 'Colaba' therefore was not required"

Chairman.—You might point out that section 1, which has been referred to, is now known as Block 8.

Sir Frederick Hopkinson.—Yes, the small portion at the southern end. Then it jumps to October, 1923—"The dredger to work in area C through pipe-line No. 2 from Arthur Basin, as the length to Marine Lines is very long." That is, it had 10,000 feet of delivery pipe on the harbour side. Then it goes on to say that the "Sir George Lloyd," the "Colaba," and the "Kalu" were to work together. That is presumably on the harbour side?
A.—Yes.

Q.—Can you tell me how that was to be done, and why you wanted three on the harbour side when the distance was only about 5,000 feet, and you had 10,000 feet on the other side?
A.—Really, Sir Frederick, I cannot go into this. This is a suggested programme made in 1921.

Q.—But I want to see why the "Kalu" is introduced into this, because there was no more to be done at this time than was originally contemplated?
A.—Well, I cannot answer these questions. This is a proposed programme of operations, subject to discussion. There it is.

Q.—But this is a programme given by you, the Chief Engineer of the works, to be carried out. I want to know why you want three dredgers on the harbour side?
A.—"The following is the proposed programme of operations."

Q.—You suggest that the "Kalu" should begin work in October, 1923, but actually she was not fit to work until July, 1924?
A.—No, for a very excellent reason.

Q.—That she had not been repaired?
A.—That she had not been repaired.

Q.—Did not you know this when you made this programme of April, 1921?
A.—That the "Kalu" had not been repaired?

Q.—Yes?
A.—I take it that I supposed that the "Kalu" would be in working order by that time. I had nothing to do with the repairs of the "Kalu."

Q.—Did not you do anything to make sure that she would be in working order at the time?
A.—I had nothing to do with the "Kalu." I do not even know what the repairs cost. I had no hand in the surveys. There is a letter on record, I remember, in which I wrote to the Director of Development impressing upon him to speed up with any repairs necessary to the "Kalu."

Q.—I think that was towards the end of 1923. I am speaking of a programme made in April, 1921. You are sending out a programme for a machine to work which could not possibly work?

A.—I do not see why I should assume that the " Kalu " required all these repairs. We sent out, to the best of our ability, a programme of operations for consideration. As a matter of fact, that programme was not carried out at all. We sent out programmes, but we had no power to carry out those programmes. We sent out suggestions. We were full of suggestions, but we had no power to tell the Chief Engineer to hurry up with the repairs to the " Kalu," or to do this, or to do that.

Q.—My suggestion is that it was never necessary or desirable to put three dredgers working in series on the harbour side? There was no room for them to work. They could not work there.

A.—I should not like to agree or disagree with you without consideration. As I say, it is a very long time ago. As a matter of fact, this programme was not carried out.

Sir Frederick Hopkinson.—I am afraid that applies to practically all the programmes.

Chairman.—Can you, even now, looking at the map in front of you, suggest how those three could have been worked conveniently and economically together? Does it occur to you now how it could be done? We have all the plans and everything here?

A.—I could not say off-hand, Mr. Chairman, but if I went to my office I could produce a plan showing the three working. As a matter of fact, it never materialised.

Sir Frederick Hopkinson.—There was no alteration between then, 1921 and 1919. The work remained the same, and in 1919 the work was to be done by two boats. It is only more or less of an accident that you have the " Kalu " there. She is not a part of your operations for completing the work in six years?

A.—No.

Q.—Then it goes on to say that you hope to finish section 2 in one season—5,700,000 cubic yards. Of course, we know she never did more than one-fifth of that.

A.—Well, it was a very good thing to be optimistic, and to express a hope.

Q.—You think it was?

A.—I do.

Q.—Then in October, 1924, there is another programme, area No. 3, to be begun. Area No. 3 is the Marine Lines end. That was to be begun from H.J. and K.—that is here? (*indicating on map.*)

A.—Yes.

Q.—We know it was physically impossible to do that?

A.—You see, all these programmes were altered when the Development Directorate discovered, as they thought they had, the material in Back Bay itself.

Q.—But this is October, 1924?

A.—Yes, October, 1924. This is the suggested programme made in 1921.

Q.—No, this is a new programme made in October, 1924.

A.—I have not got that. What page is that?

Q.—It follows on in that book.

A.—Yes, it is all under the same letter of the 25th April, 1921.

Sir Frederick Hopkinson.—No, this is October, 1924.

Chairman.—Will you turn back to page 5. It is a forecast looking ahead from 1921 onwards?

A.—Yes. In 1921 one makes a suggested programme for five years' work, but in a work of this magnitude questions arise every few months. You must have something to start upon.

Sir Frederick Hopkinson.—There, again, your optimism is just as strong as ever. You are going to do 6,387,000 in one season of 1924-25 and a portion of 1925-26?

A.—Yes.

Q.—Section 4 was 3,500 feet away from the end of the pipe. Then we come to the programme of 3rd May, 1923, in which the " Kalu " and the " Colaba " are to be working together in Back Bay?

A.—Yes.

Q.—And the " Sir George Lloyd " alone in the harbour?

A.—Yes.

Q.—Was anything done to prepare for the " Colaba " working in Back Bay?

A.—Which page is that?

Q.—That is 3rd May, 1923, page 84. The third paragraph in the letter says: " With regard to the general dredging programme, we have prepared a scheme on the assumption that an effort will be made to put both dredgers in commission after the coming south-west monsoon." That would be December, 1923?

A.—Yes.

Q.—They were only to make an effort to get them ready?

A.—Well, if you ask people to make an effort——

Q.—This is on the assumption that an effort will be made. Where was the " Colaba " to work, and how was she to work, because so far we have only had a reference to a hole being dug to float the " Kalu "? Will you turn to page 100. This is the 3rd November, 1923. You write to the Director of Development and you say in the first paragraph : " It appears to us that it will assist the administration to have before them even a tentative programme of operations ".

A.—Yes.

Q.—So that, as far as we have got at that time, it is a tentative programme?

A.—Yes.

Q.—On page 101 you say that it will be possible to complete the dredging in the year 1926-27?

A.—Yes.

Q.—I want to suggest to you that these programmes are absolutely futile and have no solid foundation of any kind whatever. Then on page 101 is the first statement about the " Kalu ". This is the 3rd November, 1923. " I also recommend that very early action be taken in putting the dredger " Kalu " into working order and arrange for any additional pipeline and a terminal pontoon, if such are required."

A.—Yes.

Q.—That is the beginning of that season, November, and therefore nothing whatever could have been done by the " Kalu," nor could you have had those additional pipelines until the end of the season, and that is throwing it all forward to 1924?

A.—Where is that?

Chairman.—That is Page 101, the last paragraph but one : " I also recommend that very early action be taken in putting the dredger ' Kalu ' into working order." She was bought in November, 1919, was she not? " And arrange for any additional pipeline and a terminal pontoon if such are required." Sir Frederick's question is : Having regard to the fact that that letter was written in November, 1923, did not that mean that the " Kalu " must have been out of commission the whole of that season—November to March or May; and also could not do any more work until the following October or November, 1924? That seems to be so, does it not?

A.—Yes. It states in this letter : " I recommend that very early action be taken in putting the dredger ' Kalu ' into working order." That is not to say that I for my part had forgotten the existence of the " Kalu "; it does not mean to say that every year I was out there I had not spoken about the " Kalu."

Sir Frederick Hopkinson.—But had you?

A.—Yes, I had.

Q.—Well, there is no suggestion here that they have not been carrying out your wishes. It comes as a new thing. " I also recommend "—as if it were something fresh.

A.—I do very distinctly remember that I was constantly pressing upon them to do something to the " Kalu ".

Q.—Did they ever give a reason why they did not do it?

A.—No. The reason was that Mr. Lewis did not seem inclined to do it.

Sir Frederick Hopkinson.—Now I want you to look at the bottom of Page 103 where Mr. Lewis makes a statement. I do not know to whom it is made; it is simply dated 21st November, 1923.

Chairman.—It is evidently a memorandum to the Director of Development.

Sir Frederick Hopkinson.—He says : " I would point out that we are by no means sure that the filling from the harbour is going to be of use as a means of reclaiming the area ". Surely that was a very alarming statement, was it not, made in November, 1923, as to whether the whole scheme was not going to be valueless as originally proposed?

A.—This is a note, I think, to the Director of Development. I saw it for the first time the other day. I do not think I have seen it before. We are back on the old subject which I emphasised in my statement, that Mr. Lewis got very pessimistic about the drying out qualities of the material in the harbour. This is November, 1923, and it was about this time——

Q.—Just before the dredger was to start?

A.—Yes.

Q.—My question is, is not that a very disturbing statement to make at this period?

A.—Yes, if you do not know all the circumstances.

Q.—But even if you do know all the circumstances, it is disturbing as a statement from the chief engineer—a man who was responsible out there for the carrying on of the work. He did not know that the material, which you had spent three-quarters of a million in providing dredging plant for, was going to be any use for the purpose intended?

A.—I think you examined Mr. Lewis about this, did you not?

Chairman.—It must be disturbing one way or the other. It is extremely disturbing if Mr. Lewis is right that the material is unsuitable, and it is extremely disturbing if Mr. Lewis is wrong, because he is your chief engineer. It is disturbing either way?

A.—Yes.

Sir H. Courthope-Munroe.—Might I suggest that he was " the " chief engineer and not " your " chief engineer?

Chairman.—The chief engineer.

Sir Frederick Hopkinson.—He was the resident engineer, and his title was altered.

Sir H. Courthope-Munroe.—But it is " the " and not " your ".

Sir Frederick Hopkinson.—He was the resident engineer and then his title was altered, but his work was not altered?

A.—Mr. Lewis was obsessed with the idea, as I have already said in my statement that he could get the whole of the material from Back Bay.

Sir Frederick Hopkinson.—He has given a specific quantity. He said he found 24,000,000 or 25,000,000 yards, did he not?

A.—Yes, and at Page 106 of my statement I quote a letter to Sir Lawless Hepper in which I say : " In the matter of dredging it seems to me that for some reason of his own Lewis has made up his mind to delay operations as long as possible and to begin reclamation at Marine Lines instead of at Colaba." Later on we had to protest and say that we could not agree with his proposal that the whole of the material should be obtained from Back Bay. It was a complete reversal of the whole programme. He was obsessed with that idea.

Q.—But having seen that mud here in this room, do not you think there is something to be said for Mr. Lewis' point of view? Was not it sufficient to disturb him to think that that was the material he was going to get for making a reclamation which was to be finished and developed in 1928? Do not you think he was justified in fearing that it could not possibly be done?

A.—Subsequent to his writing on that date he got a lot of that identical mud and put it into an enclosed area, and it did dry out, and he was very pleased with it.

Q.—You remember when I asked you the question as to whether you had known that was the kind of material before you advised the Bombay Government, you hesitated a good deal before you said it would not alter your opinion—and I think very properly so, too, if I may say so. I cannot conceive much worse material for reclamation purposes?

A.—Yet we can produce examples from different parts of the world where quite as bad material has been used.

Q.—A great deal depends on what you are going to use the reclamation for. If you are going to make streets and to build houses on it, I should think you could not have anything possibly worse?

A.—The advantage of that reclamation is that the foundation is all rock.

Q.—Yes, when you get down to it?

A.—Yes, when you get down to it.

Q.—But you have got to get down to it?

A.—Yes, you have got to get down to it.

Q.—Besides, you do not know that it is all rock anywhere near the surface, any short distance from the shore. There are no borings or anything to show that. On page 104 Mr. Lewis was equally confident that the dredging was going to be finished by 1927. He is still going on that arithmetical computation of yours, that the dredger was going to work so many days a year and so much an hour, and therefore it would do 5,000,000 cubic yards in a year. He goes on to say : " This will be incorrect probably as to area (7) and would have to be altered as experience is gained; but it is as accurate as any other forecasts."

A.—Yes.

Q.—I think Mr. Lewis did see occasionally. Then on page 114, in May, 1924, Mr. Lewis is writing for a lot more plant for the dredging programme?

A.—Yes.

Q.—He suggests the purchase of the " Jinga " because it had got a bad hull. So far as I can understand, he proposed to take the engines out of the " Jinga," scrap the hull, and put them on a pontoon, or something of that kind?

A.—Yes.

Q.—And buy a barge for an independent pumping station. This makes four dredgers against two contemplated in 1919?

A.—Yes; but might I just make a remark? I would like to point out that there are a number of comments to make, especially on this one dated the 10th December, 1923.

Chairman.—What is the page?

A.—104. I should like it noted there that the chief engineer corresponded freely with his chief, the Director of Development, as he should do; but we never saw any of this correspondence. Perhaps there is no reason why we should. He was the chief engineer and the Director of Development was his chief; but we never had any copies of this correspondence sent to us.

Sir Frederick Hopkinson.—On 7th May, 1924, we come to another dredging programme of yours in which you propose that the " Kalu " and the " Colaba " work together in Back Bay, and the " Lloyd " works alone in the harbour. That means that the " Lloyd," working alone, could only reach 5,000 feet from the point where dredging was taken until its final point in the reclamation. Therefore its work would be very limited?

A.—Yes.

Q.—Then you come to another one on page 117, on 5th June, 1924, whereby the " Kalu " was to dredge flotation in Back Bay, and on page 118, the " Kalu," the " Colaba," and the " Lloyd " were to do long-distance pumping. I cannot reconcile the two at all.

A.—These were all different programmes got out to assist the Development Directorate as the situation developed.

Q.—Then on the same page, 118, there is a suggestion from your firm of an entirely new development, namely, that of an electrical pump. Where was that to be put? This on the 2nd May, 1924.

A.—Yes.

Q.—If you were going in for a new electrical pump, that would have meant you could not have used it for 18 months. That is taking you into December, 1925. Could you tell us what the electric pump was for?

A.—Why do you say that?

Q.—A big thing like that cannot be bought off a shelf. You have got to get it made. They do not exist.

A.—We suggested that he should investigate the possibility.

Q.—What is it for? What has it to do? Where is it to work?

A.—It was on the supposition, according to all these borings, that there was all this material in Back Bay.

Q.—Where was this to work? Was it for Back Bay, or was it for the harbour?

A.—Obviously, to work in Back Bay.

Q.—The electrical pump?

A.—Obviously.

Q.—Where was it going to be put?

A.—Obviously, it was to be used in conjuction with the " Kalu " in Back Bay on the supposition that there was all this wonderful material there.

Sir Frederick Hopkinson.—But there is nothing to suggest that it was going to work with the " Kalu " at all.

Chairman.—I think, if you look at it, it says: " We agree with you that for use with the ' Kalu ' a second intermediate pumping station is desirable." That is what was being discussed?

A.—That is what was being discussed.

Q.—It had been mentioned before, and Mr. Levis had put forward the purchase of the " Jinga " : " We note your remarks as to the proposed purchase of the ' Jinga.' " That would be as a second intermediate station, would not it?

A.—Yes.

Q.—" But we suggest that before taking any action in this respect you should investigate the possibility of using an electrically working pump." That was the alternative to buying the " Jinga "?

A.—Yes; that was the suggestion. I see that on the 12th June, 1924, again trying to keep a curb on the expenditure, I wrote to Sir Lawless Hepper and said: " I may say we have given the whole subject prolonged consideration, and we cannot understand why Brims requires the enormous quantities of pipes for which he has indented."

Q.—Is that in the print?

A.—No; this is a letter of which I do not think you have a copy.

Q.—There is a letter very similar to it at pages 126 and 127.

A.—Yes. In the same letter I say: " The diagram showing the method of filling the military area sent us by the letter dated the 28th April, 1924, is to us quite inexplicable."

Sir Frederick Hopkinson.—Whereabouts is that?

A.—That is a letter which is not in the book of correspondence. It is really a question of one party making orders and having no power to tell the other party what they are to do.

Q.—This is just a casual remark about the electric pump. Then there is another letter which follows suggesting that you are going to generate your own electricity by Diesel engines. That is another new phase. That is page 130: "We are disposed to think that if you cannot get electricity from the Tata Supply Company it will be quite worth while to have a small electrical installation of your own worked by Diesel or semi-Diesel engines." There we are getting to July, 1924. That could not possibly be available until October or November, 1925.

A.—I would not say that; but that, again, is a suggestion for them to consider. We did not dictate.

Chairman.—At page 127 you say: "In any case, you will not require the second intermediate pumping station for the coming season's work."—

A.—Yes.

Chairman.—So that you did not recognise this plant could not be got out until, as Sir Frederick Hopkinson says, October, 1926?

Sir Frederick Hopkinson.—To continue the correspondence: at the bottom of page 130 you telegraphed to them that you are "anxious about dredging. Have you made arrangements regarding engagement of complete staff for working double shift on all dredgers?"

A.—Yes.

Q.—You knew exactly what arrangements had been made because you had sent all the men out from England. I suggest it was for you to say you are to work double shift, or treble shift, whichever you like; and therefore so many men will be necessary, and saying how many men will be necessary, and that you would arrange to send them out?

A.—There I must dissent absolutely. My firm had no authority whatsoever to say to the Development Directorate: "You have got to do this," or "You have got to do that." "You have to work one shift," or "You have got to work two shifts."

Q.—We must carry this a little further. You have the responsibility for completing the work in five years. One of the essentials for doing that is that your dredger should be working 24 hours a day, is not it? Is there any correspondence in which you told the Development Directorate that until they worked the dredger 24 hours a day, 15 hours' pumping time, the scheme could not be carried out?

A.—Well, it was obvious without putting it in the correspondence.

Q.—You are involved in this because you have given the Government an estimate for doing it in five years?

A.—Yes; but I am not responsbile for the carrying out of the work. I say that I had no responsibility for the expenditure, and I had no responsibility if the Government chose to be dilatory. I put in a letter the other day from Mr. Lewis in which he, as chief engineer, says he had written four letters to the Government and had asked for sanction to engage the additional dredging staff. He said: "Here you are. I have written four letters. I cannot get any reply. What am I going to do?" You cannot force a Government to do things—at least I cannot.

Q.—Will you turn to page 131? We come to another thing then. This is a letter from Mr. Elgee to you in which he speaks of two booster pumps being required. That is making a new pump. That is August, 1924. Does not this boil down to the fact that nobody, either in London or in Bombay, had anything but the very faintest ideas of how they were ever going to do the work?

A.—No; I do not agree.

Q.—We have had all these variations, and now we come to another one in August, 1924—two booster sets in addition to the three you have already got.

A.—No.

Q.—You have got three floating ones?

A.—We are talking about booster pumps.

Q.—There are three floating ones and one electrical one, and now another one. There are the "Kalu," the "Colaba," and the "Sir George Lloyd"—that is three.

A.—Those are not booster pumps.

Q.—They are not; but those are three, two of which were going to do the entire work. You have got three, and now you have the "Jinga," a floating booster, or electrical booster—I do not know which—and now you come to another booster, which makes two booster pumps. That is five pumps to do the work of two.

A.—I cannot be responsible for this letter. Mr. Elgee says that he thinks two boosters will be required, but I do not think that I am responsible for that.

Chairman.—The only point of the letter is this. Sir Frederick Hopkinson puts it to you: Does this letter of the 8th August, 1924, with all this backing and filling, and so on, show that nobody really had any set deliberate plan, even at this date of August, 1924? That is the only question you are asked.

A.—There were plenty of definite plans. Let me put to you a case, viewing the matter in another way. The original programme for dredging was in the harbour—in very suitable material. Then, due to the action of the Port Trust, we had to look about for new area, and we propose to go further out into the harbour, involving more pipe line. Then the chief engineer and the Director of Development initiated the programme for Back Bay. That involved another dredging operation in Back Bay as well as dredging operations in the harbour. If you go from step to step you can see how the various programmes have been worked out. We did not initiate Back Bay. We did not approve of Back Bay. Now that the borings have turned out to be erroneous it seems a pity they ever went to Back Bay; but the chief engineer was obsessed with the idea that he would get an enormous amount of material from Back Bay. That is how these various programmes originated. First of all the Port Trust and the Indian Marine took away a large area. Then we made other arrangements, and then the Development Directorate, on their initiative said: "Let us go to Back Bay." You can follow the thing through, and I dissent entirely from the suggestion that we are a set of fools, the whole lot of us, and we never had any programme at all, and we did not know what we were doing. We gave the matter very serious consideration.

Sir Frederick Hopkinson.—Answering one or two of the things you have said, it is true the Indian Marine took away a certain area up here (*pointing on the plan*)?

A.—Yes.

Q.—But that is from 75,000,000. They still left you with more than you wanted. Moreover, all you had to do was to come out here to get it nearer than that, so that you had no limitation of material at all, but you had ample material without going to Back Bay at all. The reason you went to Back Bay is the very obvious one, that it was physically impossible to do the reclamation with the plant you had provided. It had not power enough?

A.—No, I do not subscribe to that idea at all. It is perfectly true that there was material available, but in another position.

Q.—Equally convenient or more convenient?

A.—I do not think so.

Q.—It is a matter of measuring it off. It does not involve more pipe-line, it involves less pipe-line. Now what about these erroneous borings? You have said several times that the borings in Back Bay are erroneous, but that is the only statement that has been made by anybody about their being inaccurate. So far as we know, they are perfectly accurate. They give you the depth of the moorum or rock in a very large number of places?

A.—Well, I think we have reason to suspect that a lot of them never were taken at all.

Q.—No wonder the Back Bay scheme is where it is.

A.—We did not take them. We had nothing to do with the taking of them. I notice, if I may interpose a word, that at page 133 there is a letter of the 18th September, 1924, which shows the way in which the dredging masters were selected. It is a letter from the Secretary to the High Commissioner for India in London to the Secretary to the Government of Bombay.

Q.—They ought to have been out there then for that season's work.

A.—But see the routine, and you see the difficulty in getting the people. The Governor of Bombay sends a telegram to the High Commissioner for India, asking whether, in consultation with Messrs. Meik & Buchanan, certain dredging masters may be appointed. Then there is a Selection Committee on the dredging masters, and the terms of engagement, the salaries and allowances, and so on, were made by the Government of Bombay entirely without reference to us.

Q.—You mentioned this the other day, and I said that all this was done on your recommendation, the Committee though appointed did not know the difference between, a dredging master and an engineer, and they would be taken on your recommendation.

A.—On their terms.

Q.—You agreed to it?

A.—We did not agreed to the terms. We had the terms put before us.

Q.—It was on your recommendation of the men?

A.—Yes.

Q.—The terms did not matter, because the terms were acceptable to the men, or they would not have gone?

A.—Naturally you can get very much better men at higher pay than you can get at lower pay.

Q.—That question has not arisen. Then on page 139, in a letter from yourselves to the Chief Engineer, you say: "You have no doubt been able to form a definite opinion as to the cause or causes of the low output, and we shall be glad, therefore, if you will let us have all information on the matter, so that we can consider it before taking up the matter with the builders." That is because the dredger was only giving 43 per cent. of the specified output?

A.—Yes.

Q.—This is February, 1925. Did you take it up with the builders?

A.—Well, in February, 1925, as a matter of fact, I thought I was going to die.

Q.—Not February—that was August.

A.—No.

Q.—August, 1925.

A.—No.

Q.—In February, 1925, you were on your way to Australia, and were having an ideal sea trip, I have no doubt?

A.—Yes.

Chairman.—This is Mr. Halcrow's letter from London?

A.—Yes, this is Mr. Halcrow's letter. He is a member of the firm. I think you might have asked him about that.

Sir Frederick Hopkinson.—Have you ever heard that he ever took it up with the builders, and with what result, because we have not seen any result?

A.—I will refer to that and see what was done.

Q.—Have you heard that anything resulted from taking it up with the builders—if anything serious was done? If anything of consequence had resulted, you surely would have heard of it?

A.—My impression is that the builders said: "You have got the dredgers and you have got the tests. We are not working the dredgers, and that is all about it."

Q.—You think that is all the builders would say?

A.—I think that is all the builders would say.

Q.—But did they? Evidently Mr. Halcrow was under the impression that he was going to get some satisfaction from the builders, or was going to try to get some satisfaction?

A.—Well, what he actually did I will investigate.

Chairman.—What, in fact, happened was that the firm of Messrs. Meik and Buchanan said they had several conversations with the builders, and neither your firm nor the builders could understand why the dredger was not giving its output. I am sure that is somewhere here.

A.—I think I remember something of that kind. There is a letter of the 15th October, 1925, at page 166. Is not that it?

Q.—I am sure there is a passage somewhere making that statement, that neither the builders nor yourselves could understand it.

A.—Here it is at page 166: "The builders are naturally, for their own sakes, anxious that the plant should prove a success, but they are not specialists in the handling and working of dredging plant, and in the absence of any specific complaint about the machinery or any portion of same, it is not clear what good interest could be served by their representative going to Bombay."

Chairman.—That is not the letter. Here it is, page 158: "Since the beginning of the year, we have had several conversations with the builders on the subject, and are in further communication with the Chief Engineer." This is a letter from Messrs. Meik and Buchanan of 25th May, 1925. Then: "Neither we nor the builders can understand why any estimate should be based on a figure which is less than one-and-a-half of the designed output of the 'Sir George Lloyd,' more especially as the less powerful vessels 'Jinga' and 'Kalu' pumped much larger quantities over long periods when working on the Sewri reclamation." That shows the conversation, and I believe there is another reference to it. The conversations with the builders evidently would mean with Mr. McMurray.

Sir Frederick Hopkinson.—Yes. I think you told us that early in 1922 Mr. Brims was in London, and you then told him that the dredger was to be double shifted?

A.—Yes.

Q.—But so far as I have seen, there is no other reference in any of the correspondence about this. When the dredger started the first year you single-shifted. I

do not see any letter of complaint from London saying: " Why are you only working single shifted? "

A.—We do not put every complaint in writing.

Q.—But this is a very, very important one—it is a very serious matter, is not it, because it is prejudicing the entire completion of the work?

A.—Yes.

Q.—It is one of the most important things. I just wanted you to tell us if there had been any other reference to it, because I do not remember any.

A.—I do not remember any written reference. As I told you, Mr. Brims went out with orders to work two shifts.

Q.—But you say you had no power to give him orders?

A.—Very well; with the suggestion or hope that he would work two shifts.

Q.—Do you mind looking at page 152, the document dated the 8th April, 1925? The chaos about these dredging programmes apparently leads them to consider the proposal to carry out earth filling simultaneously with dredging operations?

A.—Yes.

Q.—Which seems to be a recognition that the dredgers have failed?

A.—Yes; and later on we scouted the idea, in reply to that letter, and told them to work their dredgers properly.

Q.—Would you mind turning to page 65, paragraph 3: " Assuming that the dredger ' Sir George Lloyd ' commences to pump from the Harbour to Colaba next November, Sir George wished if possible "—that is you—" that the dredger ' Kalu ' should commence about the same time to pump from Back Bay to Marine Lines. Mr. Lewis said he thought it better to use both dredgers at Colaba, as the land there was of more value to the Development Directorate. That was admitted, but Sir George said that Sir Lawless Hepper agreed with him that it would have considerable moral effect on the whole scheme to complete a section at Marine Lines as soon as possible "?

A.—Yes.

Q.—What does that mean " moral effect "? Why was it to have a moral effect?

A.—Well, I remember that. Sir Lawless Hepper and the Government of Bombay were always anxious that there should be something to show to the people to enamour them of the scheme. Sir Lawless Hepper and I were discussing it, and, as put there, it would have a considerable moral effect—I do not mean by " moral effect " anything to do with public morals, but, to put it in another way, it meant this.

Chairman.—You mean it would be heartening for the people to see considerable progress being made?

A.—It would be heartening for people to see something going on. When we started working at Marine Lines, I know the Government of Bombay was most anxious that work on the gantry should go on, so that everyone driving in the morning should see the work going on, and be heartened, as the Chairman puts it.

Sir Frederick Hopkinson.—" What a wonderful scheme we have going on; we can see it growing day by day."

A.—Yes.

Q.—That is your idea; but do not you think the best moral effect would have been produced by the dredger delivering 2,000 yards an hour?

A.—The people would not have seen that.

Q.—But it has a pretty heavy effect—2,000 yards an hour.

A.—I do not despair of hearing that the dredgers are doing 2,000 yards an hour, if they are given a proper show.

Q.—I would like to lay a little stress on your calculations in your original report, about the daily output of the dredger. Was it your intention that the dredger was to work 24 hours a day, of which 15 hours would be actual pumping?

A.—My idea was that it would pump for 15 hours a day.

Q.—How long would that necessitate the men working?

A.—That would depend on the circumstances, rather. We certainly did not contemplate them going off for meal-times. We contemplated a 15-hours day.

Q.—Fifteen pumping hours?

A.—Yes.

Q.—I still do not understand how you expected to do that in this first season, when you had only one dredging master. The whole thing was laid on the shoulders of one man. If he had fallen sick, your dredger could not work.

A.—Well, you are quoting my own words, Sir Frederick Hopkinson. What did I do? I go to Bombay and I see one dredging master doing the work, and I say: " Good God, look at this; if this man falls sick, your dredging must stop."

Q.—I should have thought you would have said: "Good God, why did not I send out some more dredging masters?"

A.—Must I repeat again that I had no more power to send out dredging masters than you had power to send out dredging masters?

Q.—So far as I can see in any of the correspondence, there were no orders or instructions that 15 pumping hours per day must be worked, in order to carry out the proposed scheme; but you say over and over again that the dredging is the crux of the whole scheme, yet there is no instance anywhere, in any of the correspondence or instructions, that the dredger must work 15 pumping hours per day. Do you agree with that?

A.—Well, I cannot see anything of the kind, but we get up to the old story that without control there was no possibility of making them work 15 hours.

Q.—Then I would like to call your attention to the fact that on 15th December, 1924, you wrote: "The Dredging Department have done all that is humanly possible to get on with the work"?

A.—Yes.

Q.—What does that mean?

A.—I remember that.

Q.—What does it mean?

A.—Well, the individuals.

Q.—No. This is the Dredging Department, not the individuals.

A.—Very well. Take the Dredging Department. Mr. Brims is the head of the Dredging Department; and there had been a lot of difficulties when I was out there. I reported them in my report. There had been difficulties here, and there had been difficulties there; and so far as I could see the Dredging Department, that is to say, Mr. Brims and his staff, had done all that they could to overcome those difficulties. I described those difficulties in detail. They had done all that was humanly possible. I wanted them to realise that I thought they had done all that they could to overcome those difficulties. That is nothing to do with the difficulties of the Government.

Q.—I am dealing with the dredging only.

A.—And the difficulties of getting the men and working 24 hours, and all that part of the thing. That is the explanation of that.

Q.—How do you square that with an accusation that the dredgers have been mishandled?

A.—Well, that comes later on. The dredgers had been mishandled. I call it mishandling the dredgers when they only work for a few hours a day.

Q.—Well, they always worked a single shift the first year, the year you spoke of as the experimental pumping?

A.—I can only say: "Free the work of Government control. Do not let the senior officers' time be taken up writing forms in their office. Give them a free hand to push the work on; but first of all, take it out of Government control."

Q.—That is a thing the Government will consider. I suggested to you the other day that the order of priority for doing the work in your report was not right. The dredger actually began working in December, 1923. If that dredger had been provided in September, 1921, the price of ship-plates at that time was £14 a ton, but at the date the dredger was ordered, they were £24 a ton, which is very nearly double. I suggest to you that had you postponed the purchase of the dredger for 18 months, you would still have been in ample time to do the dredging work, and have got your plant at a little more than half the price you paid for it?

A.—It is always easy to be wise after the event.

Q.—I suggest to you that every day wise people are wise before the event?

A.—Some people are and some people are not. If you look at things to-day, and how things have happened since, naturally you would say: "Yes, we should have saved money if we had bought the dredgers a year later than we did." But when we bought the dredgers it was on a different programme altogether. We hoped that the works would be pushed forward much faster than they were, and that the dredging would begin sooner, much sooner, than it did, and so on, and so on, and so on. According to our lights, we recommended what at that time we thought to be the best.

Q.—The contract time for building the dredger was 14 months?

A.—Yes.

Q.—If you had ordered the dredger and began the works at the same time it would have been different, but actually you did not begin your preparatory works in ordering the plant until about September, 1920, and therefore the dredger which had then been ordered six months would be half built. You had to decide on the method of doing the work, you had to decide on what plant you were going to use; you were going to

order that plant and have it made specially; you were going to get it to Bombay; you were going to open up the quarry and fix all this plant. That left you with only about eight months to do all those things. It is a physical impossibility. You ought to have had at least 18 months for that—18 months to two years.

A.—The original proposal was to let the contract in October, 1920. The contract was actually let in October, 1920, and it was then cancelled because the Governor in Council had decided to do the work departmentally. I was in London, and the dredger had been ordered when we got the intimation that the programme had been changed and that the Governor in Council had decided not to go on with the contract. As regards arranging for the quarry, we had nothing to do with arranging for the quarry; that was entirely done by the Development Directorate.

Q.—It was not the actual arranging I am speaking of, but it was the provision of the time for doing the work. That you were controlling—do not forget that—because you ordered the dredger. You made the programme. You were laying down the programme. All the machinery was designed or arranged for in your office by Mr. Lewis and Mr. Meik.

A.—By Mr. Lewis.

Q.—And Mr. Meik, because Mr. Lewis told us that Mr. Meik overrode him.

A.—Overrode him?

Q.—Yes, about the gantry, for instance?

A.—Well, I should like to read Mr. Lewis's evidence.

Q.—He said Mr. Meik said how the work was to be done.

A.—Mr. Meik certainly did not order the plant.

Q.—He did not actually order it, but he decided what plant was to be ordered?

A.—No, I disagree, because Mr. Lewis came home specially to order the machinery for the quarries. He had a free hand in ordering the machinery for the quarries. He knew everything that was wanted for the quarries, and he came home. He saw Sir Lawless Hepper when he was at home, and he ordered the machinery.

Q.—Actually he told us that Mr. Meik was advised by a contractor in London not to build that gantry, but he insisted upon doing it because he said it would be more convenient. That is what Mr. Lewis told us.

A.—Yes; that is talking about the gantry, but I mean the general arrangement.

Q.—That is one of the proposed arrangements?

A.—Yes.

Q.—In your report of 15th December, 1924, stating the reason for the alteration of programme, you say: "The proposed pipe-line involves such an immense amount of costly and difficult work that all idea of a pipe-line in that vicinity should be abandoned." That existed in 1919, did not it?

A.—That existed in 1919.

Q.—And should have been foreseen?

A.—No. Mr. Kidd investigated it for this pipe-line, and Mr. Kidd never considered——

Q.—We are dealing with your pipe-lines—we are not dealing with Mr. Kidd's pipe-lines—which run along Ormiston Road. I say that should have been seen early in 1919. Now I am coming to rather an important point in connection with the dredging, and that is this: You calculated getting 2,000 yards an hour for 15 hours a day?

A.—Yes.

Q.—That would be under average conditions—an average output for those 15 hours?

A.—Yes.

Q.—I suggest to you that a prudent and experienced man would provide that the dredger's maximum output on trial should be nearly double that in order to get 2,000 yards average?

A.—Well, that is a matter of opinion. You get a reputable firm of builders who give you a plant which they say will give 2,000 cubic yards for 15 hours.

Q.—On trial; but they did not say in their tender it would do it as an average?

A.—There again these are not the only dredgers these people have made.

Q.—We are dealing with this particular dredger, and do not let us get away from it. They contracted to give you a dredger to deliver at the rate of 2,000 cubic yards an hour on trial, and they say they have fulfilled that condition, and the marine architect has agreed with that?

A.—Yes.

Q.—My suggestion is that a prudent and experienced man, a man who knew of all the delays likely to arise in connection with dredging, would provide that the maximum output should be nearly double the average output?

A.—Well, that is entirely a matter of opinion. If you had had a dredger that dredged 4,000 cubic yards an hour under the conditions that prevailed in Bombay, you would not have got the output.

Q.—That is not my point.

A.—Under the conditions which prevailed in Bombay.

Q.—That is not my point at all. A machine designed to give an average output should be designed to give a much greater test output for a short period. It is not a question of opinion; it is a question of ordinary daily common sense and experience.

A.—Well, you have your opinion on that, but I should like to have evidence on that. Let us see what has been done.

Q.—Can you tell me any machine doing such work as a dredger that is going to work at 100 per cent. efficiency for 15 hours at a time?

A.—Not 100 per cent. efficiency for 15 hours at a time, but 15 hours out of 24.

Q.—Well, 15 hours out of 24 at 100 per cent. efficiency at each hour; that is what it has to do. You are reckoning on it working 15 hours?

A.—Yes.

Q.—I suggest to you that it really is absurd to expect a machine to do that?

A.—Well, I cannot agree with you, and I think if you search among the records there are of dredging plants you will find it has been done.

Q.—That what has been done?

A.—A dredger has done it.

Q.—That is, its test output is taken as its average output?

A.—No; that a dredger of this kind, capable of delivering soft clay a distance of 5,000 feet at a rate of 2,000 cubic yards per hour—I think the records will show you that it has been done for continuous periods.

Q.—You think so. How about the "Kalu" and "Jinga"? Is not that a case in point that was prominent before your eyes? They fulfil their test out there, but their average load was only about 50 or 60 per cent.

A.—Yes.

The Chairman.—1,126 was the average.

Sir Frederick Hopkinson.—A little over 50 per cent.—is not that an illustration?

A.—I do not think it is. I would like to say a word about the "Jinga" and "Kalu." I said to the Chairman the other day that I had not seen Mr. Messent's note. As a matter of fact I had forgotten the particular note, but two or three days ago when I was looking over my records I came across the copy which obviously had been given to me by Mr. Messent, because it had his own signature upon it. Well, I read the note through very carefully naturally, but I cannot find in Mr. Messent's note anything condemnatory of the dredgers, obviously when you read this report it is plain the work was done in a leisurely manner—there was no particular hurry. But there is nothing in Mr. Messent's note to say that he is dissatisfied. He puts on paper a plain record, and there is nothing to show he is dissatisfied. I was reading Lord Lloyd's evidence the other day, and I read what he said about the Sewri reclamation works.

Q.—I entirely agree with Mr. Messent. If he had only specified for a test output and was satisfied with 50 per cent. of it, he had nothing to complain of. In fact, he confirms what I have said, that he ordered his dredger to do 50 per cent. more than he expected to get.

A.—Why all these complaints about the "Jinga" and "Kalu"?

Q.—I am suggesting to you that a wise and prudent man would have specified for a dredger that would have done something between 3,000 and 4,000 yards an hour on a test, in order to make certain of getting 2,000 yards an hour under ordinary conditions.

A.—Well, I say again that is a matter of opinion.

Q.—I suggest to you that there is no question of opinion about it whatever?

A.—Well, I do not agree.

Q.—In connection with the clay there is one point I should like to ask you about. You told the Chairman the other day that your references to hard clay meant clay in relation to its hardness in the reclamation?

A.—Yes.

Q.—On June 22nd, 1921, you use these words in a letter: "as we hope there will be a great deal of hard clay in the harbour."

A.—Yes.

Q.—I suggest that does not mean in the reclamation, but it means what it says—that the clay is hard in the harbour?

A.—Well, we have talked a great deal about the clay.

Q.—I thought probably you had not got this particular letter before you?

A.—Yes I had. I could never possibly in the highest flights of imagination believe that the material we were going to dredge in the harbour was hard clay, in the sense of being hard for the dredger to cut.

Q.—But you say you hope there will be?

A.—But hard there again ——

Q.—You call it hard clay. I am only taking your own words.

A.—Hard clay—well, I have talked very much about hard clay and soft clay and unctuous clay.

Q.—You have always defined it as meaning hard clay in the reclamation?

A.—Yes.

Q.—I am pointing out to you that you have given another definition yourself here—that is hard clay in the harbour. That is before you touched it—nothing to do with the reclamation at all, but " in the harbour "?

A.—Well, I repeat, whatever I said, that I could never have meant hard clay for dredging, because I knew perfectly well there was not any.

Q.—I agree with you that it is a very difficult thing to try to explain away. I sympathise with you.

A.—I do not agree at all. Once one starts to define what is hard and what is soft, you get involved in all kinds of language. You can have a hard boiled egg.

Q.—You can have a hard drink and a soft drink.

A.—Yes, and you can have a hard-mouthed horse.

Q.—You can have a hard head and a soft head.

A.—You can have clay that is soft and you can have steel that is soft and hard.

Q.—We know what " hard " means in connection with clay. I was very much interested in some tables given to us the other day by Mr. Settle. He gave the velocity of the effluent from the pipe as the same as Sir John Biles said was to be expected. In order to get 2,000 yards an hour the solid matter would have to be on an average for the whole 15 hours a day of no less than 14 per cent. in clay. Everybody who has given evidence before us has agreed that when you get 10 per cent. you are doing quite satisfactorily. Ten per cent brings us back to something like what the dredger has done. You will excuse me being rather disjointed, but the Chairman has been so exhaustive that I have to pick out the little points which he has not touched upon. There is one thing I would like to get on the notes, and that is this. The project estimate is stated to be 702 lakhs?

A.—Yes.

Q.—It really is not anything of the kind. It is 813 lakhs, because it is 775 lakhs without deducting the reclamation value of the dredging plant and the other plant. To that must be added 38 lakhs for concrete blocks omitted—that is, to compare it with the original estimate, you must add those 38 lakhs. That brings you a total of 813 lakhs as the gross project estimate.

A.—That seems rather curious arithmetic. The project estimate was 702 lakhs. You cannot go and add 30 lakhs which you are not going to spend.

Q.—I mean for the purpose of comparison with the original estimate?

A.—Yes.

Q.—You cannot compare one with the other if you do not do the whole thing, can you?

A.—Well, when you come to comparisons of that nature you can carry it on indefinitely.

Q.—Do you mind giving me the blue file of yours that you lent me the other day, of the estimates? (*Same handed.*) This is my last subject, I am glad to say. I noticed in looking through this the other day that nearly all the estimates of various things are in manuscript, but when I come to dredging it is in type?

A.—Yes.

Q.—And appears to have been torn off a full page?

A.—No; that is the copy out of the file; that is the exact copy.

Q.—Out of the file of what?

A.—Out of the file of one of our office files.

Q.—To me this is nothing in the nature of an estimate at all. It simply says dredging so much, and the working expenses, wages, fuel, stores, run into millions of rupees?

A.—Yes.

Q.—I do not see how that can be called an estimate. Where are the details of that? Who worked those figures out in order to arrive at the price of dredging?

A.—They are worked out in the office.

Q.—Who really worked them out? Can he give us the details on which he arrived at these?

A.—I really could not tell you. But what is the matter with them?

Q.—This is only a bald summary; it looks as if it had probably been supplied to you by somebody else.

A.—As a matter of fact, there is a great deal of detail in it. We do not always go into such details.

Q.—Take the working cost, wages 720,000 rupees: what does that mean—how many men and how many dredging masters? It is no estimate at all to me. Then fuel, 1,680,000 rupees. It does not give the quantities or the prices. How can it possibly be checked?

A.—Well, we do not make estimates the way that contractors make estimates. As you know perfectly well, we go by comparisons with other works. Certainly we got that out as an aid, but I would like to give you some records of the actual dredging costs in other works.

Q.—Are they under the same conditions?

A.—Yes, more or less the same conditions.

Q.—Are they with two dredgers, because this is quite unusual dredging at Bombay, is it not?

A.—It is quite unusual dredging—yes, I suppose it is—but the working costs of dredgers are fairly uniform.

Q.—According to this, the cost of dredging, steam dredger and steam float shore delivery was going to be 7·35 annas per cubic yard. Can you tell me, if dredging costs are fairly uniform, why it cost you 1*s.* 6*d.* in Rangoon?

A.—It did not cost 1*s.* 6*d.* in Rangoon.

Q.—My information is taken from your published figures.

A.—I should like to see that very much.

Q.—It is in the Institution of Civil Engineers' Journal?

A.—I should like to see it.

Q.—Here is the volume. (*Same produced.*) It is 1*s.* 6½*d.*

A.—May I see it?

Q.—Certainly. (*Same handed.*)

A.—There is no statement there that the dredging cost is 1*s.* 6½d. It is an inference of yours.

Q.—It gives the quantity done, and it gives the total cost, and the one divided by the other gives 1*s.* 6½*d.*

A.—If I may say so, that is absolutely misleading.

Q.—It is?

A.—Absolutely.

Q.—Why was it ever published if it was misleading?

A.—I say that that inference of yours is absolutely misleading.

Q.—It is not an inference, it is a calculation.

A.—I would like to read you some notes about dredging.

Chairman.—Let us get that accurate. Apparently, this is a lecture or paper read at the Institution of Civil Engineers?

A.—Yes.

Q.—At which a certain amount was said to have been the cost of the work, and a certain volume of work was done?

A.—Yes.

Q.—Sir Frederick Hopkinson has divided one by the other, and says it works out at 1*s.* 6½*d.* per cubic yard.

A.—Yes.

Q.—That is right, is not it?

A.—No.

Q.—Why is not it right? Will you explain it to him?

A.—He has taken the whole cost of the dredger.

Sir Frederick Hopkinson.—I have taken the net cost after sale.

Mr. Billimoria.—Do not the figures speak for themselves?

Sir Frederick Hopkinson.—I am afraid the figures shout for themselves.

Chairman.—You might just look at these figures and see if it is right. You have told us that the dredging did not cost 1*s.* 6½*d.* Take your own time about it, and just see whether Sir Frederick Hopkinson is right about that, on your own statement to the Institution.

A.—Well, I do not think he is right.

Q.—Why not? He says that five divided into 20 goes four times.

A.—It will take a few minutes to check this, but I do not think that he is quite right.

Sir Frederick Hopkinson.—My own is only a calculation.

A.—As a matter of fact, I can tell you the actual cost of the dredging in Rangoon.

Sir Courthope-Munroe.—Perhaps you will let Sir George deal with that after lunch. It has been sprung on him in this, and he wants time to develop it.

Sir Frederick Hopkinson.—Yes; but I did mention it the other day.

A.—" The suction pump dredger ' Pelican,' working in Rangoon in 1912 and 1913 in sand and silt, moved 2,000,000 tons at a total cost for working expenses of 1·90 annas per cubic yard."

Q.—Where is that? That is different to the information published in that book. Moreover, the information published in that book said that she did not move 2,000,000 yards, but the 2,000,000 was done partly by dredging and partly by scouring. Subsequently a letter was written by your late partner Mr. Meik, in which he said the total dredging done was 1,000,000 cubic yards?

A.—Well, this is an official record which I have got—1·90 annas per cubic yard.

Q.—Obviously that is wrong, or Mr. Meik is wrong. If one says 2,000,000 and the other says 1,000,000, they cannot both be right. When you first went to Simla you told them there that your estimate for dredging was 6 annas a cube yard. The work in Rangoon is pre-war prices?

A.—Yes.

Q.—Does that include the dredger?

A.—No.

Q.—That is only the working cost?

A.—The working cost.

Q.—That was sand and silt?

A.—That was sand and silt. I have got a lot of information about dredging.

Q.—I shall be glad to know where it has ever been done for 2 annas a cubic yard post-war.

A.—Well, 1915, I suppose you would call pre-war, or post-war—I do not know.

Q.—Where was it?

A.—In Burma. You might kindly note that Mr. Messent, when I saw him in 1919, told me that the working costs of dredging between pre-war and 1919 had only increased by 20 or 25 per cent.

Q.—I am afraid I should believe that with a good deal of difficulty.

A.—That is the chief engineer of the Port Trust.

Q.—I doubt that, knowing the rates of fuel and wages.

A.—Would you like me to give a little experience of dredging? It would only take me a minute.

Q.—Certainly.

A.—I have taken an opportunity of looking through some of my records. This is what I have got to say about dredging costs: In estimating dredging costs two factors must be considered, capital cost of plant per unit and working cost per unit. The capital cost naturally varies according to the quantity dredged, the greater the quantity the less being the capital cost. In two dredging propositions of, say, 10 million cubic yards and 5 million cubic yards respectively, executed by similar dredgers, the capital cost per unit of the large scheme would be less than that for the smaller scheme, if the total cost of the plant was debited against each scheme. Working expenses, however, are fairly uniform, and comparisons can be made with different works. In my 1919 report and estimate I calculated that capital cost of plant would be 3.24 annas per cubic yard, and working expenses 2.66 annas—total 5.90 annas; but in my estimate I allowed 8 annas per cubic yard, an increase of 2.1 annas, or on the total the sum of Rs. 32,81,250, say £216,000; whilst dividing 2.09 annas equally between capital and working expenses, we have capital cost 4.39 per cubic yard, working expenses 3.61 per cubic yard. It has been freely stated that my estimate of 8 annas was too low because Mr. Kidd's tender, made in 1912, was 9 annas 3 pies per cubic yard. I again assert most positively that my estimate was a reasonable one, and that Mr. Kidd's was excessive. Mr. Kidd gave no details in his tender, but in the course of his evidence before the Committee, said his dredging plant was estimated to cost in 1912 £287,625, which converted into rupees at 15 and divided by 24,162,463 comes to 2.86 annas per cubic yard. I consider his price for plant in 1919 high, but assuming that amount is allowed, there is left for working expenses 6.39 annas against my figure in 1919 of 3.6. The easiest way to see which figure is correct is to take reliable figures of cost of

dredging executed elsewhere about that time, and I will therefore quote figures in my possession which I used to check my estimate. Take the Twante Canal, Burma: This project was the nearest in approach to the Bombay scheme. Three suction cutter pipe line dredgers were used, the material was clay and silt, and the total working expenses for the six months ending 30th June, 1915, was annas 1.83 per cubic yard, and for the previous six months 1.88 annas per cubic yard, and from the beginning of the work in 1912 the dredgers had excavated 10,420,000 cubic yards, the total working expenses being 2.01 per cubic yard. To take some more examples from my records: Dredger "Pelican"—The suction pump dredger "Pelican," working in Rangoon in 1912 and 1913 in sand and silt, moved 2 million tons at a total cost for working expenses of 1.90 annas per cubic yard.

Q.—I hope there is not going to be the same conflict in all the other cases as there is in this case, because your partner says 1,000,000 yards was done, and the cost was 1s. 6½d.

A.—The suction dredger "Balari": This is a large suction dredger working on the Hooghly, and an analysis of her work in 1914 gave total working expenses of 8.40 pies per cubic yard. The suction cutter pipe line dredger "Foyers": Working in Bengal in 1914 moved 3,200,000 cubic yards at a total working cost of 10 pies per cubic yard, and working from 1908 to 1915 moved 14,230,000 cubic yards at a total working cost of 1.16 annas per cubic yard. These examples from actual work done are, I think, sufficient, and surely with these figures before me I was justified in thinking Mr. Kidd's estimate of 6.39 annas most excessive and my estimate of 3.71 annas ample—the difference between Mr. Kidd and myself on the whole 25 million cubic yards being Rs.53,22,000, or over £350,000. I have no information in detail as to the cost of dredging in Bombay on the Back Bay scheme, and am perfectly satisfied that with proper organisation and continual working enormous economies can be effected. These figures are taken from official documents which show that the dredging in 1915 was in the neighbourhood of 2 annas, and less, per cubic yard.

Q.—You want to be very careful in comparing these figures. For instance, in the Twante Canal, Burma, you have three suction cutter pipe line dredgers being used, but they would be working independently?

A.—Yes.

Q.—Did they deliver 5,000 feet, or only just a few hundred feet?

A.—No; they did not deliver 5,000 feet.

Q.—Then you cannot compare it. Can you compare that with two dredgers working on the same pipe line? Your costs are double, are not they?

A.—No; not double.

Q.—How much less does it cost to run the "Colaba" than the "Lloyd"? The only thing that the "Lloyd" does that the "Colaba" does not do is to cut clay and lift it. She does not lift it any more than the "Colaba," so that the costs are almost identical.

A.—No; I will not admit that, but, however, here are the figures showing what the dredgers can do. You can take them for what they are worth. Those are figures taken not working 24 hours a day. Most of these were Government works, being done in a more or less leisurely way. They are not contractor prices.

Q.—I have shown that they are not comparable. For instance, your dredging plant in Bombay cost you 8 annas, as much as your total estimated cost. You cannot say there is any uniformity in dredging prices when that sort of thing happens.

A.—But there is a certain uniformity in dredging costs.

Q.—There is no uniformity in the figure you have given us. You give us there 8.40 pies, which is less than a penny a cubic yard.

A.—Less than a penny. These figures are given you to show there is still hope of reducing expenses in Bombay.

Sir Frederick Hopkinson.—Do not ask me to take a contract on these prices, Sir George.

Chairman.—Would you between now and half-past two just work out that calculation which Sir Frederick Hopkinson has put to you—that the cost in Rangoon is 1*s.* 6½*d.* per cubic yard?

A.—Yes.

(*Adjourned for a short time.*)

Chairman.—In the report of Lord Lloyd's examination contained in a Bombay paper which has arrived by this mail, the summary of the evidence does not accurately convey what took place. In Bombay Mr. Cowasji Jehangir had said that Lord Lloyd took away a good deal of private correspondence. Sir M. Visvesvaraya put questions to

Lord Lloyd to ascertain if any of that correspondence was relevant and available. There was nothing in any of the questions put by Sir M. Visvesvaraya which in any way suggested any impropriety on the part of Lord Lloyd; indeed Sir M. Visvesvaraya expressly disavowed it. The object of the questions was to get, if possible, information which would give the Committee the circumstances under which the decision was arrived at to undertake the scheme.

Sir H. Courthope-Munroe.—I was going to ask this, Sir. We have been, at your request, during the adjournment at some little trouble to arrive at this 1*s.* 6*d.* The best we can do in the way of arithmetic is to arrive at 8*d.* Sir Frederick Hopkinson asked "Can you tell me at what cost?—(A.) No, I cannot. (Q.) I will tell you, then. It cost 1*s.* 6*d.* a cube yard." I rather gathered from that that it appeared in the Lecture or in the Address which was given by Sir George that he stated 1*s.* 6*d.*

Chairman.—I did not quite gather that.

Sir H. Courthope-Munroe.—I may be wrong.

Chairman.—What I gathered was that the figures given in the Address enabled Sir Frederick to get out the calculations.

Sir H. Courthope-Munroe.—It is a little hard on Sir George.—He has put together every figure he can find, and he cannot arrive at anything but 8*d.* Sir Frederick Hopkinson says his figure is 1*s.* 6*d.* I have not the privilege of cross-examining Sir Frederick, but no doubt he will tell us the sum by which he arrived at 1*s.* 6*d.* in order that we may clear up the matter.

Chairman.—I have not the privilege, either, of cross-examining Sir Frederick, but by to-morrow morning you shall have the figure.

Sir Frederick Hopkinson.—Certainly.

Sir H. Courthope-Munroe.—We have done our best, and we cannot get more than 8*d.*

Sir M. Visvesvaraya.—Will you explain how you arrived at 8*d.*?

Sir H. Courthope-Munroe.—By all means. Sir George is there and he will tell you. It is not my 8*d.* It is his 8*d.* He will tell you how he comes by it.

Sir Frederick Hopkinson (*to the Witness*).—Will you tell us how you arrived at your figure of 8*d.*?

A.—Somebody seems to have abstracted my calculations.

Sir H. Courthope-Munroe.—The only question is, as a matter of fairness, seeing that Sir Frederick has made the allegation of 1*s.* 6*d.*, might not we have his explanation first?

Sir Frederick Hopkinson.—There is no allegation at all?

Chairman.—No, we must clear this up. We will get to the bottom of it. It must be a matter of calculation.

Sir H. Courthope-Munroe.—It must be that some figures want explaining.

Chairman.—Now, Sir George, will you tell us how you arrived at your 8*d.*?

The Witness.—At page 39 of my paper you will see, "Dredging plant, net cost, £54,665, and dredging £23,253, total £77,918. Then, to be quite fair, we have put on £2,600 for engineering expenses and miscellaneous. That comes to £80,518. Looking at page 40 of the same book it says: "The dredger ceased work at the end of August, 1913, having removed 54,584,000 cubic feet." That equals 2,021,000 cubic yards. Putting one into the other the cost per yard comes to 8·72*d.* That is all.

Sir Frederick Hopkinson.—I think your paper also states that 2,000,000 yards of dredging included the amount that had been scoured, and during the course of the discussion afterwards, Mr. Meik said "the quantity of material dredged in the channel in front of the wall did not amount to 1,000,000 tons."

A.—That is a pious opinion of Mr. Meik, but as a matter of fact, whatever was scoured was moved by the dredger.

Q.—It is not so.

A.—However, there are the figures.

Q.—Your paper somewhere says, "Dredged and scoured"?

A.—I am simply going on these figures. "The dredger ceased work, having removed 54,584,000 cubic feet."

Q.—Where is that?

A.—Page 40, "and formed a channel averaging 600 feet wide with depth below low water range from 20 to 40 feet."

Chairman.—It comes to this. If you take dredged and scoured as equivalent to dredged, the price works out at 8·72*d*?

A.—That is right, yes.

Chairman.—If you accept Mr. Meik's statement as correct, that the quantity dredged did not exceed 1,000,000 tons—is that the figure?

Sir Frederick Hopkinson.—That is not as much as a cubic yard. This costs 1*s.* 6½*d.* a ton. A ton is 20 and a cubic yard is 27, so my 1*s.* 6*d.* is very much below.

Witness.—But I do not accept it as correct. It was a mere pious opinion expressed by Mr. Meik at the meeting.

Chairman.—Wait a moment, Sir George. Mr. Meik was your partner?

A.—Not at that time.

Q.—Had he any special knowledge of this work?

A.—No, no particular knowledge. I was away at the time, and he was present when my paper was read.

Q.—It does come to this—that on your showing, if you accept dredged and scoured as equivalent to dredged, it is 8·72*d*?—

A.—Yes.

Q.—If one gives weight to Mr. Meik's statement that the dredger did not do more than 1,000,000 tons, then Sir Frederick Hopkinson is right that it works out at rather more than 1*s.* 6½*d.* a ton?

A.—But what was scoured was moved by the dredger. It was caused by the action of the dredger.

Sir Frederick Hopkinson.—Was it not caused by the action of the wall?

A.—No. The dredging was finished before the wall was started. We had moved the dredger. The dredger ceased to work at the end of August, 1913. After that, when the dredger had been removed and the wall was practically finished, then the scour began. But my point is that the reasonable figures to take are those stated in the report.

Chairman.—We see how it stands.

Sir Frederick Hopkinson.—There is a paragraph somewhere in this (I cannot put my finger on it at the moment, but I will look it up later) in which it is said that the 2,000,000 included both dredging and scouring. But supposing we leave it there for a moment, and take your price of 8·72*d.* per ton, or cube yard?

A.—8·72*d.* per cube yard.

Q.—Very well. That was pre-war, was it not?

A.—That was pre-war.

Q.—Your dredging plant at Bombay cost four times as much as the dredging plant pre-war?

A.—Yes.

Q.—Then that 8·72d. goes, does it not?

A.—I do not see the analogy at all. You cannot compare dredging propositions in that way. As I said in my note, which I read before lunch, you can make some comparisons in the case of capital cost and working expenses; but naturally the capital cost of a dredger which removes 10,000,000 tons is very much less than the capital cost of a dredger which only removes 1,000,000 tons.

Q.—That does not touch my point. It is bound to be much more when the capital cost comes to four times as much. Can you get away from that?

A.—I do not see what you are driving at.

Chairman.—May I try to put it? In your estimate of 125 lakhs for the dredging you included the total cost of all the plant which you estimated would be necessary?

A.—Yes.

Q.—That is, you took the probable cost of a dredger, of a booster and of the pipe lines?

A.—Yes.

Q.—You took that, I suppose, as your first item of cost?

A.—Yes.

Q.—Then I suppose you would make a calculation as to the cost of labour for the actual dredging operations?

A.—Yes.

Q.—And the period over which that labour would have to be paid?

A.—Yes, in a measure.

Q.—There may be other items, but anyhow there would be those. What Sir Frederick Hopkinson is putting to you is that if your dredger is going to cost four times the amount in 1919 that it cost in 1912, you at once get a much heavier ultimate dredging cost?

A.—Naturally.

Chairman.—That is the only point which Sir Frederick is putting to you about it.

Sir Frederick Hopkinson.—Two per cent. of 702 lakhs, the project estimate cost, is £105,000 approximately, is it not?

A.—Yes.

Q.—You have disclaimed all responsibility for the construction of the work and for the management of the work. The Committee would like to know what you understand the Bombay Government is paying you that large sum of money for?

A.—I am not prepared to discuss that point. You have got my agreement.

Q.—There must be something?

A.—No, I am not prepared to discuss that point.

Q.—But you must agree that there must be some *quid pro quo*?

A.—I say there is a very adequate *quid pro quo*. However, that is a matter of my agreement, and I think we might leave it at that.

Q.—I have now a few questions to ask you on the general subject of estimates. I should like to point out that on page 16 of your original estimate you give an estimate for the completion of the various areas. No. 1, 354 acres, was to be complete in February, 1923. No. 2, 289 acres, was to be complete in June, 1924. No. 3, 298 acres, was to be complete in May, 1925, and No. 4, 204 acres, was to be complete in December, 1926. That is the total scheme?

A.—Yes.

Q.—December, 1926—that is next month. Up to the present time no single one of those areas is complete, is it?

A.—No, I do not think any one of them is complete.

Q.—And only one of them is really seriously started?

A.—It is so long since I have been at Bombay that I do not know what the situation is.

Chairman.—They tell us they hope to get Block 8 done by May, 1928.

Sir Frederick Hopkinson.—With regard to this file of estimates which you left with me this morning, I cannot see that any of the detailed estimates made here are carried into any summary and allocated to the various works; but I should need probably an hour or two to go through that with you, and I do not think we can spare the time for it now. I think we had better leave it.

Chairman.—Very well.

Sir Frederick Hopkinson.—You say in a letter which you sent us the other day, or in a statement which you made, that it was notorious that prices of labour and materials had soared by leaps and bounds between 1919 and 1922?

A.—Yes.

Q.—I suggest to you that that is not correct—that the major increase in prices occurred before 1919, and that by 1922 the prices were down to the 1916 prices; that when Government control was taken off on April 13th, 1919, prices had a sudden jump then and went up to September, 1920, and then they fell rapidly to May, 1921, when they were down to the 1919 prices, and in 1922 were down to the 1916 prices. You say further that the prices of dredging plant had increased by something like 100 per cent. between 1919 and 1922. Simons' price for dredging plant was £190,000, I think it was. That would have made it £380,000 by 1922; but actually from the prices on which the contract was let the Government got a rebate from Simons?

A.—They did.

Q.—Which shows that prices have fallen?

A.—Yes.

Q.—Since they took the order. I do not quite understand, then, why you should say that the prices of labour and material had soared by leaps and bounds between 1919 and 1922?

A.—It is common knowledge that the price of Indian labour did increase by leaps and bounds from 1919. It was from 1919 that the price of labour did increase. The Special Committee appointed by the Government of Bombay to report on the scheme remarked in their report, dated November, 1925, quite gratuitously, because they would not report in my favour, that the excess was due—that is the excess for the 702 lakhs estimate—to the fact that " since Sir George Buchanan prepared his estimate the prices of working materials, fuel and labour had risen considerably. Also Sir George Buchanan's estimate had been based on exchange at 12 rupees to the £, whereas when the plant was imported in 1921 the rate was in the neighbourhood of 15 rupees to the £. That is the opinion of the special Committee appointed by the Government of Bombay.

Q.—Actually, labour rates in Bombay have never been more than double pre-war rates, have they?

A.—I was not engaging labour in Bombay, but the chief engineer, Mr. Lewis, certainly put it on record in his earlier letters that the way prices were going up, particularly of labour, was astonishing.

Q.—It never more than doubled itself between then and pre-war?

A.—There is the statement of the special Sub-Committee, deliberately appointed, and as I say they were not reporting in my favour. They gratuitously make that statement.

Q.—Do they say between 1919——

A.—They say: "The excess was due to the fact that since Sir George Buchanan prepared his estimate the prices of working materials, fuel and labour had risen considerably. Also Sir George Buchanan's estimate had been based on exchange at 12 rupees to the £, whereas when the plant was imported in 1921 the rate was in the neighbourhood of 15 rupees to the £."

Q.—All plant had been paid for in sterling. Therefore the rate of exchange does not enter into it at all?

A.—It certainly does.

Sir Frederick Hopkinson.—I think that is so, is it not, Mr. Billimoria? All plant has been paid for in sterling from Bombay?

Chairman.—Yes, but if you are paying £480,000 in England and your rupee is worth 1s. 8d., you have to spend far fewer rupees than if your rupee is worth 1s. 4d. That is the point.

Witness.—The point is that when this plant was paid for the rupee was 1s. 4d.

Sir Frederick Hopkinson.—But we have all along been dealing in sterling in all the prices for plant.

Chairman.—That is true, but when Sir George Buchanan puts an estimate of 367 lakhs, he is basing it on the rupee being worth 1s. 8d.

Witness.—Twelve to the £.

Sir Frederick Hopkinson.—Can you tell me off-hand how you made only 1,000,000 cubic yards less filling than Mr. Kidd had?

A.—I cannot tell you off-hand. I thought I had made it more.

Q.—No, a little less—dredged filling?

A.—Mr. Kidd made it 24,000,000 cubic yards and I made it 25,000,000 cubic yards.

Q.—That is right. He made it 24,100,000 and you made it 25,000,000. You made it nearly 1,000,000 more?

A.—Yes.

Q.—Was that a lump sum put on, or was it the result of calculation?

A.—Of course it was not put on. It was the result of calculation.

Q.—But you had no plans to work accurately to. You only had about two cross-sections over four miles of foreshore?

A.—I had all the cross-sections which Mr. Kidd had taken, at all events.

Q.—I think there were only two?

A.—I would not say that.

Q.—You estimate the total cost of the staff and supervision at 17.98 lakhs. Call it 18 lakhs. Actually it is costing 6¼ lakhs a year, so your estimate is only half the supervision?

A.—But, Sir Frederick Hopkinson, it is "Engineering charges, including all establishments, 17.98 lakhs." That does not include the whole of the establishments carrying out the works.

Q.—I quite understand that, but that is the establishment charge. You take the same basis of establishment as they take in Bombay. It only includes the superior establishment charges?

A.—It is "Engineering charges including all establishments." That means——

Q.—What it says, I take it?

A.—Yes.

Q.—Establishment charges are well understood?

A.—What do you say the establishment charges actually are?

Q.—They are double what you have allowed. They are 6¼ lakhs a year, and you took 18 lakhs for five years?

A.—Yes, and their 6¼ lakhs includes the establishment on the Khandivli Quarry.

Q.—Of course. That is part of the works, is it not?

A.—Not included in this estimate—not in the engineer's estimate. These are all included in the prices. No engineer's estimate includes under "establishment" prices of that kind.

Q.—Can you show me in any of these figures where you have got establishment charges charged to the Khandivli Quarry?

A.—No. Why should I?

Q.—I am sure you cannot. Can you show where it is allowed for in the prices?—

A.—We are discussing the matter from different points of view. You are discussing it from the point of view of a contractor making up a tender, and I am discussing it from the ordinary point of an engineer's estimate.

Q.—What do you include in it?

A.—That is an ordinary engineer's estimate at so much a cubic yard and so much a cubic foot.

Q.—But what is your establishment?

A.—I do not deal with establishment. It is "Engineering charges including all establishments."

Q.—"Including all establishments." What does it include?

A.—That includes the resident engineer and his office, and all our fees.

Q.—Does it not include all the other engineers?

A.—No.

Mr. Billimoria.—May I point out that this is a round figure of 5 per cent. added on? There is no calculation about it.

Sir Frederick Hopkinson.—No calculation at all.

Mr. Billimoria.—It is only a 5 per cent. addition.

Witness.—Very well; that is usual.

Chairman.—I confess I do not quite understand this point. Will you continue, Sir George? Sir Frederick Hopkinson has asked you what it includes. You say it includes your own fees and your own establishment?

A.—It includes presumably the resident engineer and his office.

Q.—It includes the resident engineer, the cost of the resident engineer's office; anything else?

A.—Yes, I suppose it would include the deputy-resident engineer. I cannot think of anything else.

Sir Frederick Hopkinson.—But surely the two engineers would not come to as much as 2 per cent—your fees. Does it not include the constructional engineers?

A.—No.

Q.—Surely they are establishment. Does it include the clerks? Are not they establishment?

A.—"Engineering charges including all establishments, 5 per cent." That is a usual figure to put on to estimates, as you know. If you want to know whether I worked out a detailed establishment for the whole of these works, certainly I did not. It was not my business to do so.

Q.—I am pointing out that your estimate is less than half what it costs.

A.—And I am pointing out that the whole of the establishments, if it had been let by contract, would be contractors' charges.

Chairman.—I may point out that Sir Frederick Hopkinson has been reading from Page 29. A reference to Page 13, item No. 5, Table B., shows that you altered the phrasing of it a little. "Engineering and management inclusive of establishment and all other charges." Does not that mean all the necessary cost of establishment?

A.—No, it does not include all the clerks for the contractors' part of the work.

Sir Frederick Hopkinson.—Where is that included?

A.—It is included in the figures.

Mr. Billimoria.—If you look at Page 30 you will find "Wages, stores and fuel" only are provided for in those other working costs—nothing more. None of the management expenses or overhead charges are there.

Sir Frederick Hopkinson.—Wages, stores and fuel. The rest is all supervision and establishment.

Mr. Billimoria.—That is so.

Sir Frederick Hopkinson.—I do not think I can carry that any further, but I would like to call your attention to an interesting little calculation. If you take Mr. Kidd's estimate, deduct the roads and drains, and add on 10 per cent., you get almost exactly your estimate of 1919, minus roads. In one case it is 292·36 lakhs, and in the other case it is 292·61 lakhs—almost identical figures?

A.—Yes. I do not see what is the inference.

Q.—I am pointing out an interesting fact.

A.—I do not see what the analogy is.

Q.—I am going to draw your attention to various things in connection with the estimates. Take the muram topping, for instance, in 1919. You said it was going to be 1,830,000 cubic yards. In February, 1922, you said it was going to be 3,660,000 yards—doubled?

A.—Yes.

Q.—Why is that?

A.—In February, 1922, did you say?

Q.—February 11th, 1922?

A.—Is that in a letter?

Q.—Yes, Page 63, the middle paragraph?

A.—I cannot see it.

Q.—" Referring to the revised estimate accompanying Sir George Buchanan's report dated 11th February, 1922, we find that the quantity of muram allowed therein is 100,000,000 cubic feet." That is double what was in the previous estimate?

A.—Yes, but there is nothing peculiar about that. As a matter of fact that estimate was not accepted, so why argue about it.

Sir Frederick Hopkinson.—I am pointing out to you the disparity in these various estimates. I have got a lot more points to put to you.

Mr. Billimoria.—A higher estimate than that was accepted. The 702 lakhs estimate was accepted. This is only 598 lakhs.

Sir Frederick Hopkinson.—I am going to suggest to you later on that the word " estimate " has been very grossly misused?

A.—I resent that suggestion.

Chairman.—I would like to know how it is that in February, 1922, you are suggesting twice the amount of moorum that you put forward as necessary in 1919? What was the reason?

A.—The reason was that Sir Lawless Hepper, as I told you the other day, asked me to put on to that estimate of mine 100 lakhs and divide it amongst the equipment of the area and the moorum filling, because he did not think we had got sufficient.

Q.—I wonder if you have got to hand that document, because I would like to see whether there was any contemporary alteration. Do you remember there was an alteration where you wrote the words in pencil, " storm water and sewerage "? You remember that?

A.—Yes. I have not got that with me. I will let you have it.

Q.—Again, I do not follow that. Did you consider that it was necessary to load your February, 1922, estimate by doubling the amount of moorum, or not?

A.—It was discussed.

Q.—Did you agree that it ought to be done?

A.—I did not think there was any particular objection to it. It had been put into the project estimate. In any case, nothing was done with this particular estimate, so why discuss an estimate which, in reality, was put into the waste paper basket?

Q.—The value of it is that it has your signature to it as an estimate revised and approved by you. That is the importance of it. If, of course, you did not believe that the moorum topping would cost 60 lakhs, but that it would only cost 30 lakhs, you would not have put it into your revised estimate. The question is, what was the reason?

A.—There was no objection to putting it into the estimate. They wanted a big estimate. There was no objection. We did not know exactly how much moorum we were going to put in. Sir Lawless Hepper said, " Better have a large sum than a small sum." We do not know now how much moorum is going to be used.

Q.—In point of fact, really, the extra amount of moorum was the difference between 1 ft. and 2 ft., was it not?

A.—Yes.

Mr. Billimoria.—May I point out that, out of the 100 lakhs which Sir George has been mentioning, 85 lakhs consist of only two items—roads, lights, storm water drains, etc., 60 lakhs, and 25 lakhs for contingencies, leaving only 15 lakhs to be apportioned among the other items. So that could not be with regard to moorum topping at all?

A.—Well, it was.

Mr. Billimoria.—85 lakhs are covered by only two items—25 lakhs for contingencies, and 60 lakhs for storm water drains. That leaves a figure of 15 lakhs to be accounted for, which, if spread over all the remaining items, 1 to 10, could not have gone into one item alone of moorum topping?

Sir Frederick Hopkinson.—Which all points to my remark about the misuse of the word " estimate."

Witness.—I resent that suggestion. I say that at the time these estimates were prepared they were the ordinary engineers estimates. I am willing to submit these estimates to an investigation by any impartial tribunal of Westminster engineers—absolutely willing.

Sir Frederick Hopkinson.—I should just like to run through the difference between Mr. Kidd's estimates and yours. With regard to Back Bay, Mr. Kidd says it is full of rocks and pockets, and impossible to get material for reclamation. You say the same. Incidentally, both of you appear to have been wrong.

A.—Why?

Q.—Because Mr. Lewis says you can get 25,000,000 yards from Back Bay, and they are getting it at the present moment.

A.—They are not getting 25,000,000 yards.

Q.—They are dredging at the present moment——

A.—I have no knowledge of what they are doing at present.

Q.—I will tell you then. The area is the same in each case; the line of wall is the same; the dredged material is the same; the dredging plant, 2,000 cube yards an hour, is the same, except that Mr. Kidd provided 7,500 H.P. and you provided 3,000 H.P.

A.—I beg your pardon. That 7,500 H.P. of Mr. Kidd's has not been verified.

Chairman.—We are making inquiries about that.

A.—It has not been verified yet.

Sir Frederick Hopkinson.—Make any deductions from what you like, you will find that you may possibly get it down to 6,000.

A.—It is no good making any guesses until you have the figures.

Q.—We know the horse-power of the winches, and we know the horse-power of the propelling engines, and we know the ordinary service pumps in the boat. Dredging plant, 2,000 cubic yards an hour, is the same; the booster was the same and the quantities were the same. Sea wall, the rubble bank is slightly different. Mr. Kidd provided for 25-ton concrete blocks; you provided for 20-ton blocks. Again, incidentally, neither of those were required. A foot of moorum topping is the same in both cases. Mr. Kidd provided seven pipelines and you provided five. The storm drains were omitted by Mr. Kidd, and were also omitted by you.

A.—I beg your pardon.

Chairman.—I do not think you agree to that?

A.—I do not agree to that for a moment.

Sir Frederick Hopkinson.—Now the estimate details. Mr. Kidd had six items; you had seven items. Otherwise your estimates are the same. Mr. Kidd gave his estimate of plant and temporary works at £500,000. Yours have cost two and a half times—which shows that we are not very far out in taking two and a half as the difference between pre-war and post-war costs. Mr. Kidd says his is a safe estimate. You say your prices are reasonable and reliable and you never over-estimate?

A.—Yes.

Q.—There is very little difference between Mr. Kidd's project and yours?

A.—Except that I maintain that Mr. Kidd had over-estimated his dredging.

Q.—It appears that you under-estimated it—that, under the most favourable circumstances, it is costing over a rupee a cube yard. Against his cost of 9 annas, which would probably have been just about right, and yours of 8 annas, it is costing over 16 annas?

A.—I have given you a lot of examples to-day of dredging costs at 2 annas. Supposing you put on another 2 annas, that is 4 annas, and you get charged nearly 7 annas as this dredging cost?

Q.—I do not accept those instances which you have given us to-day. They are all instances of single-dredger working. You have two dredgers working on the same pipeline. Therefore your costs must be doubled?

A.—You can double Mr. Kidd's, and still have a margin of 2 or 3 annas.

Q.—I do not follow that. We do know that Sir Sydney Crookshank considered Mr. Kidd's a very careful and ably prepared project, and he did not attach any value to your comparative estimate of 241·9 lakhs.

A.—And the Chairman has pointed out that Sir Sydney Crookshank had had no experience of that kind of work, and therefore any opinion of his was not reliable.

Q.—Again, on the subject of estimates, the project estimate of the value of the plant was 67 lakhs—£502,000. Your estimate was 10 lakhs—£75,000, a difference of £427,000?

A.—I do not quite see where that is.

Q.—I will tell you again. The project estimate of the value of the plant is 67 lakhs.

A.—Of all plant, or dredging plant only?

Q.—All plant, I presume. That is £502,000. Yours was 10 lakhs, £75,000—a difference of £427,000.

A.—You mean dredging plant, or all plant?

Q.—I mean all plant—the credit which the work was going to get when they had finished, and sold the plant?

A.—I did not buy the plant. My point is that I had no responsibility for any expenditure on the works.

Q.—You do not see my point. I am trying to point out how this poor word "estimate" has been misused. Here is one engineer, in 1922, saying it is going to be worth £502,000, and you consider it is only going to be worth £75,000. That is the sale price at the conclusion. I want you to look at this from the point of view of the Government of Bombay?

A.—You mean allowing for the value of the plant on the completion of the work?

Q.—Yes. You put 10 lakhs, and Mr. Lewis put 67 lakhs for the value—realisation value.

Chairman.—He was very optimistic.

A.—It has nothing to do with me.

Chairman.—No.

Sir Frederick Hopkinson.—I am contrasting the two. I am sitting here in the position of the Government of Bombay for the moment and trying to realise how I should have been bewildered when I received such so-called estimates.

Chairman.—You came to the conclusion that, at the end of the work, the greater part of the material would be sold at scrap rate, and therefore you put it at 10 lakhs?

A.—Yes.

Q.—Mr. Lewis, for some reason that is not very clear, thought that, at the end of the work, the plant would be worth 67 lakhs?

A.—Yes.

Sir Frederick Hopkinson.—I should just like to put in a tabulated form, so that it can be seen when the Report is considered, the various estimates. Mr. Kidd's in 1912 was 325·23 lakhs. Sir George Buchanan's in 1919 was 367·61 lakhs. Sir George Buchanan's in Februray, 1922, was 598·89 lakhs. As it was submitted this was 498, but an extra crore was put on it for some reason.

A.—At the request of the Director of Development.

Q.—Then the project estimate of April, 1922, is 702·43 lakhs, and then in July, 1924, as a result of the decision to dredge Back Bay, Mr. Lewis made it 726·54. Mr. Elgee made a revised estimate in January, 1925, of 712·79. Mr. O'Rourke, for the Advisory Committee, and based on dredging results of 1924-25, made an estimate of 1,109·43. Mr. Elgee's present estimate is 1,000 lakhs. And there has been no essential alteration in the scheme from 1912 to the present day?

A.—Quite true.

Q.—Now I will just finish the roads. Mr. Kidd, in 1912, said the roads, drains, etc., were going to cost 59·45 lakhs. Sir George Buchanan, in 1919, said they were going to cost 75 lakhs. Sir George Buchanan, in February, 1922, said they were going to cost 135 lakhs, and Mr. Lewis, in May, 1922, said they were going to cost 211·90 lakhs?

A.—That sounds very——

Q.—Awful, does it not?

A.—No. Take that last subject of roads. You must remember that there was 136 lakhs equipment of the reclaimed area which had nothing to do with the 367 lakh estimate or had nothing to do with Mr. Kidd's estimate.

Q.—Yes, it is all in?

A.—Oh dear no.

Q.—Yes, it is.

Mr. Billimoria.—At page 13, if you refer to the report, the figure is there—59 lakhs.

A.—Fifty-nine lakhs was not to include the equipment of the whole of the reclaimed area, because no one knew how it was going to be equipped.

Sir Frederick Hopkinson.—What do you mean by all the equipment?

A.—Roads and sewerage works.

Sir Frederick Hopkinson.—It specifically says "roads."

Chairman.—Are not you rather in a difficulty over this in making that statement—because you never saw the Public Works Department estimate?

A.—No, I never saw the Public Works Department estimate.

Q.—You did not know what it contained?
A.—No, I did not know what it contained.

Q.—Therefore, not knowing its contents, why should you say so positively that the roads, lighting, and drains of the Public Works Department, 59·45 lakhs, did not include the lay-out?
A.—I cannot say, because I never saw the estimates.

Q.—In fact, you arrived at your figure of 75 by putting on a percentage?
A.—Yes.

Sir Frederick Hopkinson.—Once more referring to Mr. Kidd's details, if you look through his papers you will find that he gives rates for all sorts of people—the Chief Superintendent, Superintending Engineer, the Dredging Master, laddermen, Chief Surveyor, second engineers, engine-drivers, and so on. You gave none of that information?

A.—No, I would not expect to give it. No engineer would expect to give it. But I do give what Mr. Kidd does not give. I give the quantities of cubic yards of concrete and facing and tipped rubble, and so on.

Q.—I mentioned that. You split it into six items, and he gives it in one—lineal measurement. I should like to call your attention to the fact that the prices which the Directorate have recently been paying for all these men I have been speaking of—superintending engineers, and so on—are just about two-and-a-half to three times the price that is contained in Mr. Kidd's schedule, which again confirms our two-and-a-half. I should also like to get it on the notes as an interesting comparison between 1912 and 1920, that ship plates in 1912 were £8 10s. a ton and £24 10s. a ton in 1920, when the dredger was purchased.

Sir H. Courthope-Munroe.—Do you accept that, Sir George?
A.—I do not know.

Chairman.—The Director-General of Stores has proved that from official documents which he has put forward. It is all on a table here.

Mr. Billimoria.—Sir George, I am afraid I shall have to make some preliminary remarks before I ask you a few questions. You will appreciate that this is an Enquiry Committee, and if some of the questions appear on the surface to be unpleasant, you need not necessarily assume that these are intended to offend or annoy you. What I want are the facts and the truth, and we are particularly anxious that you should be good enough to help this Committee by enlightening us on the true state of affairs, as you may be able to do so, to the best of your ability and knowledge.

Chairman.—I think Sir George has been very helpful to us.

Mr. Billimoria.—I do not deny that. I have to make these observations so that there may not be any prejudice, or that any of my questions may not be misconstrued. What I want are the facts, and I shall be obliged if you will be good enough to tell us exactly what you know of the situation. Most of the ground has already been covered by our Chairman and my other colleagues who have preceded me, and therefore I shall confine myself to asking you a few questions with a view to eliciting a few further facts. I am very glad to observe that you have the benefit of being assisted by three legal luminaries of the British Bar. The Committee welcome those eminent lawyers here, but I find that it has not gone on our records, or at least on the evidence, as to the circumstances under which you were extended this special indulgence of appearing by counsel. I have to mention this, because when our Report is written and submitted to the people in Bombay, it is quite likely that questions may be asked in the Legislative Council, and in other public places, as to why this special concession was made in your case. I understand from certain statements that have been made by your eminent learned counsel, Sir Harry Courthope-Munroe, that you do not want to take up the attitude of being on trial or on your defence. May I therefore ask you whether you had any feeling that the public mind, being seriously agitated, and the scheme being likely to prove to be a financial failure of serious dimensions as the result of relying on your advice, you thought it advisable to engage counsel and lawyers to defend you?
A.—I can reply to that question, Mr. Billimoria.

Q.—If you please?
A.—No such idea entered my mind, but such extraordinary statements had been made in the course of the Enquiry in Bombay that I thought it would be advisable for me to have the assistance of the legal luminaries whom you have mentioned.

Q.—I very much appreciate that.
A.—That is the reason.

Q.—It clears the atmosphere to a very great extent, because you can understand that, when we get back, in certain political quarters questions may be asked as to why we showed special indulgence to you.

A.—Well, that is the reason.

Q.—Will you kindly turn to the book of correspondence, page 160, paragraph 2 of the letter written by Mr. R. J. Bell, Secretary to the Government of Bombay in the Development Department. It is dated 28th August, 1925. The Government of Bombay through their Secretary state as follows: "I am desired to emphasise the very unsatisfactory nature of these figures and to state that Government view with great dissatisfaction the slow progress of the work, which threatens most seriously to prejudice the financial prospects of the scheme. Government undertook the reclamation on the recommendation of Sir George Buchanan contained in his report of September, 1919." Have you any remarks to offer on the observations of the Government of Bombay as contained in paragraph 2 of this letter?

A.—Yes. I have given the reply several times.

Q.—Then, as you will observe, they go further and say: "The work cannot be completed until the year 1943, and the cost, excluding interest charges, will amount to 11 crores"?

A.—I do not accept that estimate.

Q.—Then in paragraph 3 they say: "So far, therefore, the matter of reclamation by suction dredging has proved a failure"; and in paragraph 5 they say: "In the circumstances I am to say that the Government call on you as the engineers for the scheme to take necessary steps without delay." I shall be very much obliged if you will kindly state what you have to say with regard to the observations made by the Government of Bombay as contained in the letter of the 20th August, 1925?

A.—I can only repeat what I have said before—that I do not think the dredgers have had a fair trial. I am only repeating what I have said several times, and you will excuse me repeating it once again. I would reserve an opinion until the work has been taken out of Government control.

Q.—By your suggestion of "a fair trial, do you mean in the year 1926? We are now at the close of the year 1926, when you expected the whole scheme to be completed?

A.—I say that the sooner the works are taken out of Government control and put into the hands of business people the better. In fact I will quote again what I said in my statement. "The creation of the Development Department and Directorate I consider, in the light of events, to have been a mistake. The Governor of Bombay (now Lord Lloyd) hoped that he would institute a new department with fresh blood, freed from the restrictions and red tape of other departments, but when he disappeared from the scene and with him the only driving force in Bombay, the Development Directorate degenerated to an ordinary Government Department slavishly following other departments and hide-bound by rules, regulations and restrictions. It was a Public Works Department being carried out on exactly similar lines to the recognised P.W.D. and subjected to precisely the same rules and regulations, but without its experience."

Q.—That is the explanation you offer with regard to the observations of the Government of Bombay. Now will you turn to Page 164, Paragraph 2, letter written by Sir Lawless Hepper to you dated 24th September, 1925, in which he says "It seems inevitable that Government will be faced with a very heavy loss." I am particularly bringing this paragraph to your notice because in the note which you have submitted you say that this is going to be a brilliant success. The Government of Bombay feel otherwise, and the people of Bombay feel very sore about it, because they know it is going to result in a very heavy loss. Paragraph 3 says: "The work will cost about 11 crores and will not be finished until about 1944-45."

A.—Those are all wild estimates. The estimate of 11 crores was a wild estimate.

Chairman.—You do not disagree with it if it continues in the same control, do you?

A.—No, not if it continues in the same control; I think it might go up to—well, I would not like to say how much.

Q.—In one of your letters you said the scheme, if worked at the rate at which it has been going on, would take 35 years?

A.—I did. I notice that some people have taken that seriously but as a matter of fact we tried a little sarcasm.

Mr. Billimoria.—May I now ask you to direct your attention to Page 175 of the book of correspondence, Paragraph 2. I will read one sentence only: "The data adopted by Sir George Buchanan in his report upon which he founded his estimates have been found to be unreliable." "These estimates, both as to time and cost will be exceeded beyond all reasonable allowance, and the item of dredging has been specially unsatisfactory." I suppose you make the same observations, do you?

A.—I do, certainly. I agree.

Q.—You do not agree with the Government of Bombay with regard to anything which they have stated in those various letter addressed to you?

A.—No. I think it would be better if they put their house in order.

Q.—Now will you kindly turn to page 129, which is a letter written by yourself to the chief engineer of the Reclamation Branch, dated 23rd July. In paragraph 2 you say that at the present rate of progress the reclamation will be completed in 35 years. In the light of what has happened do you at all doubt that this scheme will take 35 years to complete—knowing what has gone on in the past and how things have moved? Have you any doubts about it?

A.—It is difficult to express an opinion about 35 years.

Q.—That is your statement, Sir George?

A.—I was sarcastic. This statement about 35 years was written in a sarcastic mood.

Q.—In a sober moment how many years would you say it would take to complete the scheme?

A.—We hoped to arouse them by talking about 35 years.

Q.—Supposing they were in a very good slumber, how many years do you think it would take to rouse them?

A.—I think they ought to be aroused at once.

Q.—Talking seriously about it, Sir George, how long do you think it would take to complete the whole scheme? I am asking you because we have to recommend whether the scheme should be completed *in toto* or partially. Supposing this Committee decides that the scheme has to be completed, may we have the benefit of your advice as to how many years you calculate it would take for the whole scheme to be completed, taking into account the manner in which the work is at present going on, or alternatively with the necessary improvements which you no doubt could suggest?

A.—I am very sorry, Mr. Billimoria, but it would not be possible for me to give that information. It would really require a deliberate and considered investigation, and as I have no further connection at present with the scheme, I could hardly do such a thing. Your honourable colleague, Sir M. Visvesvaraya asked me more or less a similar question, and I then suggested, what I have suggested before—taking it out of the hands of Government and letting it out to contracts.

Q.—Seriously, how long do you think it would take?

A.—I should be very sorry to express an opinion.

Q.—I am very much disappointed at that answer, because the people of Bombay were looking forward to your advice and co-operation in this matter?

A.—I should be delighted to give you an opinion if I could, but you must remember that Sir Lawless Hepper thought the best thing he could do towards putting things right was to send me away, and he is now carrying on by himself. Sir Lawless Hepper said in his evidence that Government thought they had better leave him in entire charge. I should very much like to help you, but I have not got the information.

Q.—Very well then, we shall have to leave it at that. May I ask you one question with regard to your remuneration. You were paid a special remuneration for preparing and drawing up your report and estimate, and subsequently an agreement was entered into between yourself and the Secretary of State by which you were to be paid a commission of 2 per cent. on the total expenditure of the works?

A.—Yes, and which I may say we have not received.

Q.—You have stated you have received a substantial portion thereof. I take it that by now you have received something like six lakhs, or roughly about £50,000?

A.—I will take any figure like that, and I would again say what I stated the other day—and in regard to which Sir Frederick Hopkinson for once in his life entirely agreed with me—that when Income Tax and Super Tax and various other taxes and expenses had been taken off, there was not such a large sum left as one might imagine.

Q.—I appreciate that, but I suppose when you undertook the job you calculated all that; you foresaw it?

A.—Yes.

Q.—Every professional man, including myself, has always to look ahead in matters of that sort, so you cannot make any complaint about that?

A.—I do not make any complaints at all, only people have seemed to think it was a large sum of which we have had the entire spending.

Q.—I am raising the question because at Page 63 of your note you seem to be worrying about it. You say " We employed a permanent staff in our office whose time was chiefly devoted to the Back Bay reclamation scheme," and then you proceed to say that in many cases it has not paid your expenses. When the job was undertaken by you, I take it that you had anticipated what your expenses were going to be. You contemplated what staff you were going to employ—necessarily an expert staff because this

was of very vast magnitude. Therefore reading your Paragraph 80, I was a little surprised to find you making a grievance of the fact that the remuneration has not been sufficient to pay you your expenses?

A.—If you will allow me to say so, I should be very sorry if you took that as being a complaint.

Q.—I came to that conclusion on reading it?

A.—It is not a complaint at all; it is simply a statement of facts. There is no complaint at all.

Q.—When you undertook this job it was on the basis of an estimate of three crores and 67 lakhs. That estimate, according to your own report, was based upon substantially reliable data, and you said you never over-estimated an estimate.

A.—Yes.

Q.—Evidently, therefore, when this job was undertaken by you, you calculated that your gross commission was going to amount to about 6 or 7 lakhs—taking 1 per cent. on the dredgers?

A.—Yes.

Q.—You have practically been paid that remuneration, although not even 25 per cent. of the work has been done. Therefore, if this is in the nature of a complaint, I say the complaint is hardly justified, because you have been already paid the full amount of the remuneration which you originally anticipated, although not even 25 per cent. of the work has been done?

A.—As I said before you made your last remark, it is not a complaint.

Chairman.—I do not read it in any sense as a complaint. It is a statement of fact that, in fact, although you got the large sum of £45,000, against it you have to set off large numbers of expenses, journeys to India of yourself and other people, and in the result in some instances it has not proved remunerative. It is not a complaint at all.

Mr. Billimoria.—I am very glad to hear you do not make any grievance or complaint about it, but the people in Bombay will make serious complaint of it, because you have already been paid a sum of 6 lakhs for work which they anticipated you to complete for that remuneration, and they do not see anything approaching 25 per cent. of that work. That means they have to pay four times over if the scheme is to be completed. That is their grievance. Supposing, Sir George, when you submitted your report and estimate to Government, some officer in the department, either in the Public Works or in the Secretariat, had suggested that before any administrative sanction could be obtained it was desired to consider carefully your report, you would most willingly have given that officer all the information in your possession, I take it—if he wanted information or assistance from you?

A.—You mean, for example, Sir Sydney Crookshank?

Q.—Yes.

A.—Certainly. It would be my duty to give that information.

Q.—You would place before him all the necessary materials and data upon which you arrived at your various conclusions, without the slightest hesitation?

A.—Without the slightest hesitation.

Q.—You would have been very pleased to have discussed any points arising out of your report and out of these details?

A.—Yes.

Q.—I am very glad you admit it, because I find that your learned Counsel the other day raised the objection that we were not entitled to the details. Therefore your last few answers dispose of that objection. You say that any officer of Government had the right to demand from you particulars, and that you would very willingly have furnished them. Therefore this Committee is entitled to ask for those details from you, acting, as it now is, in the spirit of an Enquiry to gather all these details from you?

A.—Do not misunderstand me. I should be very sorry for you to think that I was not anxious to furnish everything to this Committee. This particular case raises a little bit of professional etiquette. An engineer does not usually publish all his calculations, and so on. It was not with any idea of keeping anything from you.

Mr. Billimoria.—I am very glad to hear that, because there was a passage at arms between myself and your Counsel when, on one day, he got up and said that the newspapers had reported something of mine to which he took exception.

Sir H. Courthorpe-Munroe.—I did not desire to cross swords with you. I think I made my position in the matter clear to the Committee.

Mr. Billimoria.—Your visits to Bombay in different years, Sir George, were not exclusively in connection with the reclamation work. Along with your visits to Bombay there were other visits to Baroda and other places in India and elsewhere. Therefore

you cannot say that all your visits were simply in connection with the reclamation scheme at Bombay?

A.—Not absolutely. The Secretary has the list of my visits.

Q.—He has, and from that list I find that you very often went to Baroda, and you enjoyed your Christmas holidays in Calcutta, and you had many other pleasant trips all over India?

A.—That is a very nice way of putting it.

Q.—So that the time you spent in connection with your various visits to India was not exclusively devoted to the reclamation work?

A.—No.

Q.—I will now direct your attention to the letter written by H.E. Lord Lloyd on the 25th May, 1919, and request you to turn to Page 29 of your statement. You remember the letter which was read out to you by the Chairman?

A.—Yes.

Q.—In Paragraph 34 you say: "If I said the scheme was impracticable he would turn it down at once and start on something fresh, but once my opinion was given he would refuse to allow any other expert to report, and he asked me not to let him down". This is in reference to an interview between yourself and the Governor of Bombay?

A.—Yes.

Q.—At the interview Lord Lloyd asked you not to let him down?

A.—Yes.

Q.—You have been good enough to explain to the Chairman what that means. What I want to get from you is this—that Lord Lloyd depended entirely upon your skill and ability to carry out the project, and had very great confidence in you?

A.—Yes, and I think he still has that confidence—at least I hope so.

Q.—I am very glad to hear that. He said so when he was giving evidence here. If you remember, that letter speaks of the financial aspects besides the engineering aspects; and you will agree with me that all engineering propositions are very closely linked up with finance?

A.—Yes.

Q.—Some schemes may appear very glorious on paper from an engineering point of view, but from the financial point of view they may not be so promising. If they are not promising or financially sound, there would be considerable hesitation before embarking on such schemes or projects?

A.—I absolutely agree with you.

Q.—Your report of 1919, and the estimates, were the foundation for giving birth to the present reclamation scheme?

A.—Yes.

Q.—The whole scheme is based on that report of yours of September, 1919?

A.—Yes.

Q.—If those estimates had been exceeded in a measure so as to make the scheme a financial failure, as pointed out by the Government of Bombay, it would mean that you have let down the Government. Do you agree with that?

A.—No, I would not agree that I had let down the Government at all.

Q.—The scheme was launched on the basis of your 367 lakh figure. If that estimate is three times as much now, would not you call it letting down your employer?

A.—No. If you ask me whether I have let down Lord Lloyd, I say no I have not, and some day, I hope, when this is all over, he will express his opinion upon the matter. You know as well as I do of the extraordinary optimism there was in Bombay. Even when the 702 lakh estimate was sanctioned they expected to get 369 lakhs of rupees profit.

Q.—Circumstances have altered since then?

A.—Circumstances have altered since then.

Q.—What I am driving at is this—that Lord Lloyd had implicit confidence in you?

A.—Yes.

Q.—He said he would not go and consult any other civil engineer but would rely on you absolutely. The whole scheme was launched, recommended and approved by the Government of India and the Secretary of State on the basis of the figure of 367 lakhs?

A.—Yes.

Q.—Now that that figure is three times as much do not you think it is letting down the Government?

A.—No. If you could prove that I was entirely responsible for the figure increasing to the extent that it has, it would be a very grave error of judgment on my part, but I

would like to try to make you believe that this plan and these estimates were made in good faith, with all the knowledge that I could get on the subject; and I still say that they were reliable in 1919. As I have said this afternoon, I am perfectly willing to let a board of impartial Westminister engineers express an opinion on that report and on those estimates.

Q.—You will agree with me that in the light of events that have transpired, this was rather a hurried report; that you did not give it as much thought and consideration as you might have done under normal conditions?

A.—Mr. Billimoria, I should like to agree with you, but I cannot accept that. I consider I gave it all the care, consideration and time that was wanted. If I may make an analogy, probably you are very quick indeed at making an audit. Supposing you make an audit and you take half the time which a less skilled professional man would take, you would not say that you had made an inaccurate audit.

Q.—True, but if I had overlooked something very material, I should be hauled up in a Court of Law by the Learned Counsel who is appearing for you, and I should be sent to penal servitude for seven years if I let down the shareholders of the Company.

A.—I consider that I remained long enough in Bombay to get all the information that I wanted. Then I went home and spent the whole time I was at home considering this report, along with a very skilled engineer indeed—the late Mr. Meik, an engineer quoted by the Government of Bombay as being in the very first rank of harbour engineers. It was five or six months between the time I took on this work and the time before it was finished.

Q.—Do you think your ten days' stay in Bombay was sufficient to gather all the information necessary for a scheme of this vast magnitude—perhaps the biggest in the world?

A.—Honestly I do, Mr. Billimoria.

Q.—Ten days was sufficient for you to gather all the data and information?

A.—It would not have been if I had been doing it as a contractor, but I was not. I was not doing it as a contractor would have done it. I had not to go and work out all the details on the spot of constructing the quarry. This was not a detailed report. This was a report upon Mr. Kidd's report. This was in no sense a working document. This was not a document with which you could have gone to a contractor and said: "Will you take the work on this?" In fact in the correspondence I have stated that the first thing to do after the administrative sanction to the scheme was passed was to get out the detailed working plans and estimates.

Q.—Your responsibility with regard to that report was very much greater than that of a contractor, Sir George, because it was on the basis of your report that the Government embarked on the scheme. Had you stated something otherwise in your report—had you expressed the slightest doubt that the scheme was not feasible, or that it was not financially sound, Lord Lloyd, as stated in his letter, would have directed his attention to something more serious, and would have abandoned the scheme altogether. So that there was a greater responsibility on your shoulders than there would have been on the shoulders of a contractor, who would simply have burned his fingers if he had gone on that estimate.

A.—If you will excuse me, it was no business of mine to report on the financial prospects of the scheme.

Mr. Billimoria.—The letter indicates that, "both financially and otherwise," as to whether it is a sound proposition.

Chairman.—The letter says "on the present prevailing prices."

Mr. Billimoria.—If it is on the present prevailing prices that indicates the same thing.

A.—I do not follow you.

Chairman.—In Lord Lloyd's letter of 23rd May he put before you two things. He wanted to be advised as to the feasibility of the scheme and whether, in view of the greatly enhanced prices of dredgers, the plan was a workable one.

A.—I understand exactly; but I understood Mr. Billimoria was suggesting that I should have assisted in discussing the ultimate financial success of the scheme.

Chairman.—Lord Lloyd never put that to you.

Mr. Billimoria.—Not the ultimate success; but in any scheme that is launched, if the cost is so much and the Government contemplated if they were going to get a return of so much it would be a financial success, then financial considerations come in?

A.—Yes.

Q.—If your report had stated 702 lakhs, and the Government contemplated it was not possible to recoup 702 lakhs, they would have given up the scheme as a financial failure. That is where the financial aspect comes in.

A.—In point of fact, would they?

Sir Frederick Hopkinson.—You mean that the ultimate result is affected by the cost?

Mr. Billimoria.—It must be so.

Chairman.—Mr. Billimoria's point is even shorter than that. He say, if Sir George Buchanan had stated at the outset 702 lakhs for the cost of the execution of the work, the Government might possibly have turned it down. Sir George Buchanan says: would they, in the prevailing spirit of optimism?

Mr. Billimoria.—If you will kindly return to your own report, you find that the Government of India was very, very cautious. They said: "Nobody had previous experience of reclamation on an open sea front."

A.—The Government of India were certainly very cautious, indeed.

Mr. Billimoria.—They would not have listened to anything at a figure of 702 lakhs. It is most unfortunate that things have turned out otherwise, but if Sir George's figure had been 702 lakhs there are grave doubts whether the Government of India and the Secretary of State would ever have sanctioned the scheme.

Chairman.—We must be a little careful about that because Sir Sydney Crookshank, when the point was put to him, said: "I am not at all prepared to say that I would have turned it down."

Mr. Billimoria.—I will put it in a different way. Leaving out the dredging proposition, if it had been an ordinary moorum filling proposition it would have cost 702 lakhs. If it was an ordinary dry filling proposition, and not wet filling, according to my learned colleague's figures it would have cost 702 lakhs, or perhaps a little less.

A.—I can hardly express an opinion about that.

Mr. Billimoria.—My friend has worked out the figures, and that is what he tells me.

Sir M. Visvesvaraya.—I think both of us are agreed as to that.

Mr. Billimoria.—So that the Government of India could never have entertained the proposal of dry filling at a cost of 702 lakhs. That is one of the reasons why I say the Government would have turned it down.

A.—Yes.

Q.—You know the area to be reclaimed is 1,145 acres?

A.—Yes.

Q.—Out of that only 22 lakhs of square yards of land were to be made available for building sites after providing for roads and open spaces?

A.—Yes.

Q.—If you will kindly turn to your statement at page 16, you will find there is a forecast in the middle of the page: "The Bombay Government anticipate carrying out the work in eight years, and the forecast is based upon that assumption and the leasing out of an area of 60,000 square yards per annum commencing with the seventh year on the basis of 60,000 square yards of leasing per annum." If you have 60,000 square yards per year; that is to say, available for leasing out, it would have taken 36 years to dispose of the entire area of 22 lakhs of square yards?

A.—Yes.

Q.—Thirty-six years is too long a period.

A.—That is a quotation from a letter of Mr. R. P. Russell.

Q.—He had gone into the scheme very carefully. He had considered the previous projects very carefully. Did you consider that aspect of the case, as to how many years it would take to sell the land?

A.—No; I did not. That was not within my province.

Q.—Were you told anything about it, or consulted?

A.—No; I was never asked a single question.

Q.—You have in your memorandum at various places made references to Committees appointed by the Government. I need not draw your attention to any particular passages, but in various places you have referred to that?

A.—Yes.

Q.—Did you at any time see the report of the Bombay Development Committee, published in 1914? (*Book handed to the Witness.*) Was that volume ever brought to your notice?

A.—I seem to recognise it, but I do not think I have read it.

Q.—Do you know the opinion that was given by Messrs. Jacob and Davies, the American engineers who had reported on the scheme?

A.—No.

Q.—It is page 185.

A.—No; I never saw their opinion.

Q.—I shall be obliged if you will kindly turn to page 185. It is a letter written by Messrs. Jacob & Davies, engineers, dated 21st March, 1911, to Ratan Tata, Esq. In paragraph 4, the last sentence is : " In our opinion this huge scheme is unnecessary and chimerical to the last degree. All this is entirely beside the question of whether the work can be done for the sum estimated by the Government engineers, which from the data collected on the ground last year by our representative, we consider is in the highest degree improbable, and we may even say, impossible." This is the opinion of very eminent engineers expressed in 1911?

A.—Yes.

Q.—Then later on they say : " We think that Government has got hold of the reclamation idea and has run it to death, without fully balancing in all their aspects what benefits and what harm will accrue to the city by this gigantic piece of meddling with the natural situation." Then if you will kindly turn to page 188, paragraph 8 of the same book, the same engineers express this opinion : " While we consider the Government cost figures as impossible on such a scheme as we deem proper and sufficient, they none the less had 13,000 borings from which to judge of the nature and quantity of the material available." Then at page 189 they say : " It goes without saying we gave you the best possible advice, not only with regard to yourself, but presumably with regard to the investing public, and stated we believe that the pressure on the available area of Bombay did not warrant any such scheme of reclamation, the return from which would seem to be highly doubtful, to put the case mildly. If the Government is willing to tax the people in favour of such a scheme, the matter assumes an entirely different aspect and puts a burden upon the public." Then at page 193, in paragraph 12 (*b*), at the middle of the page, he says : " As I have said before, both in the report and in letters to you, I cannot, for the life of me, see the slightest call for all this immense reclamation. Bombay has plenty of available area (except in the Native town) ; its population density," and so on. Then he says : " Any scheme of reclamation cannot be financially productive for many years (calculated at 31 years, I believe) "—according to that forecast it would be 36 years— " even at the low cost of reclamation which the Government arrives at, and even on the assumption that considerable blocks of land are taken up at rates of Rs. 25 per square yard per annum every year, while the reclamation process is still going on. This, I believe, is a far-fetched assumption, and not likely to be realised." Then I would draw your attention to these last few lines : " I should think that the Government would, or should, hesitate considerably before embarking on such a scheme, to find that the cost were higher than estimated or allowed for, which I believe would inevitably be the case, and finally to be compelled to leave it partly done, or have it drag on over much more time than was expected, or would not have the land taken up in the quantities or at the rates assumed, would be a disastrous affair for a town like Bombay." These gentlemen have turned out to be the real prophets.

A.—" I believe still that the place is ' reclamation crazy,' if I may use the term."

Q.—If you read the paragraph further on, he says : " My figure seemingly comes to over twice that of the Government, and my figure has large allowances which they may not have taken into account, for all that I know." The figure of the Government is evidently Mr. Kidd's. Then he says : Mr. Tata, I believe, will live to congratulate himself on having been persuaded from going into this thing, if the project ever comes off." Then on page 194 he says, in the last paragraph but one : " However, even in my over much more time than was expected, or would not have the land taken up in the Government's, and their estimates I can only look upon as optimistic."

A.—Yes.

Q.—What you have done is, you have taken a figure far below Mr. Kidd's figure, and yet here are these eminent American engineers who say that Mr. Kidd's figures are far too low. Can you give us any explanation as against the opinion expressed by these eminent engineers of America, who have eventually turned out to be trus prophets, as far as this scheme is concerned?

A.—No, I cannot. Who is Mr. Hewett?

Mr. Billimoria.—He is a partner in that firm evidently of Jacob & Davies, as you will see from the correspondence.

Chairman.—Was that letter addressed to the Tatas?

Mr. Billimoria.—Yes. It was submitted to the Committee and embodied in the report of the Bombay Development Committee of 1914.

Chairman.—That letter addressed to the Tatas must have fallen on very deaf ears, because, as we know, in December, 1917, the Tatas were crying out for a concession to do this very reclamation by dredged filling.

Mr. Billimoria.—We have heard a lot about that, but we do not know on what principle that was, or on what basis of figures the Tatas were prepared to do it. There is nothing before us. There is nothing to indicate that the Tatas were prepared to do it for 367 lakhs.

Chairman.—No.

Witness.—No, but they were prepared to do it. They were prepared to take on the work.

Mr. Billimoria.—Yes; but at what figure we have no evidence before us.

A.—I think that report is very interesting.

Q.—I am very glad that you find it interesting. What opinion have you to express about it?

A.—I do not know what data they had.

Q.—When you estimated you considered Mr. Kidd's figures were excessive. Messrs. Jacob & Davies find they are far too low—it ought to be twice as much. That is going back to 1911 or 1913?

A.—Yes.

Q.—Prices had advanced, as you have admitted, two-and-a-half times; so that if these figures are low, your estimate should have been at least 2½ times as much, and not at the figure of 367 lakhs?

A.—Well, I do not know the data on which these people expressed their opinion, but I have given very freely the reasons I had in preparing my estimate.

Q.—Will you kindly return to your report at page 6 : " The Government of Bombay are satisfied that Mr. Kidd's figures may be accepted with safety, as a sufficiently close approximation to the cost of the work to justify further investigation of the scheme." Then : " The Governor in Council has closely examined the figures, and is convinced that they have been drawn up with due care and are sufficient for the immediate purpose in view, and as such deserve detailed investigation." The Government therefore relied very much on the figures of Mr. Kidd, and did not consider them excessive. If you will kindly turn to page 7 of your report, you will find in paragraph 21 they say : " The investigation had been most carefully made, and might be accepted as exhaustive, the report was clear and complete, all doubtful points had been settled, and the revised estimate might be accepted as completely trustworthy and ample." So that the Government had ample confidence in Mr. Kidd's figures. Then in paragraph 24 of your report, it says : " The Government of India were, however, still unconvinced and expressed the opinion that a strong representative Committee should be invoked." Then at page 9 you stated that you did not agree with certain figures of Mr. Kidd, and that you had to go into the matter *ab initio* and prepare your own designs and estimates?

A.—Yes.

Q.—If the Government experts in various Departments, with experience at their back for a number of years, found that Mr. Kidd's figures were reliable, and if the independent experts, Messrs. Jacob & Davies, found that the figures were low, how were you tempted to believe that Mr. Kidd's figures were excessive?

A.—I do not know anything about the experts from America, I have not got their data, but really it would be very interesting to ascertain precisely to what extent the Government of Bombay did examine Mr. Kidd's figures.

Q.—As you will find from the corespondence between the Government of Bombay and the Government of India, when the figures were submitted, the Government of Bombay expressed the opinion that they had been thoroughly scrutinised and looked into by the Department of Government, and they relied on those figures?

A.—Yes.

Q.—Therefore, ordinarily one would take it that those figures were not excessive. If they were excessive, the Government Engineers would have pointed out that they were wrong and that they were excessive; but on the contrary they say they are trustworthy, thoroughly reliable, amply justified, and so on?

A.—With all due deference, I do not think that the officials of Government would ever say that an estimate was excessive.

Q.—They would not say that?

A.—I do not think they would say it was excessive.

Q.—They have not said it was excessive?

A.—I do not think that they would. They would not say that the estimate was excessive. I think you must consider in what spirit the Government of Bombay looked at the scheme. We know that a previous Governor, Lord Sydenham, was very keen indeed on getting his scheme through.

Q.—I will tell you why the Government of Bombay should have considered, if there was anything in it, that they were excessive, because at that time the Government of Bombay did not contemplate doing the work departmentally. It was to be done by a firm of contractors. The Government would not feel that 50 per cent. profit should go to the pockets of the Directors at the expense of the poor tax-payers of the City of Bombay. They would reasonably allow a certain margin for people who would come forward and undertake the job, but they would certainly not allow a private profiteer to come and put in his pocket 50 per cent. of 325 lakhs. Surely if you were there in the Government, you would put your foot down against any such proposal?

A.—I certainly should.

Q.—In the course of your evidence in reply to the Chairman, you have stated that the Government were inconsistent. I think you made that remark. I suggest that the Government were very prudent when they decided to have the scheme thoroughly examined by the best expert available before embarking on the scheme? If you would kindly turn to page 6 of your report, the letter from the Government dated the 6th December says that there was enough " to justify the further investigation of the scheme." So that they were not at all inconsistent when they employed an expert like your good self to advise the Government whether they should embark on the scheme or not? That was not an inconsistency at all?

A.—I cannot remember the remark that I made to the Chairman about there being an inconsistency.

Chairman.—I think I can tell you what it was. You pointed out that at one moment the Government had apparently regarded the report of Mr. Kidd as final and conclusive, settling every matter, and then there was a letter later on saying : " We have always recognised that we should have, before deciding this matter, to employ an independent expert." You are quite right in pointing out that there was an inconsistency there.

A.—Yes.

Q.—At one time they were saying that they regarded Mr. Kidd's report as final, satisfactory, complete and conclusive?

A.—Yes.

Q.—Then two or three years later they are saying : " We have always recognised that, before embarking on the scheme, we should have to take the opinion of an independent expert."

A.—Yes.

Q.—That was the point.

A.—Yes.

Mr. Billimoria.—I would rather not call it an inconsistency, but I would rather flatter the Government of Bombay, and say they were very prudent. They were very careful before embarking on the scheme to have another expert's advice; they were prudent, and not inconsistent.

Chairman.—They may have been inconsistent in a sensible way?

A.—Yes.

Q.—But it was not inconsistent. It does not follow that it was not prudent to do it.

A.—A prudent inconsistency, you may say.

Chairman.—You can have both.

Mr. Billimoria.—In the course of your evidence you have referred to the trials of the dredger on the Clyde. Do you suggest that the material in the Clyde is the same as the material that you find in Bombay Harbour?

A.—No.

Q.—The clay which you find in the Clyde is not the same as that in Bombay harbour?

A.—I have not any personal knowledge of it, but I should not say it was the same.

Q.—If it was the same do you think it was prudent or safe for an engineer of your repute to have placed an order with dredger builders which involved a test on the Clyde with material which you did not know about? What was the value of that test?

A.—If I may say so, I think really that question would be more suitably addressed to Sir John Biles, because he drew up the specification, and he arranged for the test. But I think you will find it is a very ordinary test. As I said this morning to Sir Frederick Hopkinson, this is not the only suction pump dredger that has been made, and I suppose there have been dozens and dozens of dredgers tested on the Clyde. Certainly I have had personal connection with 7 or 8 dredgers that were tested on the Clyde, in the same way that these dredgers were tested, and there has never been any complaint at all.

Sir Frederick Hopkinson.—It all depends what they have to do——how you test them, does it not?

A.—Yes.

Mr. Billimoria.—Was the material similar? It may be that the material in other harbours was infinitely better than what it was in the Clyde, so that the test would be a reasonable test?

A.—No; it was very similar material to the material at Bombay—clay and silt.

Sir M. Visvesvaraya.—They were suction dredgers, I suppose?

A.—Yes. The Calcutta Port Commission have got a lot of very powerful suction dredgers on the Hooghly, and I very often used to go there and inspect. The extraordinary thing is that of the numerous suction dredgers that have been built in the course of the last 20 or 30 years, this is the only case where there has been a charge of definite failure against the dredger.

Mr. Billimoria.—We will leave it at that. I take it that you kept diaries for all these years since you have given us so many details and dates of your various visits to Bombay, and so on? Could you produce any note from your diary with reference to your interviews with Mr. Messent in 1919 in connection with this scheme, when you were in Bombay in 1919?

A.—No, I do not think I can produce any note. In my private diaries I have merely made very short records.

Q.—If you had interviews with Mr. Messent I suppose they would be recorded in your diary?

A.—No, I do not think so. You must remember that I had known Mr. Messent for 30 years, and I frequently used to have dinner with him when I was in Bombay.

Q.—This was all after dinner conversation?

A.—Well, I think you probably will agree with me that most of the business in Bombay is done in after dinner conversations.

Sir Frederick Hopkinson.—Does not that account for the Bombay Back Bay reclamation works, because it looks very much like after dinner work?

A.—Or after lunch. He was a very great friend of mine, and I saw him as one does see an intimate friend—I probably saw him every day.

Mr. Billimoria.—I ask you that question because you have laid so much emphasis upon the information that was given to you by Mr. Messent. Undoubtedly Mr. Messent had a very great reputation in Bombay connected with the Bombay Port Trust, and one would look upon his view with a certain amount of weight and confidence.

A.—Mr. Messent and myself were boys together on large harbour works in the north of England, and therefore he was a very great friend of mine for the last 30 years. Whenever I have been in Bombay I would always go and see him, so that one did not have to go and write him official letters and say "Will you give me this information, or that information?"

Q.—It is very unfortunate so far as this Committee is concerned that Mr. Messent is dead and gone, otherwise we would have had some very interesting facts as to how he arrived at this data and how he communicated this data in conversation to you. You were employed as a technical independent expert by the Government to advise them on the feasibility of the scheme from an engineering point of view. Did any member of the Government or the Governor of Bombay or any officer at any time ask you to rely on Mr. Kidd's borings.

A.—No, certainly no one asked me to rely on Mr. Kidd's borings.

Q.—You were called upon to submit an independent opinion?

A.—Yes.

Q.—If you turn to the terms of reference there is no suggestion whatever that you had to depend upon Mr. Kidd's borings or anything of the kind?

A.—No, there would not be, but if you look at page 21 in my statement you will see a telegram from Lord Lloyd stating "My Government are desirous of securing your services at once. All plans and data are here."

Q.—That does not give any indication that you had to rely upon that data. Looking to the terms of reference as stated, page 1 of your report, the specific points on which your opinion was required, was: "The practicability of the scheme from the engineering point of view. (2) The suitability of the type of wall proposed, or alternate suggestions for better types. (3) The suitability of the proposed method of reclamation by means of dredging, or alternative proposals for same."

A.—Yes.

Q.—There is no indication that you had to rely on Mr. Kidd's borings or upon any of the past figures or data, but you were called in as a special expert, and Lord Lloyd made it perfectly clear that he would depend on your advice. If you turn to

page 9 of your report it gives the impression to anyone reading it that you had prepared this report quite independently of Mr. Kidd, because on certain points you differ from Mr. Kidd, and you say : " Under those circumstances I have had to go into the matter *ab initio* and prepare my own designs and estimates."

A.—Yes; that is true.

Q.—" There can be no doubt that for the following reasons the scheme is practicable." You are expressing there a very definite opinion?

A.—Yes.

Q.—Any layman or man in the street reading this report would come to the natural conclusion that your report was based upon a thoroughly independent careful investigation and examination?

A.—If you turn to page 11 of my report you will see I say : " On the assumption that Mr. Kidd's surveys and borings are correct, and I see no reason to doubt their accuracy, as a great many borings were taken, I accept his conclusion both in respect to quality and quantity of material."

Q.—That is true.

A.—I still maintain that I have never had anything to do with a project where there has been a more complete and systematic investigation by borings than by Mr. Kidd. In my letter on page 29 of my statement of the 29th May I wrote to the Joint Secretary of the Government of Bombay and the Public Works Department, and said : " I have examined the site on several occasions, and have satisfied myself that the survey and borings made by Mr. Kidd are sufficient to enable me to write my report."

Q.—That gives an impression that you have made some sort of independent investigation?

A.—In my examination by the Chairman I think that came up, and we agreed that " I have examined the site on several occasions " did not mean that I had taken any borings, but that I had gone over the ground and had satisfied myself that the survey and borings made by Mr. Kidd were sufficient to enable me to write my report. I had to report on Mr. Kidd's scheme, and I still say that Mr. Kidd's survey and Mr. Kidd's borings were sufficient. After all, Mr. Kidd's borings and Mr. Kidd's plans and Mr. Kidd's scheme had been sent to the Government of India by the Government of Bombay, with an expression of opinion that they were absolutely complete in every respect. and could be accepted with confidence.

Q.—So that any assumption with regard to the reliability of Mr. Kidd's borings was made on your own responsibility. No suggestion was ever made by any officer of the Government that you should rely upon them. If you relied on them it was on your own responsibility?

A.—I accept all the responsibility for relying on Mr. Kidd's borings.

Q.—Sir Frederick Hopkinson having taken you through the various figures of the comparative estimate, I need not trouble you about it, because he has already anticipated my questions, and I shall only ask you one question regarding it. Taking the cost of the sea wall alone, Mr. Kidd estimated 64 lakhs, and you in 1919 increased it to 118 lakhs?

A.—Yes.

Q.—In 1922 you increased your own figure to 200 lakhs, and the Chief Engineer in his project estimate increased it to 235 lakhs?

A.—Yes.

Q.—So that your figure of the sea wall was more than three times Mr. Kidd's figures?

A.—Yes.

Mr. Billimoria.—In spite of that, in your note you say that you have made a considerable saving on the sea wall. The dimensions of the wall were considerably increased, but the expenditure, on the contrary, has gone up. How do you reconcile that?

Chairman.—It is a considerable saving upon a section of the sea wall?

A.—Yes, and alteration in the design.

Mr. Billimoria.—The sea wall was reduced both as regards the weight and height?

A.—Yes.

Q.—But the expenditure has been twice your original figure, and three times Mr. Kidd's figure?

A.—Yes.

Q.—Have you any explanation with regard to why that figure has gone so high?

A.—I think a great deal too much money has been spent on the sea wall.

Q.—By whom?

A.—By the Development Directorate.

Q.—Had you no control over that?

A.—Absolutely none.

Q.—Why did not you put the brake on, saying they were not within the estimated figure? You are there as responsible engineer for the scheme.

A.—I never knew what the work was costing.

Q.—I know you have made a grievance of that.

A.—That is a fact. I could not put the brake on when I had not the faintest idea how much money they were spending.

Q.—Then what did you mean by being "responsible engineer"? In the book of correspondence at various pages you call yourselves "responsible engineers to the Government." What is the meaning of the expression "responsible engineers" if you allow things to drift in the manner they have done? Where do you come in as the responsible engineers?

A.—I think that would be more suitably argued by my Counsel.

Mr. Billimoria.—If your learned Counsel is going to argue that I shall listen to him with great attention.

Sir H. Courthope-Munroe.—That is all I want.

Chairman.—You want something more than that. You wish to carry your audience with you.

Sir H. Courthope-Munroe.—I hope so.

A.—I would just say that there seems to be as many definitions of "responsible engineers" as there are of "unctuous clay."

Mr. Billimoria.—If we had at every stage and every turn to fall back upon the dictionary, I suppose business morals would never exist.

A.—No.

Q.—I would invite your attention to the matter of moorum toppings. I want to refer to page 86 of the book of correspondence and to your report, page 4. In your report you say one foot of moorum toppings is sufficient?

A.—Yes.

Q.—At page 86 of the book of correspondence Mr. Lewis writes to you on the 29th May, 1923: "I am told that the thickness of moorum laid over the harbour dredgings averages something like 6 feet, and rises to 9 feet in places on the Mazagaon reclamation." If you had any conversation with Mr. Messent with regard to this moorum topping, Mr. Messent had experience and had personal knowledge that the moorum required there was 6 feet deep and not 1 foot. How did you come in your report to take the figure of only 1 foot?

A.—But we hoped to get much better stuff than they got in the Sewri reclamation.

Q.—Have you ever been to the Sewri reclamation?

A.—Frequently.

Q.—You must have noticed that the moorum topping is nearly 6 feet deep?

A.—Yes.

Q.—In many cases it is more than 6 feet.

A.—They began with a great deal less, and they they had to increase it.

Q.—In spite of that experience and knowledge, were you satisfied that only one foot of moorum topping was sufficient for the Back Bay reclamation?

A.—Well, the Sewri reclamation was very largely mud. Later they went into blue clay, but the Sewri reclamation is not on a rock foundation. We thought that 1 foot would be enough over the area. There is another point to be remembered. A great deal can be said about the quantity of moorum. It was decided in consultation with the town planner that it would be extravagant to put a foot of moorum over the entire area; and that the moorum should be confined to the roads, because you would not want to go and put moorum on the site of a house, which would be at once dug up for the foundations. So that there were several estimates for moorum. After the lay-out was obtained from Mr. Davidge there was another estimate got out for moorum on the supposition that it would only be laid on the roads.

Q.—Were you satisfied at the time when you wrote this report that 1 foot of moorum topping was sufficient?

A.—I was.

Q.—Within a short time thereafter you changed your opinion and made it double the quantity. In your revised estimate you take it at 2 feet deep?

A.—Yes.

Q.—Were there any circumstances, strange or unfamiliar or extraordinary, to make you believe otherwise in 1922 to what you believed in 1919?

A.—That, I think, we discussed when I said Sir Lawless Hepper had asked me to put on an amount for moorum reclamation and equipment.

Q.—May I ask you to direct your attention to page 103 of the book of correspondence? Mr. Lewis says: "That the whole show has busted." I will read the whole of the paragraph: "I would point out that we are by no means sure that the filling from the harbour is going to be of use as a means of reclaiming the area. If it proves unsuitable the fact will become common property about the time the work at Marine Lines will be stopped. What inference is the man in the street to draw?—'That the whole show has busted'." Have you any remarks to offer with regard to those remarks of Mr. Lewis?

A.—No; I only saw them since this Committee sat. They were not addressed to me.

Q.—You have no knowledge of those?

A.—No; no knowledge of those. They were addressed to his immediate chief, the Director of Development, and I never saw the correspondence between the Director of Development and Mr. Lewis.

Q.—Do you mean to say that such materials facts were kept back from you by the Development Department?

A.—Well, if you call that letter a material fact, that would never be sent to me.

Q.—It has been suggested that you and Mr. Lewis were not on good terms, practically not on speaking terms. It has been said because Mr. Lewis pointed out various defects in your working that you were hostile to him, and you actually recommended the Government of Bombay that his service should be terminated. Have you any explanation to offer with regard to that? I only say it has been suggested.

A.—Yes; I think I have made it sufficiently clear in my statements in my examination by the Chairman and others that I have no hostility at all, and never had, against Mr. Lewis. I believe I have spoken very fairly about him indeed in this room. All that I say is that his health broke down absolutely, and that affected him mentally and physically. As to personal hostility, I had none at all. It is quite true that he was in such a peculiar state that he would not see me. I have got a note, which I showed to Sir Lawless Hepper, that the last time but one when I was in Bombay, although I had been several weeks in Bombay, Mr. Lewis had refused to come near me more than two or three times.

Q.—So that I take it you are prepared to repudiate any suggestion made in Bombay that because Mr. Lewis pointed out various defects in your working you were hostile to him?

A.—Most emphatically.

Chairman.—That has not been stated in evidence.

A.—No.

Mr. Billimoria.—That has not been stated in evidence, but that is the suggestion which is made.

Chairman.—I am not taking any notice of anything unless it is in the evidence.

Mr. Billimoria.—Turning to page 12 of your report, you will find in paragraph 37: "From Mr. Kidd's plan I see he proposes seven pipe lines across the peninsula. I think this number is excessive, and have reduced the number to three." Have you any special reasons for disagreeing with Mr. Kidd?

A.—Yes; I have a number of reasons which will appeal to you very much as a resident of Bombay. One of Mr. Kidd's pipe lines was to go through the heart of Bombay I cannot remember the names of the buildings now, but it was quite impracticable to put a pipe line through there. I think they went past the Majestic Hotel, and through the congested part of Bombay.

Q.—We have heard Mr. Kidd, and Mr. Kidd said that it would be impossible to have this reclaimed with three pipe lines. The scheme could never work with three pipe lines. Do you still disagree with him?

A.—I do; and I do not see how he was going to put in his seven pipe lines.

Q.—You conclude your statement by observing that the scheme could be brought to a triumphant success. Do not you think that is a very bold statement to make when you are alive to the fact that, as a result of relying on your advice, the Government of Bombay are now placed in a most embarrassing position?

A.—Not for relying on my advice, but for relying on the powers given to the Development Directorate to spend money and carry out the work.

Q.—Do you seriously suggest that if there was no Development Department and you were the responsible engineer in charge, you would have carried out this project for 367 lakhs and completed it? Is that what you are seriously suggesting?

A.—No; I do not. Though Sir Frederick Hopkinson disagreed with me, I say that prices very materially increased between 1919 and 1922, and to-day the prices of labour in Bombay are considerably higher than they were in 1919.

Sir Frederick Hopkinson.—They are only double pre-war prices to-day.

Mr. Billimoria.—The scheme which was expected on a modest estimate to provide a profit of 30 crores will, on a careful consideration of all the circumstances as now ascertained close with a loss of 13 or 14 crores. Would you still call that scheme a triumphant success?

A.—Why should you say it will close with a loss of 13 crores?

Q.—That is the opinion of the Government of Bombay on the subject, expressed in their letter. You are fully aware of this correspondence, I take it?

A.—No; I do not think I am.

Q.—If you refer to page 179 of the book of correspondence this is what the Government of Bombay say: "The Government of Bombay undertook the work believing in the reasonable accuracy of Sir George Buchanan's estimate. The result so far has been that the annual output has not been more than 25 per cent. of it, and a careful and prolonged investigation shows that unless substantial improvement can be attained the work will not now be finally completed till 1944, and that assuming that the whole area is sold off by 1952 the scheme will close with a loss of between Rs. 13 and 14 crores. This loss written back to the present day is equal Rs. 3 crores, and Government are confronted with the necessity of writing off this sum. The result, in practice, is that provincial revenues will be burdened for 60 years with an annual payment of Rs. 20 lakhs to cover the interest and sinking fund charges on the anticipated deficit, and provision for the first payment had been made in the budget estimates for 1926-27."

A.—Is that from the Government of Bombay Development Department?

Q.—Yes.

A.—Well, that is practically Sir Lawless Hepper, is not it?

Q.—It is written by the Secretary to the Government.

A.—Yes; he would see the letter. That is the extraordinary situation.

Q.—According to what we now find, the resources of the Presidency are mortgaged for a number of years to come.

A.—I hope without being too optimistic that these figures will not be fulfilled.

Q.—That is not the view of the Government alone, but people within and without the Government have expressed grave doubts on the practicability or feasibility of the scheme ever turning out to be a financial success. Those are the remarks with which I conclude the examination in reference to your observations that the scheme is going to result in a triumphant success, and I thank you for the assistance you have given.

A.—Thank you very much.

Re-Examined by Sir H. Courthope-Munroe.

Sir H. Courthope-Munroe.—Mr. Billimoria has been good enough to refer Sir George to the fact of my appearance here as Counsel, and I hope your answer to him has satisfied him that in the special circumstances you were entitled to appear by Counsel, and I hope Mr. Billimoria will take it from me that I shall do my very best to assist the Committee to arrive at a true determination of the facts.

Mr. Billimoria.—I very much appreciate that and thank you for it.

Sir H. Courthope-Munroe.—May I fill up the remainder of the day, instead of dealing with the big questions, by clearing up some of the matters that have been dealt with this afternoon? It is not often one has an opportunity of travelling back into a large number of matters, and there are certain facts which are fresh in the minds of us all to-day which might be dealt with to-day and cleared out of the way. May I start by getting rid of the vexed question of Mr. Lewis, and once and for all bury it? It has been said that there was an antipathy between you and Mr. Lewis. I think Mr. Billimoria, if I caught him rightly, suggested that at some stage Mr. Lewis took objection to your instructions, or quarrelled with you as to the nature of his orders?

A.—There was a suggestion to that effect in Bombay.

Q.—Let us try to clear it up. Mr. Lewis, when you honesty recommended him to the attention of the Government, was in your view, a good man?

A.—A most excellent man.

Q.—With a good record?

A.—With a very good record. A great deal has been said about Mr. Lewis, and Mr. Lewis, when he appeared before this Committee, was, I understand, obviously in very bad health. I have known Mr. Lewis for a number of years, and I have no hesitation in saying that he was quite one of the ablest men in the Indian Public Works Department. He was the same type of engineer that is carrying out to-day the Sukker Barrage, and other great works in India. He was an excellent type of Indian Public Works Department engineer.

Q.—And had he been in a responsible position and had done good work?
A.—He had been in a responsible position and had done good work.

Q.—Let us dispose of the question of Anno Domini: what was his age when you suggested his taking over this work? Was he an old gentleman down and out, or what were his years?

A.—He appeared to be in robust health, I do not know what his age precisely was.

Chairman.—I should think about 49 to 50.

Sir H. Courthope-Munroe.—That is near enough.

Chairman.—He was just at the end of his service?
A.—He retired at 53, I think.

Sir H. Courthope-Monroe.—You would not say that everybody who had reached 50 years of age ought to be abolished?
A.—No.

Q.—You would not put it quite as high as that?
A.—No.

Q.—Assuming he was a sound man when you recommended him, which was in 1920?
A.—Yes.

Q.—In April, 1922, you had come to the conclusion, which I think you expressed in a letter of the 11th April, 1922, that Mr. Lewis's health had gone. You used the expression that it was a danger for him to continue with the work—that he was dangerous to the work?
A.—Words to that effect.

Q.—He had got to that stage?
A.—He had got to that stage.

Q.—Then on the 12th May you again write—I am epitomising your letter—saying Lewis is not up to the job. Then on the 3rd June, the next month, you complain in a letter that you could not get any information from Lewis, and that he was keeping you in the dark. Then a week after that you write a letter on the 8th June, of which my summary note is: "Lewis must go." That was in 1922?
A.—Yes.

Sir Frederick Hopkinson.—There was one letter which said he was too old.

Sir H. Courthope-Munroe.—I will come to that in a moment. So that he having come on the scene in 1920, in 1922, April, May and June, you write in various stages that the time had come when he was dangerous to the work, and not up to the job, and that Lewis must go?
A.—Yes.

Q.—He did not go. He remained on although you said he was a danger to the work all through 1922, and all through 1923 till August. Then you write on the 30th August, 1923, a letter which I will summarise by saying again, "Lewis must go."
A.—Yes.

Q.—In point of fact the man whom you had stated, in your opinion, was a danger in 1922 did not go till the 12th July, 1924?
A.—Yes.

Q.—So that he was in charge, notwithstanding your complaints, for two years and several months, dealing as responsible engineer with this very important work which, as Sir Frederick Hopkinson has repeatedly said, was the crux of the whole thing. That was notwithstanding your protest?
A.—Yes.

Sir Frederick Hopkinson.—You will realise at this time, in 1922, nothing practical had been done beyond ordering the dredger?

Sir H. Courthope-Munroe.—I am not arguing with you about it. I want to get these facts on the notes. I am reminded that in the final letter which I referred to of the 30th August, 1923, my summary of it saying, "Lewis must go," is not strong enough, because you say in that letter, which appears on page 87 of your statement: "Mr. Lewis no longer possesses our confidence. We believe he has done good work in his time, possibly he is still suffering from bad health or he is too old for the job; he appears to have no grip of the works; there is no co-ordination or planning out ahead, and we are convinced that, in the interest of the work, an immediate change is necessary."

Chairman.—That is right.
A.—"Old" is a relative expression.

Sir H. Courthope-Munroe.—I understand, as to the whole of this business you are going into this because you are bound to do it because, as the Chairman has said, there is no room for sentiment in this case unfortunately in view of what has happened, but the whole thing is very distasteful to you?

A.—Yes.

Q.—You are challenged about it, and you are now endeavouring to point out that for two years and three months you had been preaching the gospel "Lewis must go"?

A.—Yes.

Q.—The answer which is sent by Sir Lawless Hepper is this: "Your letter of the 6th September regarding Lewis' services. Lewis has intimated that he proposes to take eight months' leave due to him next July preparatory to him retiring." So that apparently he was to run on from September to July, and then the matter was to be considered?

A.—Yes.

Q.—He being there meanwhile in this state in charge of this most important work?

A.—Yes.

Q.—"After careful consideration the Government consider it desirable to accept his proposal." So much for that. You told the Committee that you honestly recommended Lewis and that he was a good man, but his health failed him, and when the time came, upwards of two years in fact before he went, you suggested that he should go?

A.—I did. I spoke twice to the Governor of Bombay on the subject. That is on record. There was also a meeting with the Member of Council concerned.

Q.—Do you think it is fair at this stage of the inquiry to charge you with anything that could be laid at Mr. Lewis's door? What more could you have done?

A.—I do not see that I could have done anything more. The Chairman suggested that I might have resigned.

Q.—That is a counsel of perfection. I will venture to deal with that when I address the Committee. You are referring to what the Chairman said about resignation?

A.—Yes.

Q.—Mr. Billimoria put a question to you about Mr. Kidd's figures. Let us just get rid of that once and for all. You have given a reason which in your view is a good reason why you regarded Mr. Kidd's figures as excessive?

A.—I have.

Q.—Will you put it in half a dozen words again, and we will leave it? May I refer to what Lord Lloyd drew attention to in his evidence? There was a clause in the agreement that in the event of there being a saving, there should be an allowance made for it?

A.—Yes.

Q.—Human nature being what it is, you thought naturally the man would be on the safe side, but when you came down actually to bed rock figures you thought they were too much.

A.—I honestly thought they were too much.

Q.—That is the point?

A.—Yes.

Mr. Billimoria.—I am afraid there is a little confusion with regard to that. That was not with regard to the original estimate. That was in connection with the second scheme.

Sir H. Courthope-Munroe.—That is my mistake. I thought that was the point.

Mr. Billimoria.—No; it was with regard to the smaller scheme.

Sir H. Courthope-Munroe.—I beg your pardon.

Chairman.—He said he wanted one-fifth even in the 325 scheme.

Mr. Billimoria.—I do not think so.

Chairman.—We will see about that.

Sir H. Courthope-Munroe.—If you would not mind looking at Lord Lloyd's evidence, the whole thing is put in a nutshell. If we read that we are possessed of all we need say about it, and there is an end of it. This question was put on page 74 of Lord Lloyd's evidence: "If one believes that Mr. Kidd has made a reasonably accurate estimate of 325 lakhs, and had noticed that he had said he was loading the labour with 20 per cent. for possible rises, and that he was loading the price of materials with 20 per cent. for possible rises, and if anybody had thought the matter over and came to the conclusion that Mr. Kidd's estimate was probably an accurate one, ought it not to have occurred to your advisers and, indeed, to you, when you were reading it"—this is the crux of the thing—"that if Mr. Kidd could do it for 325 lakhs Sir George Buchanan could not possibly do it for under 700 lakhs." That is a question and a perfectly clear question, and it is also the question which has been put to Sir George. Lord Lloyd's reply is

this : My reply to that is : no, I do not think so. I think I have apprehended your point rightly. I am not aware how far the items of Sir George Buchanan's estimate have been actually checked with reference to rates for labour and materials prevalent in Bombay in 1919. I can only make a general criticism, which is a layman's observation, and say that in the first instance the estimate of Sir George Buchanan was not accepted at 367 lakhs. You are probably aware of that, are you not? That is not accurate."

Chairman.—We can dispose of this in a moment. Mr. Kidd did in fact in the 325 estimate stipulate for one-fifth of the saving.

Sir H. Courthope-Munroe.—Yes.

Chairman.—It is page 7 of his report : "' The further condition proposed of one-fifth from any savings effected would make it in our interest, as well as that of the Government, to attain the most economical result."

Sir Frederick Hopkinson.—It is a very common stipulation.

Mr. Billimoria.—But that is the alternative.

Chairman.— That is the actual text of Mr. Kidd's report of 1912.

Sir Frederick Hopkinson.—It is a common stipulation, and a very good one.

Sir H. Courthorpe-Munroe.—When your figure came out to be under his, the reason right or wrong was that you thought the figure he put a tall figure, or a little bit more than you thought it would work out to be?

A.—Yes.

Q.—You thought on that there would be something on which that one-fifth rebate would be payable?

A.—Yes.

Q.—Mr. Billimoria also referred to a matter which I think you have very much at heart, and that is the fact that Lord Lloyd placed implicit confidence in you?

A.—Yes.

Q.—I think you hope that you still deserve it?

A.—Certainly I hope so.

Q.—So far as you know, have you done anything not to deserve it?

A.—No, I do not see that I have done anything to deserve losing his confidence.

Q.—You have repeatedly said that you were not called upon to advise the Government of India upon the financial side of the scheme?

A.—That is so.

Q.—What you were asked to do was, to advise as to the practicability of the scheme?

A.—Yes.

Q.—In a broad sense finance is involved in that; but the finance of the matter was for the Government to consider?

A.—Absolutely.

Q.—In dealing with a vast and important country like India, there may be many things which would be most advantageous to the country that might at the moment be bad from the mere financial point of view?

A.—Yes.

Q.—But your view, which you have expressed to the Committee, is that in the long run Lord Lloyd's views will prove right, and that when this is completed, in the end it will be a big thing and a good thing for India?

A.—In the long run I certainly hope that it will prove a success, and that Mr. Billimoria will live to see it.

Q.—We hope so. Then Mr. Billimoria tried to draw you along the slippery path of giving the date when the work would be completed. You could not do that; but I suppose as a matter of fact if this matter is put out to, I will not say world competition, but put out to the big contractors to deal with, you will get a fair opinion as to when the work can be completed—if the matter is offered to contract, with the time limit, and the views of the contractors are taken?

A.—At the present moment I have ceased to have anything to do with the work.

Q.—Let us hope that is only a temporary matter.

A.—When things have settled down and the matter has been taken away from the Development Directorate and possibly given to contract, I am confident that there will be an enormous change.

Q.—It has been said that although this thing is a failure and all wrong financially, substantially the trouble has been over the cost of dredging?

A.—Entirely.

Q.—You say entirely; I was going to ask you whether there may be other things, but that is the big thing. The big thing that has caused all the trouble is that the cost of the dredging has simply run away with everything. I think I can certainly say that. I do not think anyone will disagree with that.

A.—No.

Chairman.—There is also the long length of sea-wall, which has cost 200 lakhs, which is now lying idle, and interest on which is being lost each day.

Sir H. Courthope-Munroe.—Yes.

Sir Frederick Hopkinson.—It is not only the cost, but it is the failure of the dredgers to do the work in the time.

Sir H. Courthope-Munroe.—Yes. I am coming to that. This is the big thing. The failure of the dredging may be owing to your having useless plant, or faulty plant, or inadequate plant; or it may be due to what you repeatedly have referred to as the "human element".

A.—Yes.

Q.—Rightly or wrongly, you think that it is the human element?

A.—I do. I think that it is the human element.

Q.—You still think, and you have said so to this Committee, that notwithstanding all you have heard about the comments that have been made, and all the evidence that has been given, that this dredger is right?

A.—I do.

Q.—And you would order it again, if you had to do similar work?

A.—Certainly, I should order the same type of dredger.

Q.—I think I am right in saying that you do not stand alone in that view. A witness, Mr. Speirs, who was called in Bombay, agrees with you, and Mr. Kidd approves of the cutter. Mr. Elgee also says that the cutter did its work. Mr. Brims admits that it is possible to get 2,000 yards an hour out of it?

A.—Brims admits that he has got 2,000 yards.

Q.—Mr. McMurray says that the dredger did in fact 75 per cent. of what it was to do in the Clyde. I will meet the point about the Clyde in a minute.

A.—Yes.

Q.—Whether you are right or wrong, do you stand alone in your opinion?

A.—No.

Q.—You have five or six people who take the same view?

A.—Yes; and Sir Henry Lawrence gave a very favourable opinion.

Q.—Sir Henry Lawrence added the valuable point in his evidence that the crew of the dredger had actually to be got rid of and replaced?

A.—Yes.

Q.—That rather points to the human element again?

A.—Yes.

Chairman.—You must not enlist Mr. Kidd amongst your supporters. He may have approved of the particular type of rotary cutter, but he disapproved of the inadequacy of the horse-power, which is very important.

Sir H. Courthope-Munroe.—One labours under a disadvantage in this case where one comes in really on the 30th or 40th day, and one has to pick out on the Shorthand Notes the various points; and I rather gathered that Mr. Kidd had approved of the cutter.

Chairman.—That is right: but when it turned out that the "Sir George Lloyd" was stated to be of 3,500 horse- power pumping, he held his hands up and said: "Your difficulties are explained".

Sir H. Courthope-Munroe.—You have had the advantage of seeing him, and I quite accept that. It is rather important, on this very big question, at some early stage that we should put before the Committee your view and Lord Lloyd's view, and the view that one can gather from the whole of the scheme, as to what in fact your duties were.

A.—Yes.

Q.—We will try to do it to-morrow. Your case is that the whole of the man-handling of this dredger was in the hands of the gentleman who was called the "Chief Engineer," but who was in your document called the "Resident Engineer," Mr. Lewis?

A.—Yes.

Q.—As to whom for two years and three months you were the voice crying in the wilderness to get rid of him. He was the man who had the handling of this?

A.—He and his staff.

Chairman.—He should have been the driving force behind the whole concern?

Sir H. Courthope-Munroe.—That is it—the driving force, acting under Sir Lawless Hepper, whom Lord Lloyd dignified by the name of the " watch-dog "?

A.—Yes.

Sir H. Courthope-Munroe.—What sort of watch-dog he was we will go into later.

(*Adjourned to to-morrow morning at* 10.30.)

The Committee Assembled at 10.30 a.m. on the 13th November, 1926, all Members being present.

The examination of Sir George Buchanan was continued.

Sir H. Courthope-Munroe.—Sir Grimwood and Sir George: I was going to suggest, if I may, that the time of the Committee would be saved if at this stage, instead of my continuing the re-examination of Sir George Buchanan, I should take advantage of the opportunity you have given me of saying a little upon the meaning, as I understand it, of the agreement. I have to put a number of questions to Sir George which must go upon a certain basis, and I think it would be in the interests of time if I were now, with your permission, to endeavour to deal with what I conceive to be the true construction of the agreement. Then when we have discussed that we are rather more on a basis to go on with my questions to Sir George; but I am entirely in the hands of the Committee.

Chairman.—Certainly.

Sir H. Courthope-Munroe.—Then, with your permission, I will proceed to do that. This matter really opens in consequence of observations which you were good enough to make in the course of the proceedings when, at the end of the meeting on Tuesday, 2nd November, in the course of the morning you put this to me. You said: " Sir George and Sir Harry, this is, in our opinion, a very curious and very difficult agreement. I do not know whether you have studied it at all, but I think if you would consent to extend your powers here a little, and would just address us for half an hour at some time on the text of this agreement, and on the point as to how far Sir George was responsible for the execution of the works as apart from supervision, it would be very useful." That is a matter upon which, on behalf of Sir George and certainly for myself, I am very much indebted to you for the opportunity you have given me. My only regret, if I may respectfully say so, is that this opportunity should be afforded at the 58th meeting, and not at the first meeting; but that is the irony of events.

Chairman.—You were not present at the first meeting.

Sir H. Courthope-Munroe.—I was not present. That is one of those things which really no one can control. Viewing it from my standpoint, and viewing it also from the terms of reference to this Committee, it does seem to me to be essential that before one starts out as this Committee has got to do, to apportion blame one must ascertain what is the contractual duty, and even, if I may so put it, the moral obligations of those persons who are concerned in the matter.

Chairman.—Did you say: " Before this Committee starts out, as it wants to do, to apportion blame "?

Sir H. Courthope-Munroe.—No.

Chairman.—We do not want to apportion blame. We may have to do it as part of our duty.

Sir H. Courthope-Munroe.—I agree; but what I meant was this. Taking, very shortly, the original terms of reference, you are to enquire: " Into the history of the inception and conduct of the Back Bay reclamation scheme." Naturally you have had, in an immense enquiry like this, largely to amplify that; but taking the mere word " conduct," that must mean and can only mean the conduct of A, B, C, D, E, and F—whoever have been concerned in the matter.

Chairman.—Quite so.

Sir H. Courthope-Munroe.—I respectfully suggest before you can consider and weigh the blame to be attached to the conduct of A, B, or C, you must ascertain in your own minds what you believe to be the contractual obligation of A, B, C, or D. That is too obvious, almost to state. That being so, it is a matter of regret that this agreement, which is the basis and the foundation, in one sense, of this enquiry, should lend itself to

being spoken of by you as "a very curious and very difficult agreement." I am not prepared to challenge that for a moment. It is emphasised, if need be, by this fact, that almost throughout this enquiry Sir Frederick Hopkinson has intimated his view as being that my client's position is, for all practical purposes, that of a contractor. That is his view, and he may be entitled to hold it. On the contrary, another member of the Committee, Sir M. Visvesvaraya—I do not know whether he happens to be a lawyer—has expressed a view, which is the view I take and the view which I am going to urge upon you most strongly, which is directly contrary to the view taken by Sir Frederick Hopkinson. Might I refer briefly to page 21 of the Evidence, and read what Sir M. Visvesvaraya said, because it expresses very succinctly and very clearly the view I want to put before you

Chairman.—Which note are you reading from?

Sir H. Courthope-Munroe.—I am reading from page 21 of the notes of the evidence of Sir Lawless Hepper in cross-examination.

Chairman.—That is page 21 of the evidence of Sir Lawless Hepper.

Sir H. Courthope-Munroe.—Of the print, not of the type. I only read this because it shows the various views. We have a difficult agreement to construe, and you have the view on one side of one gentleman, and the view on the other side of another. Before you can endeavour to do justice you must get, if you can, at what the meaning of that agreement is, and attach a meaning to the agreement.

Chairman.—Certainly.

Sir H. Courthope-Munroe.—Sir M. Visvesvaraya says this: "The engineers give professional advice, but they have no responsibility for the expenditure. The responsibility must rest either with the Director or with the Government of Bombay.—(A.) The Government of Bombay sanctioned the estimate. (Q.) But they worked through you? —(A.) Yes; but Meik and Buchanan are to carry out the work." Perhaps I might break off there to call attention to this. That answer is incorrect, if you look at paragraph 3 of the agreement, as I shall do in a moment. You will find that the carrying out of the work is, by paragraph 3, dealt with in distinct terms. Those words: "Carry out" are used in that paragraph 3, and, as far as I can see, they are not used anywhere else. That is handed over to the Director of Development and to the resident engineer. The next question put by Sir M. Visvesvaraya is this: "The local Directorate carries out the work, and is responsible for the expenditure. All technical advisers take no responsibility for the progress of the work, or for the expenditure. They advise at every stage." Then you very properly pointed out that that depended upon the construction of the document, which it obviously does. Then you say: "When he was described as engineer Sir George Buchanan's assertion was: 'I am nothing of the sort.' He wrote a letter to say: 'There appears to be a misunderstanding. We are not consulting engineers. We are the actual responsible engineers.'" Then Sir M. Visvesvaraya says: "That is their assertion, but it has not been accepted by the Government.—(A.) Of course." There, again, may I pause to say this? In discussing this matter with you I am accepting your invitation to discuss it as a lawyer. What Sir George Buchanan may have thought fit in the loose language of letter-writing to assert or not to assert, does not affect the position I am putting before you. I am putting before you, to the best of my ability, the documents and the agreement, and I am asking you to construe them. I agree with what Sir M. Visvesvaraya says: "That is their assertion, but it has not been accepted by the Government."

Chairman.—Will you just consider an intermediate possibility, the possibility that they were engineers, and in certain respects performing work generally performed by contractors? That does not necessarily mean that they had any responsibility for the execution of the works at Bombay. We must keep that very clearly in our minds.

Sir H. Courthope-Munroe.—I follow you.

Chairman.—But were they solely and entirely in everything they did engineers, or were they not, as regards some very important part of the work, doing work ordinarily done by contractors? Supposing one were to agree with you, then you have to look a stage further and ask: "Was there, in fact, any responsibility for the execution and the progress of the work in Bombay apart from the duty of supervision?"

Sir H. Courthope-Munroe.—Yes; I quite agree, and I am much obliged to you for putting it to me so clearly.

Chairman.—Those are the three positions.

Sir H. Courthope-Munroe.—Yes. When I come, at a later stage, to the actual document, I shall endeavour to extract from that document the whole of Sir George's contractual obligation, and the whole of his duty, as I conceive it. So much for that.

Before I come to deal with the actual document and the modification that was made in 1923—you remember there was a letter about it, and I treat it as one—it is necessary in order to get into one's mind the position to refer to four matters. First of all, there is the report of 1919. I shall touch upon that very lightly. Then there is the scheme—I think that is the correct word to use—called the Bombay Housing and Development Scheme, which was the result of the report.

Chairman.—I do not quite follow that—the report of 1919?

Sir H. Courthope-Munroe.—There is Sir George's report of 1919 which we have had *ad nauseam.*

Chairman.—Then you said the Bombay Housing and Development Scheme?

Sir H. Courthope-Munroe.—There is a document I have got called " The Bombay Housing and Development Scheme." That is dated the 17th March, 1920, which is the following year. I want to refer to that because that in effect deals with the foundation of the Development Department.

Chairman.—Yes; the Development Directorate.

Sir H. Courthope-Munroe.—Then the next stage which I want to refer to again in some detail is Lord Lloyd's evidence, because he deals with the history of the thing and the calling in of Sir George, his report, then the scheme, and then he tells the Committee what he thought to be the working of the scheme within the intention of the agreement. Then, lastly, we come to the agreement.

Linking those four together, I say that the scheme shows that the view put forward by Lord Lloyd to this Committee was the correct view of what was intended. I accept every word of what Lord Lloyd said, and I go further, and say that the actual agreement entered into between the parties was this. Although I agree it was very curious, as the Chairman has said—most curious—I want to say, with regard to the things it was to do, and in the events which have turned out, it is difficult of construction; but when you look through the whole thing, the scheme, the intention of the scheme, Lord Lloyd's evidence, and what he said the scheme was intended to do, and the agreement that was in fact entered into, I say they all point to the fact that the ultimate result is that my client was in the position pointed out by Sir M. Visvesvaraya in the extract I read.

Mr. Billimoria.—May I request you kindly to add the interview which Sir George Buchanan had with the Secretary of State, as the fifth point in linking up those various points?

Sir H. Courthope-Munro.—I do not quite follow what that is.

Mr. Billimoria.—It is the interview which Sir George Buchanan had with the Secretary of State before the scheme was embarked upon.

Sir H. Courthope-Munroe.—What is your proposition upon that?

Chairman.—Mr. Billimoria wants you to recite the statement which Sir George Buchanan himself has given us. There is a rather important passage in it.

Mr. H. Courthorpe-Munroe.—Is that in Sir George's statement?

Chairman.—Yes. That is what is in your mind, Mr. Billimoria?

Mr. Billimoria.—Yes.

Sir H. Courthope-Munroe.—I should like the reference, as I am anxious to put every card there is on the table.

Mr. Melville.—I think it is at the bottom of page 50, the interview of 1920?

Mr. Billimoria.—That is it.

Sir H. Courthorpe-Munroe.—It is the interview with Mr. Montagu.

Chairman.—The particular passage Mr. Billimoria wants is about a third of the way down from the top of the page.

Sir H. Courthope-Munroe.—Perhaps I might read it, if Mr. Billimoria would like it read. It is Clause 59 of the statement made by Sir George Buchanan, and runs in this way: " On the 20th April, 1920, at an interview at the India Office with Mr. Montagu, Secretary of State for India, I presented a memorandum, of which the following are extracts, detailing the position of the Back Bay scheme up to date: the position when I left Bombay was as follows: The scheme, as prepared by myself, had received the approval of both the Government of Bombay and the Government of India."

Chairman.—I do not think that is the part. The passage which Mr. Billimoria wants is where Sir George Buchanan assured the Secretary of State that he would, if necessary, give up other work in order to give his full attention to this work.

Sir H. Courthope-Monroe.—Yes, I think I have it now. It is on page 50: " I then explained to him my position, namely, that after my scheme had been approved, Sir

George Lloyd had asked me whether my firm would be the engineers, as he did not wish the Bombay Public Works Department to have anything to do with the work. I had agreed on behalf of my firm, and had promised to make the carrying out of the work my principal object, if necessary declining work elsewhere, and I had agreed to go out and spend several months every winter in Bombay."

Mr. Billimoria.—Will you kindly link that up in the course of your argument with your other points? We should be very much obliged.

Sir H. Courthope-Munroe.—Certainly. Is there anything else you would like me to read?

Mr. Billimoria.—No.

Sir H. Courthope-Munroe.—To pursue my story, I do not think I can usefully refer again to Sir George's report of 1919, because we have discussed it almost *ad nauseam.*

Now I pass to what I think is a most important point, and that is with reference to this Bombay Housing and Development scheme. You ought to have that document in front of you.

Chairman.—What we have been working on really is the speech of Lord Lloyd on the 3rd August, 1920.

Sir H. Courthope-Munroe.—This apparently is the document, with the correspondence and so forth, that led up to the establishment of the Development Directorate; and it more or less indicates what, according to the intention of the Government, should be the duties of the various parties concerned. I am only concerned to draw attention to two passages of this document. The first is page 19, where you will find this, in paragraph 10: " The following *inter alia* shall fall within the scope of the Directorate's work. It should carry out the Back Bay Scheme, the East Colaba Scheme, and any other reclamation scheme which it may be found desirable to undertake in or near Bombay." There again, I pause to point out that, so far as I can see, these words " carry out," which is another way of saying " in detail," are found in the agreement, and they are found here, and they are found in the Rules and origin of the Development Department; and in no case, so far as I know, in the terms so far as Sir George's obligation is concerned. I suggest to you this expression " carry out " obviously means, when you come to look at the contract, the details. It means Mr. Lewis; it means the Resident Engineer; it means his deputy, staff and so forth.

Chairman.—Lord Lloyd read that passage in the speech of August, 1920, to which you have referred.

Sir H. Courthorpe-Munroe.—Thank you. You will forgive me if I go over the same ground, but we have got the thing to a head here; and we have to consider what in fact everybody thought was their duty, and what they were working in fact, and what is also the legal construction. If the legal construction turns out to be something different, under the terms of this extraordinary document, it is to go to an Arbitrator, who is to settle it for all time, and apparently with no appeal to anybody. I suggest when you come to look at it, what in fact was the conception of the parties concerned is the right conception; and Sir George's obligation and duty are limited in the way I suggest.

May I pass to the other passage, on page 37? There they are dealing with the formation of the Directorate of Development. This I think is a letter in which the Secretary of State gave his approval to that being done. It is from the Viceroy, the Finance Department, to the Secretary of State for India in London. He says: " Please refer to Education Secretary's letter No. 6, dated 26th February last, Bombay Housing and Development Scheme. We agree to the formation of a Directorate of Development " —this is the important part—" for the execution of the industrial housing scheme with the two reclamation schemes, Back Bay and East Colaba." As we know, that Department was established, and Sir Lawless Hepper was put in charge of it. I say this document itself shows that the Department came into being for the purpose of carrying out the scheme, and was charged with the execution of the scheme.

May I go now to the evidence given by Lord Lloyd? Lord Lloyd gave a good deal of evidence about it. In view of some answers that had been given to you by Sir Lawless Hepper, that he had no responsibility, or no practical responsibility, you put these questions to Lord Lloyd, which are on page 42 of Lord Lloyd's evidence. You say: " He "—that is Sir Lawless Hepper—" has disclaimed any suggestion that he was employed because of any technical knowledge. What do you say as to that? Then Lord Lloyd says: " I should not agree in those terms. Sir Lawless Hepper, if he had not been an engineer, and had had various other qualifications which seemed necessary for the task to which he was going to be put, probably would not have been appointed, speaking in general. Sir Lawless Hepper was selected as the Director of Development because the success of the Development scheme depended, to a very great extent, on the capacity of whoever was appointd at the head." What more weighty language can you have? Apparently it is suggested now that this gentleman who was appointed, and on whose capacity Lord Lloyd says to a very great extent the whole thing depended, can wash

his hands of the whole thing, and lay it down at the feet of my client. Let me go on: "The work, as you know, was of a very exceptional character, and its operations were on a very large scale. We had to combine in our Director a great many different qualities. It was necessary that the Director first of all should have a very close acquaintance with local conditions." That is something which Sir George could not have, by the nature of things. "We might have got somebody from America, or from a great distance. but it would have taken him two or three years in which to learn the local conditions. It was, therefore, considered important that we should get a man who already knew the local conditions." Then comes point No. 2: "It was very important that he should understand traction and transit problems, because the whole of that Island problem (not the whole of it, but a large part of it) is a traction problem. He (that is Sir Lawless Hepper) had those two qualifications in a very high degree. He knew the place intimately. He was acquainted with traction problems, as you have just pointed out. He had had a distinguished career as a Railway Engineer, and he was then holding a very important post on the railway, as you have also pointed out." I understand he was General Manager of the Great India Peninsular Railway. "He had been further proved during the war by his work as the Local Controller of Munitions, and he stood, I think I can say, exceptionally high in the estimation of the Government of India, and what was also of great importance, he stood very high in the estimation of the public of Bombay. We had to raise public loans, and it was very important that the Director of these works should have the confidence of the public from whom we were asking the money. The local public, in a narrower sense, had great confidence in him. As a Railway agent, as Member of the Port Trust and City Improvement Trust, he was very well acquainted with all the local conditions, and, combining those four qualifications, he seemed to be almost unique in experience for that particular post. Those were the conditions which led to his appointment, therefore to some extent his engineering, in a general sense, was a qualification—not very specific." Then missing a question, you put this question: "Was Sir Lawless Hepper the person responsible for the carrying out of the works in Back Bay, or were Messrs. Meik and Buchanan, or Sir George Buchanan, responsible for it?" Then Lord Lloyd very properly says this: "That is not a question to which can be answered Yes or No. You have taken a great deal of evidence on this question, and perhaps it would be better if I described to you what were his functions." Then you say: "Will you please tell us the organisation of the Development Directorate, and then if you please, tell us with regard to Sir Lawless Hepper's special position." Then the answer is this: "I will do my best. In describing the duties of Sir Lawless Hepper, and his relation to the local Government, it is necessary to distinguish between the Secretariat Department and the Executive organisation, as a matter of fact the term 'Development Department' I notice has been used to cover both. The Secretariat Department, for any activity of Government, is the organisation which deals with the business which comes before Government, and through which they issue their orders. I think that is natural and plain. The Secretary is the principal of the Department, responsible to Government for the conduct of business, and for the issue of their orders. He is the channel, but the Secretary as such (and anyone familiar with the organisation in India will know it) has no executive powers. The Executive is usually a separate organisation presided over by a separate officer, often known as the head of the Department. In this case which we are discussing, the Executive Department was known as the Development Directorate, and its head is the Director. I can give you a suitable analogy in the case of Public Instruction in India. There is a Secretary to Government for Education, which is the channel through which Government deals with Education: and the Executive head of the Department is the Director of Public Instruction. I hope I have made the position clear. The Secretary to Government in the Development Department was also the deputy of the Director in the Executive Department. Is that quite plain?" Then he goes on to say this: "Sir Lawless Hepper's relations to the local Government, generally speaking, are the same as those of the head of any other Department. Any difference was largely in the exercise of discretion. In the Back Bay reclamation scheme his functions were qualified by the agreement with Meik & Buchanan, who ultimately became responsible for performing the work and duties set forth in that agreement." That is the point. I do not want to avoid one iota of my responsibility under the agreement; but everybody seems to have assumed that had put the agreement aside. "You are responsible for the whole thing." Anything within the four corners of the agreement I do feel a responsibility for; and that is all Lord Lloyd points out Meik & Buchanan are responsible for. Then he says "I need not recite the terms of the agreement, because they are before you." This is the text, the important part, which I am now coming to. Then Lord Lloyd says: "Messrs. Meik & Buchanan designed the work." I pause there to say for any fault in design, in estimates or things of that kind that are within the province of Sir George, he is answerable for and responsible for. Then Lord Lloyd goes on to say: "And the director "—that is Sir Lawless Hepper —"was responsible to Government for ensuring that the works were carried out

according to the firm's design by the Chief Engineer." Mark that again—mark the words "carried out ". They are in the agreement and in the scheme—" to carry out ". " The director was responsible to Government for ensuring that the works were carried out according to the firm's designs by the Chief Engineer." The word used there is " Chief ", but in the agreement it is the same or synonymous with the one who is called the Resident Engineer. " The programme of the work was set forth from time to time by Sir George Buchanan. The relations of Sir George Buchanan and Sir Lawless Hepper to Government might be described in general terms by saying that the former was responsible for the strategy and the latter for the tactics of the scheme." I do not know whether we have any military member on the Committee, but Lord Lloyd put it in that way. " The Director was responsible, for example, for organising the staff, though the principal appointments required the orders of Government, while the Chief Engineer's appointment "—that would be Mr. Lewis—" was subject to the nomination of Sir George Buchanan." Then he says: " These were not watertight compartments, and that is the difficulty of answering your question absolutely precisely. In no great organisation can it be so. The staff recruited in England was engaged by the India Office, or by the High Commissioner's Office, and the selections were usually made on the recommendation of Sir George Buchanan." May I pause there to clear up one matter? It was pointed out yesterday by Sir Frederick Hopkinson that as he conceives it, it was the duty and obligation of Sir George Buchanan to know all the men who went out to work the dredgers.

Sir Frederick Hopkinson.—No, not that, but how many there were—not to know them personally, but to know how many there were.

Sir H. Courthope-Munroe.—I agree. I want to point out and make a strong point of this. When I come to the agreement you will find that Sir George Buchanan's power to nominate anybody or to have any concern with anybody who was selected by the Indian Government began and ended with two persons, the Resident Engineer and the Deputy Resident Engineer. In point of fact he nominated those two gentlemen. One at a certain stage retired, and then I think he nominated a third. As regards those three persons he was, by his contractual obligation, bound to nominate and honestly nominate them, and do the best he could, but anything else he did was merely done by kindness and by way of endeavouring to further the best objects of the scheme. It is altogether wrong to suggest that because he was asked " Do you recommend A, B or C? " that he had not a duty in the matter a all. He honestly performed his duty when his contractual obligation began and ended with the nomination of these two people.

Now I pass on. Lord Lloyd continues: " The Director "—that is Sir Lawless Hepper—" was also largely responsible for obtaining plant according to the plans and specifications of Sir George Buchanan." Then Lord Lloyd said he thought that the Director was " the Government watchdog," in face of the disclaimer by Sir Lawless Hepper of any responsibility so far as I can see, and suggesting that everything should be laid at the door of Sir George. What is the meaning of that—" he is the Government watchdog "? When I come to deal with the ordinary terms of contract you will find the so-called watchdog in the engineering profession is invariably the Resident Engineer. Here you have somebody put up over his head who is described in apt language as " the Government watchdog." Then, says Lord Lloyd: " That was his main function. It was his duty to see that the organisation was working efficiently and economically. Any departure from the technical proposals of Sir George Buchanan, or any proposed action in disagreement with the latter, would have been referred presumably for their orders. That is about as precise as I can give you, the relations between Sir George Buchanan and the Director of the Development Department. Does that in any way answer your question? " I do not think I need read any more of that. I think that covers the ground. Could you get anything more clear or more distinct as to what Lord Lloyd intended to be the respective duties of the parties? If I read that rightly, the whole of the execution, the whole of the carrying out, the whole of the watching, the whole of the economical working and smooth working were to be carried out by the Department. On the top of that you have a gentleman who is described as the Government watchdog. In the events that have happened the watchdog appears to have retired, and the responsibility for everything that has happened, so far as I can see, is laid at my client's door. That is why at this eleventh hour I am only too glad to be in a position to try and come to close quarters with what the agreement means.

Having got the intention of the scheme, the scheme authorised by the Viceroy, having got Lord Lloyd's view of what the scheme was intended to carry out, let me now go to this document.

Mr. Billimoria.—Before you proceed further, may I just put one point?

Sir H. Courthorpe-Munroe.—I am much obliged to you.

Mr. Billimoria.—You are emphasising the word " carry out."-

Sir H. Courthope-Munroe.—I am coming to that; I have not done with it yet.

Mr. Billimoria.—Could you draw any distinction between carrying out and execution? What is the distinction or line of difference between the two?

Sir H. Courthope-Munroe.—We shall have a lot of talk about the actual meaning of the words when we come to the agreement. Before I start endeavouring to elucidate the true meaning of this agreement, which I agree is a curious one, most unusual and wants careful consideration, I think it will assist the Committee if they will let me outline what is the ordinary agreement which is entered into for public works as executed abroad, where you have got consulting engineers in London and you have got a Resident Engineer in charge of the local works. If you will be good enough to look at that document I think it will assist you to try and follow what I am putting to the Committee. (*Document handed in*). I have only put it down in that form in order to try and bring home to the minds of the Committee, some of whose members may not be familiar with the position what is the ordinary example of such an agreement. You may like to look in this connection at a case which I have found, which is commonly known as the Brazil case, which is the case of large works which were being executed in Brazil with a London engineer. There they deal with the position of Resident Engineer and emphasise his independent position. The only report of the case so far as I know is in Hudson's Building Contracts, Volume 2, page 18. It went to the Court of Appeal. It is headed " In the Matter of an Arbitration between Snell & Co. and the Rio de Janeiro Flour Mills and Granaries, Limited." I only mention the case because these cases so rarely find their way into the Courts, as they are nearly always dealt with by arbitration. But this is a case which travelled up so far as the Court of Appeal, and was considered by Lord Coleridge, Mr. Justice Mathew (a great commercial Judge), Lord Esher and Lord Justice Fry. There is in that case a form of contract which is more or less the form of contract which obtains in connection with big works abroad which are supervised by the engineer in London with the Resident Engineer in charge. I will hand that to you later.

Let us just take the ordinary case of any large private contract abroad. In every such case you have the building owner to start with; then you have the engineer, who, for reference purposes, I call the principal engineer, to distinguish him from the Resident Engineer, and the people who are doing the work on the spot. His duty is to make plans and specifications, and then to supervise. When he supervises he inspects and deals with the reports of his agent. It is his agent, mark that, not somebody else's agent, but his agent, the Resident Engineer. He approves the work and gives certificates on which alone payment is made. That is the man in London. The next person in the chain is the Resident Engineer abroad, who is nominated by and under the sole control of the principal engineer. He superintends details, and reports to his principal. To emphasise that may I just read one paragraph in the professional rules of the Association of Consulting Engineers? This is the point which all engineers lay the greatest stress upon : " The engineer alone, and not the client, can have authority to give instructions to the contractor, Resident Engineer, Clerk of the Works, and Inspectors on all works done to the engineer's specifications or drawings." Under these contracts, as I say, this Resident Engineer is under the sole control of the principal engineer. What does he do? He superintends the details, and writes to his principal. I invite the Committee at this stage—because I must deal with it at somewhat greater lengths when I come to the contract itself—to observe that there is a vast distinction between the words " supervise " and " superintend." I want you to grasp that and not to think that I am playing with words as a mere lawyer; all these things have professionally a distinct and well-defined meaning.

Sir Frederick Hopkinson.—But the case you are assuming now is the case where a contractor is employed?

Sir H. Courthope-Munroe.—Yes, obviously. No one is more familiar with that than yourself. I am taking the case of a contractor. Lastly in the chain, you have the contractor who does the work. This result arises from working out in Westminster the working of these contracts—to provide an effective check on the expenditure and a guarantee that the work is properly done. The effect of all this is that not one penny piece can be got by the contractor except with the approval of the principal engineer, who grants his certificate, as Sir Frederick well knows, after he has had his reports from his Resident Engineer. That is the safeguard. That is, I venture to say (and I invite any criticism), the scheme of an ordinary private contract for big works that are done abroad, work in many cases involving very large sums of money though not so big as in this case.

Let us see what this contract has done. The building owner in this case is the Bombay Government working through the Secretary of State of India. He takes the place of the building owner. The engineer—I have struck out the word " principal "

because the word " engineer " is the only word that actually appears in the document, but I mean the consulting engineer—in this case is Sir George Buchanan. The Resident Engineer in this case is made absolutely independent of the principal engineer. That is the keynote of the whole thing. He is under no obligation to make any reports, and all the principal's instructions, as you will see when I come to deal with them, are all controlled by the Departments. No reports had to be made by the Resident Engineer. He is not the servant of the principal engineer; he does not pay him, and he cannot dismiss him. The principal engineer has to give no certificates for the execution of the work, and he is in no way concerned, unhappily, with the value of the work done. The Resident Engineer, who, as I have told you, in the case of an ordinary contract is, if I may use the expression, the alter ego, the eyes of the man in London, in this contract is placed entirely independent of any control of the engineer in London. But he is put under the control of the Department. He is paid directly by the Government, and is dismissable by the Government. If one may refer to the expression which has been used, " watchdog," in every ordinary contract the watchdog is the Resident Engineer. But for his reports no certificates will be granted by the principal engineer in London. There is the safeguard. You cannot get a penny piece except you work up in that way. The effect of this arrangement is absolutely to short circuit all that scheme, because you find, when I come to the last stage, the contracting stage, all that is represented by the Director of Development and his staff. All check on the expenditure by the principal engineer or any guarantee as to the value of the work done is entirely cut out. You have the Bombay Government, the employer, in direct communication with the Director of Development and his staff, who take the place of the contractor, and you have got what Sir Frederick Hopkinson, I think, ridiculed, and I think very fairly ridiculed when the evidence was being given. You have got this regular scheme, and then you have this extraordinary scheme which was evolved for the work of this particular contract. You short circuit all the guardianship of the principal engineer and the Resident Engineer. You put the employer who is doing the work in direct communication with the Department who are spending the money. You short circuit these people, and you work upon a system—I am disposed to use the language which was used by Sir Frederick Hopkinson when he called it a comic opera performance. " Then you come to the question of who makes these project accounts. It seems to me rather a comic opera performance, because the man who makes the project estimate is the man who is going to carry out the work.—(A.) That is true. (Q.) Therefore he would be more than human if he cut his prices down?—(A.) Exactly, I agree. (Q.) If he cut his prices down and the work cost a little more than his estimate showed, he would get into serious trouble?—(A.) He would. (Q.) If he put his prices twice as much as he need, and he did it with three-quarters, he would be considered a more or less reliable man?—(A.) I quite agree. (Q.) Although the work might have cost 50 per cent. more than it ought to have cost?—(A.) Yes."

Sir Frederick Hopkinson.—That was intended to apply not only to the Back Bay reclamation scheme, but to the whole of the Public Works Department. It is a general comment.

Sir H. Courthope-Munroe.—I agree. To anybody who is conversant with these things it is too obvious. I think if one just considers the position between what I may call the ordinary type of contract and the ordinary safeguards which the evolution of time and the ability of lawyers and the ability of engineers has evolved, and, comparing it with this contract which was entered into, one has not far to travel to find out why this enormous waste of money has taken place.

Let me go at this stage to the actual document, the agreement. The agreement runs in these terms: " Memorandum of agreement made this seventeenth day of March, nineteen hundred and twenty-one, between Charles Scott Meik and Sir George Cunningham Buchanan, K.C.I.E., carrying on business as civil engineers in partnership under the name of Messrs. C. S. Meik & Buchanan, at 16, Victoria Street, Westminster, in the County of London (hereinafter called ' the firm,' which expression shall include the said Charles Scott Meik and Sir George Cunningham Buchanan and their successors being partners in the firm, and their and each of their respective executors and administrators)," of the one part, and then the second part: " The Secretary of State for India in Council (hereinafter called ' the Secretary of State ')." Then it recites that the Secretary of State: " is about to carry out a scheme for the reclamation of a part of Back Bay, Bombay, which is known as the Back Bay Reclamation Scheme, and it comprises the whole of the works described in the report made by Sir George Cunningham Buchanan." Then this is the material recital which we now come to: " And whereas the firm have been engaged by the Secretary of State as engineers of the Back Bay Reclamation Scheme and of all works in connection therewith upon the terms hereinafter mentioned." I pause to point out that these gentlemen were engaged as engineers. They were not engaged as quarry masters or as persons in charge of barge operations, but they were engaged as engineers. Then the agreement

goes on: "Now it is hereby agreed as follows: (1) The firm agree to act as the engineers of the Secretary of State in carrying out the said scheme and in the construction and execution of all works connected therewith (hereinafter referred to as 'the works') until the final completion thereof, and the firm shall at all times assist and advise the Government of Bombay in all matters relating to the execution of the works, and shall supervise the same and undertake and perform all work and duties devolving upon engineers of large works." Again, I lay emphasis upon that, and I also call the attention of the Committee to the fact that it says, "and shall supervise." I am going to draw attention in a moment to the definitions. If one may paraphrase it, that means "inspect and report." It does not mean, as Sir Frederick Hopkinson was good enough to suggest, that we should go on board the dredger and stop there till it worked properly—it means nothing of the kind.

Chairman.—It was I who made that suggestion.

Sir Harry Courthope-Munroe.—Forgive me, you may have made it also.

Chairman.—I undoubtedly made it.

Sir Harry Courthope-Munroe.—It was pressed to this extreme limit by Sir Frederick Hopkinson yesterday, and I want to deal with it. He said, when dealing with this everlasting question of the working of the dredger, which we all agree is the crux of the thing, according to my note, and I can check it with the Shorthand Notes: "You ought to have stayed on the dredger until the results were achieved." That is what Sir Frederick said yesterday.

Sir Frederick Hopkinson.—Prefacing it by saying: "Or find out why they were not being achieved."

Sir Harry Courthope-Munroe.—Speaking as a man of the world, not as a contractor or a lawyer, I agree.

Sir Frederick Hopkinson.—Of course you do.

Sir Harry Courthope-Munroe.—But the question we are discussing here is not whether it ought not to have been done, but who ought to have done it. I do not quarrel with the question as a question, except in relation to its being put to Sir George.

Chairman.—The other way of putting it which you are suggesting is whether there is to be found in the four corners of this agreement the legal duty to do it.

Sir Harry Courthope-Munroe.—Yes; and if I may venture to say so, I go even higher than that. I do not want it to go forth to the world that we, in this matter, are sitting tight upon our legal rights. I say no human being can gather from this document any moral obligation to do it. How can it be said for a moment that a gentleman in the position of Sir George, who has got works all over the world, and who admittedly lives in London, where the execution of the works and the carrying out of the works are upon the very terms of the scheme to be done by the Directorate, that it is any portion of his duty to get on board this dredger and stay there till it works properly?

Sir Frederick Hopkinson.—That would come under a moral obligation.

Sir Harry Courthope-Munroe.—Well, I should doubt it. How could it?

Chairman.—Sir George Buchanan being in Bombay, and being the great expert, might well have conceived it his duty to go on board the dredger and find out exactly what was happening, and might well have conceived it his duty to go to Malabar Hill and have a conference.

Sir M. Visvesvaraya.—I may add that he is also expected to devote the greater part of his time, under the agreement, to this particular work.

Sir Harry Courthope-Munroe.—I want to take it by steps. I do not for a moment want to avoid anything at all.

Chairman.—You had got down to the work in England.

Sir Harry Courthope-Munroe.—Yes: "Devolving upon engineers of large works."

Mr. Billimoria.—Before we proceed to "work in England," where is the distinction drawn between the "execution of all the works" and "the carrying out of the works." What is the difference?

Sir Harry Courthope-Munroe.—I want to answer your question. What is your question again?

Mr. Billimoria.—Taking the first line of the paragraph: "In carrying out the said scheme and in the construction and execution of all works connected therewith." What is the distinction you draw between "execution" and "carrying out" of all the works?

Sir Frederick Hopkinson.—It occurs again in the fifth line: "the execution of the works."

Mr. Billimoria.—Will you kindly enlighten us on that?

Sir Harry Courthope-Munroe.—" In carrying out the said scheme," and " in the construction and execution of all works "—it is all controlled by the word " engineers."

Chairman.—Is that your point?

Mr. Billimoria.—That is my point.

Chairman.—You say that the whole of that clause is governed by " The firm agree to act as the engineers "—as engineers in carrying out, as engineers in the construction and execution of all works, and shall supervise the same as engineers and undertake and perform all work and duties devolving upon engineers—which means: " ordinarily devolving upon engineers."

Sir Harry Courthope-Munroe.—That is it.

Chairman.—You say the whole thing is governed by the phrase " as engineers "?

Mr. Billimoria.—If it is the word " engineers," that is one thing; but the expression here is " the engineers." It is more emphatic. It is not only " engineers," but " the engineers."

Sir Harry Courthope-Munroe.—As a lawyer, I hope I shall not try to avoid responsibility by looking at this document as closely as that. It is a rule that you will agree to at once, I think, that the meaning of general words in an agreement must be construed with regard to the text of the document. You have to find it within the four corners. If you find here and there a word which is of somewhat doubtful meaning you must construe that by reference to the whole context of the document. That is elementary from a lawyer's point of view. Let me go on. That is what they are to do as engineers. Then the document turns to " Work in England " : " (*a*) The preparation of the working drawings, specifications, schedules of quantities and rates and estimates of cost for the whole of the work included in the report of Sir George Cunningham Buchanan." May I get rid of the document, which has been called the modification which was agreed to on the 13th January, 1923, by saying if you write in four or five words into Clause (*a*) you give effect to that document? Paragraph (*a*) should read in this way now in consequence of that modification, and you will check me on this: " The preparation of the working drawings, specifications, schedules of quantities and rates and estimates of cost for the whole of," insert the word " permanent " : " work," and then add: " and storm water drains " : " included in the report of Sir George Buchanan." If you insert those words you have given effect to this modification as far as it affects the agreement, and I need not weary the Committee by reading all through this. That is the effect of this modification. Then the agreement goes on to say: " And such work shall be commenced forthwith, and all such drawings, specifications, schedules of estimates and any fresh or amended drawings, specifications, schedules of quantities and rates and estimates as may from time to time be required during the progress of the works shall be promptly prepared and forwarded to the Government of Bombay, and shall become the property of the Secretary of State." There is no quarrel on that at all. Then Clause (*b*) is: " The approval in conference and in conjunction with the consulting naval architect to the Secretary of State of the detailed drawings and specifications of the dredger and floating pipe line, and the final inspection and supervision of tests and trials "—you observe those latter words. I only pause there to say that there is nothing whatever to show or suggest that what Sir George says is the usual practice, namely, to test at the place of manufacture, coupled with the firm's guarantee, or coupled with their representation as to the working capacity of what they are supplying is to be departed from, or to suggest that the test is to be in Bombay.

Chairman.—On the contrary, it is headed " Work in England."

Sir Harry Courthope-Munroe.—If you please. That emphasises it. It says: " The final inspection and supervision of tests and trials."

Sir Frederick Hopkinson.—In accordance with the contract.

Sir Harry Courthope-Munroe.—Yes; I merely point that out. In the light of events, if one could look ahead and forecast all the hundred-and-one things that are going to happen when one drew contracts, one would dot one's i's and cross one's t's, and put in a great deal more than one does.

Then we go to (*c*): " The approval in conference and in conjunction with the consulting naval architect to the Secretary of State of the detailed drawings and specifications of intermediate pumping stations, shore pipes, and the general inspection and trials of the same. Then (*d*) is: " The preparation of plans and specifications for all other plant required in connection with the construction of the works and the inspection of such plant and any material required for the works prior to shipment."

I pause there to point out this. Obviously, on the true meaning of these paragraphs, the dredger is plant.

Sir Frederick Hopkinson.—May I interpose here a moment, and point out to you that this provision in (*d*) is not required where such contracts as you have been speaking of, foreign contracts, are carried out by an engineer through a firm of contractors? The engineer never in those cases draws the plans and specifications for plant.

Sir Harry Courthope-Munroe.—I am not prepared to cross swords with you on that.

Sir Frederick Hopkinson.—That is so. The contractor is left to his own devices.

Sir Harry Courthope-Munroe.— I am only endeavouring to point out this. I start with agreeing with the learned Chairman that this is a curious and difficult document to construe, and quite an unusual one; but we have to get down to bedrock now and endeavour to find out what it does mean. I suggest here on the true construction of (*c*) and (*d*) the dredger is plant, and there is no provision made for the " inspection of plant and material required for the works prior to shipment."

Chairman.—What Sir Frederick Hopkinson is pointing out is that ordinarily an engineer would have nothing to do with any plant. That is for the contractor. If it happens that the contractor brings upon the proposed site plant that is not effective, then the engineer says: " Take it away."

Sir Harry Courthope-Munroe.—I quite agree.

Chairman.—As regards the actual provision of the plant the engineer does not trouble about that in the slightest degree. It is up to the contractor to provide himself with such plant as will enable him to do the work within the specified time—such plant as satisfies the engineer or the resident engineer.

Sir Harry Courthope Monroe.—I quite agree. I am not disputing that for a moment.

Chairman.—That is the whole point.

Sir Frederick Hopkinson.—That is the whole point.

Chairman.—That is why this may be a hybrid agreement.

Sir Harry Courthope-Munroe.—I quite agree.

Sir Frederick Hopkinson.—You will remember also that I pointed out to Sir George Buchanan some days ago twelve works that he had done in connection with this scheme which are not ordinarily done by the chief engineer, but are always left to the contractor.

Sir Harry Courthope-Munroe.—Yes.

Sir Frederick Hopkinson.—Which separates the position as it exists in Bombay from the cases you have given, such as the Brazil case.

Sir Harry Courthope-Munroe.—Yes.

Sir George Buchanan.—I think I can clear up that point.

Sir Harry Courthope-Munroe.—I do not think you had better take a hand in it at this stage.

Chairman.—You can just make a note of it, Sir George, and deal with it later on.

Sir George Buchanan.—Very well.

Sir Harry Courthope-Munroe.—All I want to point out is this. These paragraphs deal with plant, and I quite agree with what Sir Frederick Hopkinson has said about it, that in the ordinary course it is the contractor's job and not the engineer's; but Lord Lloyd points out the Director, that is in effect the contractor, according to my contention, was also largely responsible for obtaining the plant according to the specification.

Sir Frederick Hopkinson.—Not designing it, but obtaining it.

Sir Harry Courthope-Munroe.—I will leave out " obtaining the plant according to plans and specifications of Sir George Buchanan." In this case the contractor, the Director of Development, was obtaining the plant. It is quite true that we designed that plant. If, and so far as any fault can be found with the designing or with what Sir George Buchanan had undertaken to do, I agree that he is personally responsible; but it is not exactly the same position. Here the Development Department took the place of the contractors, and it was their job, and their job alone, says Lord Lloyd, to obtain the plant. That is how I deal with that. Lastly, Clause (*e*) is: " Correspondence of the Government of Bombay or any officer deputed to act on their behalf, including any reports from time to time required by Government in respect of the dredger plant, or material, or the progress of the woks.

Then I go to " Work in India," and this is very very important: " During the whole period of execution the works shall be closely supervised by the firm." I pause there to deal with this point. It is essential to get a clear understanding of what this

word " supervise " means. I have looked into the professional dictionaries and other dictionaries to find out what is the fair meaning to be given to the word " supervise." I direct your attention to what I believe is the fact, that you will not find in the whole document, certainly not as far as Sir George is concerned, the word " superintend." The primary meaning of the word " supervise " in Sir James Murray's dictionary—the primary meaning is what I am concerned with—is " to look over, survey, inspect." That is the primary meaning of the word supervise. The word " superintend," which is an apt word to describe the duties of an ordinary Resident Engineer, is defined in the same dictionary in its primary meaning as " To have or exercise the charge or direction of operations or affairs." In the course of one's researches I found an illuminating note in the Century Dictionary on the word " supervise " which I venture to think is very applicable to this case. The Century Dictionary points out that the word " supervise " often implies a more general care with less attention to and direction of details than the word " superintend." That exactly bears out what I say. If one may venture in a legal document to paraphrase a word, the best meaning I can give to the word " supervise " is that it does not mean superintend, but it does mean inspect and report —inspect rather.

Chairman.—Where do you get " report "? You said " inspect and report."

Sir H. Courthope-Munroe.—I do not get that word, I agree.

Chairman.—" Supervise " comes from " super " and " video."

Sir H. Courthope-Munroe.—Yes. Report follows in connection with duties, I agree, but I get " inspect." " And Sir George Cunningham Buchanan shall devote the greater part of his time to this particular work." This is the point which Mr. Billimoria was putting to me, and may I endeavour to meet the point? I pause there to point out this. It does not say that he is to give the greater part of his time in India t the work.

Sir Frederick Hopkinson.—But it is all under the words " Work in India."

Sir H. Courthope-Munroe.—I agree, but you have to look at the context. If the fair reading of this document is that Sir George Buchanan is to devote the greater part of his time to the work in India, cadit quastio, but is that the meaning? What it means is that he is to give the greater part of his time to this particular work. Now let me go on : " And shall, unless the Bombay Government agree otherwise, visit Bombay this year and in every year after the monsoon when the working season begins, and remain in Bombay for such period during the working season as he or the Government of Bombay may consider necessary to ensure the complete and satisfactory supervision of the works, and shall also, if necessary in his own opinion or in the opinion of the Government of Bombay, make additional visits during any monsoon." Let me take that word for word. What is the obligation? He shall " visit Bombay this year and in every year after the monsoon when the working season begins, and remain in Bombay for such period during the working season as he may consider necessary." I take up this position most strongly. Short of malafides on the part of Sir George (which I do not think anybody can suggest) on that agreement he, and he alone, is the judge as to whether he should stop there 10 days, 20 days or 30 days, or three months, and nobody else is judge.

Sir Frederick Hopkinson.—But it says : " He or the Government of Bombay."

Sir H. Courthope-Munroe.—If you suggest malafides then I agree, but on a fair reading of that document it is obvious that he is the party to judge.

Sir Frederick Hopkinson.—Or the Government of Bombay.

Sir H. Courthope-Munroe.—I will come to that in a moment; I am taking it by steps.

Mr. Billimoria.—" To ensure the complete and satisfactory supervision of the works."

Sir H. Courthope-Munroe.—I agree, but I must endeavour to take it stage by stage. If one was to decide (which I do not think is suggested) that it was a case of malafides or intention to do anything wrong, then I agree, but once you assume that the man is acting honestly in good faith, it is not open to anybody to say : " 10 days, why you ought to have stopped there three weeks." " Three weeks, why you ought to have stopped there three months."

Chairman.—The question must be, when he went away did he in fact go away before he had completely and satisfactory supervised the work?

Sir H. Courthope-Munroe.—In his opinion?

Chairman.—Yes.

Sir H. Courthope-Munroe.—Given those conditions, I agree entirely. Now let me pass to the next matter. Sir George has given you his evidence, and if my memory serves me rightly it was capped by an apt illustration by the Chairman : one learned

counsel might do in three weeks what another might take three months, and what another might take six months to do and never arrive at any result at all. That is common knowledge. Let me go on to the next paragraph: "As he or the Government of Bombay may consider necessary to ensure the complete and satisfactory supervision of the works." Stopping there, notice it says, "as the Government of Bombay may consider necessary." Once and once only was Sir George asked to remain on, and he did so. In every other case when he left Bombay the Government wished him "God speed." How could it be possibly said many years afterwards that the Government should consider it necessary that he should do otherwise than he did?

Chairman.—There is no evidence that he ever left Bombay in defiance of the wishes of the Government.

Sir H. Courthope-Munroe.—That is what I say.

Chairman.—There is no doubt about that.

Sir H. Courthope-Munroe.—It is carried a little bit further by the fact that on one occasion when he was asked by the Government to remain, he did so.

Sir George Buchanan.—To make a special visit in the monsoon?

Sir H. Courthope-Munroe.—Yes, a special visit.

Chairman.—You went there in July?

Sir George Buchanan.—Yes.

Sir Frederick Hopkinson.—To see the effect of the monsoon?

Chairman.—That is right.

Sir H. Courthope-Munroe.—I venture to put it that the Committee should be thoroughly satisfied that that paragraph 1 has been loyally followed by Sir George, and there is no right to lay at his door any neglect of his duty or any neglect of his obligation at all in respect of that. It seems to me perfectly obvious if he acts *bona fide*, the time he gives to the matter is entirely a matter for his good judgment.

Mr. Billimoria.—Would you call it an error of judgment if there was a lack of supervision? Taking a *bona fide* case, if he did not stay long enough to ensure complete and satisfactory supervision of the works, would you call that an error of judgment?

Sir H. Courthope-Munroe.—Before I answer the question let me see that I understand it. Do you mean to say could a person have properly supervised if he was negligent? No; I should answer that question by saying he could not.

Chairman.—Take an extreme case to meet Mr. Billimoria's point. Supposing as soon as he arrived in Bombay—I am not suggesting that he did this for one moment, you know.

Sir H. Courthope-Munroe.—I am obliged for the argument.

Chairman.—Assuming he arrived in Bombay and he spent a couple of days looking round the place, and then he went to a Christmas camp for 10 days, and then came back and played about in Bombay socially for four or five days, and then took the steamer home, he would not have done his duty?

Sir Courthope-Munroe.—Obviously.

Chairman.—That is your point?

Mr. Billimoria.—Yes.

Sir H. Courthope-Munroe.—It would be obviously ridiculous. You would then find he had not properly supervised. I would put it even higher. If a man undertakes to do work and is obviously guilty of gross negligence in the work, he is not supervising it—he is not doing his job.

Chairman.—That meets your point?

Mr. Billimoria.—Yes.

Sir H. Courthope-Munroe.—I am very glad that question should have been put to me so that I may endeavour to meet it. Now let me go to paragraph 2: "If the Government of Bombay shall from time to time require any alterations in the works before or after the commencement thereof or shall require any additional works to be executed, all work required to be done in connection therewith shall be in the duty of the firm under the preceding clause." I do not think there is any dispute about that.

Chairman.—You had better make the point that I take it your construction of that is that the work is work of supervision. All work required to be done is work of supervision, is it not?

Sir H. Courthope-Munroe.—Yes, I think so.

Chairman.—That is if they throw in any additional work, the same duty applies as regards the additional work as applies to the original work?

Sir H. Courthope-Munroe.—Exactly. Whatever that duty may be, the same duty applies to the additional work.

Chairman.—To see what it is you have to refer to the preceding clause.

Sir H. Courthope-Munroe.—I agree. Now I come to the next clause, where we really get down to the real point.

Sir Frederick Hopkinson.—Where the moorum is.

Sir H. Courthope-Munroe.—It is a matter which one has very carefully to consider. Before I read this I ask the Committee to strongly bear in mind the ordinary position of a Resident Engineer, with which no one is better familiar than Sir Frederick Hopkinson. This is paragraph 3: " A Resident Engineer and also a Deputy Resident Engineer (if required, and if his appointment is approved by the Government of Bombay) will be nominated by the firm and will carry out the details of the works in accordance with the firm's instructions, but subject to the control of the Director of Development or other officer appointed by the Government of Bombay, and they, as well as the whole of the staff, both engineering and clerical, employed in India in connection with the works, will be paid by the Government in Bombay." Let us tackle that bit by bit. As I ventured to point out, there is no obligation put in the agreement upon Sir George to nominate or be responsible for anybody at all except the Resident Engineer and the Deputy Resident Engineer. In point of fact he nominated Mr. Lewis. Having said that I pass from that because we have discussed all that. Also he nominated the Deputy Resident Engineer, Mr. Elgee.

Chairman.—Mr. Brims and Mr. Elgee.

Sir H. Courthope-Munroe.—He was to nominate these two people. In point of fact he did nominate these two people. Then Mr. Lewis fell out and he nominated a third man to be Deputy Resident Engineer.

Chairman.—He did not nominate Mr. Elgee. What happened was, he put an advertisement in " The Times " at the request of the Director of Development, and Mr. Elgee replied. There were several other applicants. Sir George Buchanan, having read all the applications, said he thought Mr. Elgee was the best man, and in that way the matter went through.

Sir H. Courthope-Munroe.—If you please, I do not want to stress it or labour it in any way, but I want to meet the suggestion that every person that Sir George Buchanan may have recommended and said " He is the right man " he is, from beginning to end, responsible for. According to the law—and here one again gets it from Hudson—the mere nomination of a man, if you honestly nominate him and are acting in good faith and not in bad faith, is an end of the matter—there is no legal obligation in fact in any shape or form. In this case an attempt is being made, if I follow the matter rightly, to suggest that all these actions which were done out of mere good nature and an endeavour to advance things were all actions for which Sir George is liable down to the bitter end.

Chairman.—What are you referring to when you say " all these actions "?

Sir H. Courthope-Munroe.—I cannot get out of my head what Sir Frederick is putting to him when he said, taking the crew that came out from London: " You ought to have known them all." I suggest that nomination does not involve a knowledge of the crew, but I may have misunderstood Sir Frederick.

Chairman.—I think that the particular point that Sir Frederick Hopkinson was on is this: the whole scheme hinged on the pumping hours being 15 hours a day.

Sir H. Courthope-Munroe.—Good.

Chairman.—Sir George Buchanan in his report had said that two shifts should be worked. I do not think Sir Frederick Hopkinson's questions were directed to anything more than pointing out that Sir George Buchanan must have known there were not two shifts being employed, because the personnel had not been engaged. That is it, is it not?

Sir Frederick Hopkinson.—That is it.

Chairman.—That is all; you need not labour that.

Sir Frederick Hopkinson.—That is all I meant.

Chairman.—When you get to the third line of this clause then we get to grips in the matter.

Sir H. Courthope-Munroe.—" And will carry out the details of the works in accordance with the firm's instructions." There this agreement is in exact accord with what Lord Lloyd said. It is in exact accord with the document that I read to you, which is the scheme. Who is to carry it out? A multitude of questions have been put, all perfectly good questions if put to the right person, but, being put to Sir George, they have astonished me. The person to carry out the details if the work is the Director of Development.

Chairman.—The Resident Engineer, according to this?

Sir H. Courthope-Munroe.—Yes, the Resident Engineer, but under the control of the Director. You will see that a little later on. I am not here in any sense palliating all this wicked waste of money that has gone on, and the gross neglect, but what I do respectfully suggest is, that it is monstrous in the terms of this paragraph 3 to lay this at the feet of Sir George. The Resident Engineer and also the Deputy Resident Engineer " will carry out the details of the works."

Sir Frederick Hopkinson.—As instructed by the Chief Engineer. It is the Engineer's instructions.

Sir H. Courthope-Munroe.—" In accordance with the firm's instructions." Look at this extraordinary document. It is : " in accordance with the firm's instructions, but subject to the control of the Director of Development." Getting back to our dictionary, what does " control " mean—" restraint on the free will." Can one conceive a document like this?

Mr. Billimoria.—But that " control " does not mean that; that " control " means the administrative control, which is entirely different from the engineering control.

Sir H. Courthope-Munroe.—Let me try and answer that suggestion. I refer again to what Sir Frederick Hopkinson said, which was very apt—that there is no engineering in the actual work of the dredging. You have to buy the dredger, as he aptly pointed out, and that is all. We do not want a gentleman from London with high qualifications to come out to work the dredger. There is no engineering in it. It must be common ground that that is detail. If so, the party to carry out that job is, on the very terms of the contract, the Resident Engineer, subject to the instructions of the firm. What instructions are you going to have in the work of the dredger, or in cleaning out the quarry, or in cutting stone? Is that a job for a gentleman of the eminence of Sir George Buchanan? Surely not. When you say " the firm's instructions," I am not quarrelling with your putting it to me " the firm's instructions are to be given and they are to be subject to the control of the Director," but " control " is restraint of free will. What has happened in a case of this kind? Instructions are sent out to do this, that and the other. The Resident Engineer, Lewis, is in no sense a servant or watch-dog, or representative of the principal Engineer. He is body and soul handed over to the Director. Suppose he says, " I have the control of you, and do not do it," what then?

Sir Frederick Hopkinson.—Does not that cause an explosion at once?

Sir H. Courthope-Munroe.—It ought to, I agree; but if people make these documents, what is the principal Engineer to do?

Sir Frederick Hopkinson.—Your profession made that document, not mine.

Mr. Billimoria.—Do not you think that the word " control " naturally implies administrative control, and not engineering control?

Sir H. Courthope-Munroe.—I am talking about administrative control.

Mr. Billimoria.—If there is administrative control, that does not debar the firm's instructions from being carried out. That may only mean not paying out so many pounds, shillings or pence with regard to a certain item. That is all the control that is meant there.

Sir H. Courthope-Munroe.—I want to try and meet the point if I can; but I am afraid I do not follow you. Here is this detailed work being made a ghastly mess of by reason of the conduct of these pepole who are in charge of it. They have to look after it. They are in charge of the details, and they are under the control of the Director. How, on the true construction of this clause, can you possibly say that the principal Engineer, who, mark you (and I again go back to this) starts off by being employed as the Engineer, not as the dredger-master, not as the quarry-worker, not as the clerk of the works, but as the Engineer——

Sir Frederick Hopkinson.—But the Engineer to control all the others you mention.

Sir H. Courthope-Munroe.—Having got your Engineer, your primary duty would be in ordinary practice to control: and whom would you control?—the very first man would be the Resident Engineer. But here you take away the watch-dog. You lock him up, and you refuse to give him an independent man, and you say: " I am going to have sole control." Then all this happens; and you turn round and say: " Now this is your job, you the principal Engineer." I want seriously to meet your point; and I hope I have done it.

Mr. Billimoria.—But you must read paragraph 1 " as he may consider necessary to ensure the complete and satisfactory supervision of the works." Those words " to ensure the complete and satisfactory supervision of the works," have a special bearing

on the subject. Then it says in paragraph 3: " The Resident Engineer will carry out the details of the work in accordance with the firm's instructions."

Sir H. Courthope-Munroe.—Quite so. I am obliged to you. Looking at this paragraph, we are deaing with the substance, that paragraph is directed to what Sir George is to do when he is in India, and as to his remaining there. This fiasco of the dredging work was not going on just the few weeks that he was there inspecting and what not, but it has been going on for years. Look at what I referred to yesterday. You have 2¼ years with a man in charge of the work who apparently ought not to have been in charge of anything. It is his misfortune, may be, but there it is. This Clause does not touch that. It deals with the question that he is to remain in Bombay such period as he honestly thinks sufficient, and as the Government may properly require, for the purpose of ensuring the complete and satisfactory supervision of the works. But it is right beside the point we are now discussing. It has been said again and again, and I entirely agree with it—Sir Frederick has said it, and everybody has said it—that the crux of the Inquiry is the dredging. Whether or not it was proper dredging obviously is a matter on which most exhaustive questions were put to Sir George. But the working of the dredgers, upon this agreement, is a matter which can in no sense be laid at his door. You remember the letter I referred to yesterday. I again point out that he had no power to dismiss Lewis himself. He had no power to deal with him at all. All he could do was to do what he did do. He was a voice crying in the wilderness for 2¼ years. In the instrument you have got this word " control." No doubt that is why Sir Grimwood said it was a curious condition to construe. Here you put up a man to do this, who in the normal course of things would be the servant, the *alter ego* and the eyes of the Engineer, and you put him absolutely in control of the contractor, or the person who is in that position. What can you expect? Your short-circuit every check that you would normally have in an ordinary case. In the ordinary way a man cannot get his money except by it going through the Resident Engineer and the principal Engineer. You short-circuit that; you make the employer the contractor. You get these Comic Opera or fairy-tale sort of estimates that were going on. What could the unfortunate principal Engineer do? It has been said by Sir Frederick Hopkinson, and one as things go can understand it, being wise after the event: " Why did he not put his hat on and go? Why did he not make representations to the proper Authority? " That is all very well, and at this stage it my be a fair observation to make. But Sir George had undertaken to carry out these works. What right had he to break his contract and pack up and go? He would have rendered himself liable to an action, if he had done it; and he would have done the very thing which the people who were on the spot would have been very glad to see him do. If he had done that, what would they have said? They would have said: " Look at the muddle he has got into, and now he has bolted." They would have said that for a certainty. I do not say, in the events which have happened, that people might not make the suggestions made by Sir Frederick; but if he had done that, then it would have been an end of Sir George. They would have said: " Look at the ghastly muddle that he has made in the state of affairs, and he has packed up and gone."

Chairman.—I do not quite agree. Suppose he had gone to the Governor, having prepared most careful memoranda; the Governor was deeply concerned with the success of this matter.

Sir H. Courthope-Munroe.—I agree.

Chairman.—Sir Leslie Wilson was just as much concerned as Lord Lloyd, although Sir Leslie Wilson had no responsibility for the initiation of the scheme. But he has, and would have the deepest interest in it, as a thing for the advantage of Bombay.

Sir H. Courthope-Munroe.—Good.

Chairman.—Sir George would have received the most sympathetic hearing from either Lord Lloyd or Sir Leslie Wilson. The mere intimation that his position had become impossible would have resulted in Lord Lloyd or Sir Leslie Wilson calling everybody before him, and there would have been a complete sweep up of the people who would not do their duty. It would never have got to resignation on the part of Sir George Buchanan; but he could have said: " Well, if there is not a clean sweep, then I must go;" and he would have gone under conditions which would not have rendered him subject to any criticism at all.

Sir H. Courthope-Munroe.—As I say, I can quite understand at this stage one feeling that.

Chairman.—That is how it strikes me.

Sir H. Courthope-Munroe.—I only want to say to you that there is another side to it. It might well have been said, if he had done what I respectfully suggest was a counsel of perfection: " You are a man of sense; you have made an agreement. You have carried it out. What do you mean? There is all this muddle. Now you have bolted."

Chairman.—It would not have been done in that way. It would have been done in a much more formal manner.

Sir Frederick Hopkinson.—You have to remember in these things individuals do not matter at all, it is the work that matters—the end.

Sir H. Courthope-Munroe.—I agree. I am entirely with you there. The only thing I want to say, and say again, is that this Committee has, as I respectfully suggest, to consider the conduct of this scheme. That must mean the conduct of A, B, C, D or E. My only complaint, if I may venture to make it, is that all this amount of wrong-doing has been laid against the door of sundry people. Anything that is within Sir George's purview I make no complaint about his being attacked mercilessly; but I do object to his being attacked for a number of things for which he has no more responsibility than I have. That is my point and my only point.

Chairman.—I am not content with what has been said at present about Clause 3. and I would like to put it in my way.

Sir H. Courthope-Munroe.—If you would kindly do so, I should be indebted to you.

Chairman.—I will. The middle part of the clause is: "And will carry out the details of the works in accordance with the firm's instructions." That is the point I want to discuss. Supposing it had run like this: That the firm will prepare a carefully considered programme, exact in all necessary details, and will communicate that programme with its details to the Resident Engineer, who will carry out the detail of the work—does it mean more than that? The extreme view is that the firm are to prepare details; they are to communicate those to the Resident Engineer; they are to instruct him to get on with those details, and instruct him to do them. For example, a letter from Meik & Buchanan to Lewis saying between October and December 1,600 tons of concrete are to be built into the sea-wall is a detail. Lewis, according to this, has got to do that. But if you turn to the fourth line, it is "subject to the control of the Director of Development."

Sir H. Courthope-Munroe.—Yes.

Chairman.—The Director of Development might say: "The price of cement is going up very high. Instead of 1,600 tons being put into that, I think 900 will do."

Sir H. Courthope-Munroe.—That is it.

Chairman.—It becomes unworkable.

Sir H. Courthope-Munroe.—That is my difficulty.

Mr. Billimoria.—Has it really become unworkable? Are there any instances in which the Director of Development has interfered and turned down the instructions of the firm? The Committee would very much welcome that evidence..

Chairman.—There is no evidence of his having done that.

Sir Frederick Hopkinson.—There is only one instance.

Chairman.—I am speaking very carefully, according to the way Mr. Billimoria puts it. There is no instance of that. There is only one instance where in February, 1925, they began the sealing of the sea-wall.

Mr. Billimoria.—That is quite right.

Chairman.—There has been no instance of the Engineers having put forward any scheme, having suggested any details, and Sir Lawless Hepper having stepped in and negatived them.

Mr. Billimoria.—No.

Chairman.—There has been no evidence of that.

Sir H. Courthope-Munroe.—No; and I do not want to put my case too high.

Mr. Billimoria.—Even with regard to that one item, Sir George Buchanan subsequently gave his approval to the action of the Development Directorate with regard to the sealing of the sea-wall. So if you are laying emphasis on "subject to the control of the Director of Development," I do not see where it comes in.

Chairman.—The fact that the Director of Development did not intervene does not really matter, if he had the power to intervene. He was given that power.

Sir H. Courthope-Munroe.—May I just read again three lines of what Lord Lloyd said: "He was a watch-dog. It was his duty to see that the organisation was working efficiently and economically." You see that, and then you say that Sir George is the man who ought to have done that. That is what I am endeavouring to meet.

Mr. Billimoria.—That is where supervision comes in.

Sir H. Courthope-Munroe.—I take that language to mean it was his duty. It was the duty of the Director to see that the organisation was working efficiently and working economically. Now it is said: "We find in the agreement somewhere that that

duty was not as Lord Lloyd said it was, the duty of the Director, but it was the duty of Sir George. What does he mean by not doing it?" Then I turn to the agreement and I say: "It does not say anything of the kind."

Mr. Billimoria.—Supposing there was inefficiency and want of economy on the part of the Director of Development, Sir George could come in with regard to supervision under the words "to ensure the complete and satisfactory supervision of the work."

Sir H. Courthope-Munroe.—I thought I had killed that. You are back on clause 1. That only deals with what he is to do the short time that he is in India; that does not control the whole of the agreement.

Sir Frederick Hopkinson.—But "supervision" surely means more than looking at a thing. It means satisfactory supervision.

Sir H. Courthope-Munroe.—I am not suggesting it does not.

Sir Frederick Hopkinson.—Supervision is seeing it is carried out economically and well.

Mr. Billimoria.—The words are still stronger in paragraph 1: "The firm agree to act as the Engineers of the Secretary of State in carrying out the said scheme and in the construction and execution of all works connected therewith."

Sir H. Courthope-Munroe.—Yes, as Engineers.

Mr. Billimoria.—As "the Engineers."

Sir H. Courthope-Munroe.—You have got the duty of the Engineers defined to be carried out as the general practical professional duty of Engineers within the four corners of this document. I do not want to escape from that for a moment; but what I say is: I did not undertake to act as quarry-master, and I did not undertake to work the dredgers.

Sir Frederick Hopkinson.—Yes, you did—you undertook to supervise it.

Sir H. Courthope-Munroe.—With great respect, that is a matter of opinion.

Sir Frederick Hopkinson.—You undertook to supervise it, did you not?

Sir H. Courthope-Munroe.—There again I say "supervise" is the word that is used in all these contracts; but it does not amount to superintending the details.

Sir Frederick Hopkinson.—It must have some practical meaning, must it not—something that is going to result in something?

Sir H. Courthope-Munroe.—As a man of business I am with you; but I am now speaking as a lawyer on this agreement.

Sir Frederick Hopkinson.—I thought they were both the same.

Sir H. Courthope-Munroe.—I cannot quarrel about that, but it is suggested that the effect of this agreement was to convert a person of Sir George's eminence in the engineering world into a Clerk of the Works, and a hundred-and-one other things. He will be charged with neglecting the duty of the office boy if it is put as high as that. He may, if you please, be responsible for what he has done wrong and what he has contracted to do if anything is wrong; but do not elaborate against him a hundred-and-one charges in a capacity for which he has no responsibility whatever. That is my point.

Chairman.—Clause 3 is the only thing which troubles me very much. I understand the rest of the agreement—at least, I think I do—but I do not understand Clause 3. Supposing under Clause 3 Sir George Buchanan was able to say: "I nominated a resident engineer. I gave him instructions as regards the details," had he any greater responsibility than that? "I nominated the resident engineer and I gave him instructions as regards the way in which the details of the work should be carried out. If Mr. Lewis did not carry them out, I, Sir George Buchanan, am not in any way to blame for that."

Sir H. Courthope-Munroe.—That is the way I venture to put it.

Chairman.—If that is the explanation then my difficulty goes. Where is the responsibility for Lewis carrying out the details of the work as an agent for Sir George Buchanan?

Sir H. Courthope-Munroe.—In that connection I want to call attention to a remark which was made by you which struck me at the moment as very apposite. You said this after we had a long discussion: "I think the real position was that Sir Lawless Hepper left it to Sir George Buchanan, and Sir George Buchanan left it to Sir Lawless Hepper, and therefore, relatively nothing was done." I think there you probably put your finger exactly on the spot; but what I want to say about that is this. If it was Sir Lawless Hepper's duty under the scheme, if you accept what Lord Lloyd has said, and you accept the reading of the agreement which I have put, there was nothing wrong legally or morally in Sir George Buchanan's leaving Sir Lawless Hepper, the watch-dog, to do his own work. That is my point. I think the Chairman

has put his finger exactly on the spot there, but no moral blame can be attached to me for leaving other people to do their own work.

Mr. Billimoria.—You do not accept the position that the resident engineer was the agent of Messrs. Meik and Buchanan in India?

Sir H. Courthope-Munroe.—That is the whole crux.

Mr. Billimoria.—Except in regard to the payment of his remuneration.

Sir H. Courthope-Munroe.—No.

Mr. Billimoria.—You say he was not the agent of the firm?

Sir H. Courthope-Munroe.—No; that is what I am hammering at for all I am worth. This contract was a departure from every other contract that I have come across, except where you have a Works Department, which ends in this sort of thing. In the ordinary contract which I put of an engineer in London, if you were to suggest in Westminster to a principal engineer that he would be responsible for the work of the resident engineer without any condition that the resident engineer was dismissable by him or controllable by him, but his reports were to go direct to someone else, a big engineer would not look at it. But when you are dealing with Governments you are in a different position, and you hope for the best. If Lord Lloyd had remained on things might have been different. That is the whole position. That brings us back at once to Clause 3, which is the root cause of the whole trouble, which takes the man who is naturally the watch-dog of the principal engineer, the man whom he relies on, his eyes, and, as I said a little time ago, his other self, and puts him absolutely in the pocket of the people concerned, the Development Directorate, and it short-circuits all control over money and all guarantee as to the value of the work. That is the difficulty. Then at the eleventh hour when this ghastly mess has arisen you turn round and say: "What about the principal engineer?" That is my trouble.

Chairman.—It is very difficult to say that Mr. Lewis was the agent of Sir George Buchanan when Sir George Buchanan could not dismiss him.

Sir H. Courthope-Munroe.—And it is in the evidence, or Sir George will tell you if it is not, that at one stage when he was writing and complaining, he asked to have a resident engineer of his own, and the Government would not have it and would not pay.

Chairman.—It broke down on the question of money.

Sir H. Courthope-Munroe.—That is it.

Chairman.—I do not think there is any harm in my saying my view at the present moment is that if Sir George were being challenged on Clause 3 it would be sufficient for him to say: "I nominated a resident engineer. I gave instructions to him as to the detailed method in which the works should be carried out. That was all I had to do except for my duty of supervision. As regards that work I had no further or other responsibility towards the resident engineer."

Sir H. Courthope-Munroe.—That is all I am anxious to call attention to.

Mr. Billimoria.—That cannot be the position. Supposing I employ one of my clerks to carry out a certain job and I give him definite instructions to do it. If he fails or if he is negligent, who is responsible? Not the clerk, but I.

Sir H. Courthope-Munroe.—Because you can sack him. That is the answer.

Chairman.—He was your servant.

Sir H. Courthope-Munroe.—He was your servant. You pay him and you can sack him when you wish.

Chairman.—You pay him. He was under contract with you, and you had the power to come down and turn him away at once.

Mr. Billimoria.—Supposing I do not pay him, but my client undertakes to pay me for whatever assistant I employ in that firm to carry out the job under my instructions and under my supervision. If that clerk still fails I would be responsible and not the clerk.

Sir H. Courthope-Munroe.—Certainly. That is the ordinary case I am trying to put to you. In the ordinary case of a resident engineer in big practice, in nine cases out of ten he is paid direct by the building owner. In some cases it is added to the salary of the principal engineer and he pays it; but that is quite immaterial. The resident engineer is employed by and dismissable by the principal engineer. That is the case you put. That is the whole thing. The mere fact of whether the payment goes direct to him or by addition to the fee of the principal engineer is quite immaterial.

Sir Frederick Hopkinson.—Would that apply in the case of a Government Department where the head of the Department has no power to dismiss those under him, but he has to take responsibility for what they do?

Chairman.—Heads of Departments frequently find themselves in a difficult position.

Sir H. Courthope-Munroe.—That is a departmental matter that I cannot discuss. If it works out as you suggest that may create an injustice; but I am only concerned with the gentleman on the other side of the hedge.

Sir M. Visvesvaraya.—This is the work of two parties. One was the Development Director and the other was the engineer. It was expected they would work in unison. If the engineer, having been in that position, thought he was not free to fulfil the terms of the contract, he should have made his position clear at every stage instead of allowing matters to drift.

Sir H. Courthope-Munroe.—That is the difficulty. The man who was in control was Lewis. If Lewis, as in the ordinary case, had been the servant of the principal engineer he could have dismissed him, and the whole responsibility would very properly have been laid at the door of Sir George. In fact, it would never have arisen because 2½ years ago the man would have been sacked. That is the answer to it. There it is. It is one of those things that happen when once you get this sort of Department. My memory goes back a long time, some 45 years, and I have a sort of recollection that 30 years ago there was something very similar in London. The chain was broken and you got this direct connection between the building owner and the contractor, and money simply ran to waste.

Mr. Billimoria.—With reference to the point you have raised, might I draw your attention to the letter dated the 22nd June, 1921, at page 13 of the book of correspondence? It is a letter written by Sir George Buchanan to Mr. Lewis: "I pointed out that our responsibility did not cease then as we were not only the engineers for the machinery, but for the execution of the entire work". Does not that state that Mr. Lewis was under Sir George Buchanan's control absolutely, and that Sir George Buchanan himself admitted responsibility in regard to the execution of the work?

Sir H. Courthope-Munroe.—Are you asking me that as a lawyer, or as a man in the street?

Mr. Billimoria.—So far as these documents go.

Sir H. Courthope-Munroe.—The inquiry has now reached a stage when one has got to look at what were the obligations and duties of Sir George, and what were the duties and obligations of certain other parties. Doubtless throughout the correspondence you can find such expressions and statements. Sir M. Visvesvaraya pointed out that the Government did not accept the view which is put forward there. I agree that for what it is worth, there it is; but ultimately, when you come back to consider the very grave questions you have to deal with you must get back to the actual document and the actual agreement. I agree that on reading that you may say: "Here is a man hanging himself".

Sir Frederick Hopkinson.—You must admit the circumstances that we are considering now are different from those where you are bringing an action for damages, are they not?

Sir H. Courthope-Munroe.—Yes; very difficult. It is entirely different. We are not on that at all. Mr. Billimoria is fully justified in puting that to me. There is the letter. But one knows that in the course of business correspondence a man very often inflates himself and calls himself this, that, and the other, as to which when you come to deal with it you find he is not anything of the kind.

Mr. Billimoria.—I think I could point out several other letters.

Sir H. Courthope-Munroe.—No doubt you and I could point out some.

Chairman.—I do not think there is any other letter which says in such plain terms: "Responsible for the examination of the work". They have said "We are engineers responsible for the scheme".

Sir M. Visvesvaraya.—And the execution.

Chairman.—Then let me have that because I have not got it, and I should like to have it.

Sir H. Courthope-Munroe.—That really is only paraphrasing this other one that we have been on: "Execution of the works but answerable" what as—as the engineers?

Mr. Billimoria.—There are several letters. There is one at page 55: "We are appointed the engineers in carrying out the scheme, and all the construction and execution of all the works connected therewith until their final completion". That is a letter written by Messrs. Meik and Buchanan dated the 3rd June, 1922, to the chief engineer.

Sir M. Visvesvaraya.—On the 22nd July they say: "We are the actual responsible engineers".

Chairman.—I remember that phrase.

Mr. Billimoria.—It is at page 55 : " In the execution of the works." Then on page 54 come the words: " We are the engineers responsible to the Government of Bombay and the Secretary of State." There are several letters like that, if you wish to refer to them.

Sir H. Courthope-Munroe.—A possible explanation occurs to me, that this exaggeration of the position may have been attempted by Sir George with a view of trying to get a control that he had not got. Still, as I say, this is a little off the line of argument. The question is this. You have to consider what is the true position. The true position, in fact, is the true position in law.

Chairman.—You had better explain a principle that you and I are very familiar with, which is this : When a document comes before the Court for construction it does not really matter what the parties have said. Suppose in a letter a man has written with regard to a certain document that it puts such-and-such an obligation on him, when the matter somes before a court of law for the construction of that document, you have to look at the document and see what obligations arise from the document, and not take the expression of opinion of the people who are concerned. A man may make most disadvantageous statements in a letter about the document, but the Court may say : " Oh, no, that was not the meaning of it all." The extent of the obligation must be gathered from the document itself, not from what the parties thought that it meant.

Sir H. Courthope-Munroe.—Quite so. I hesitated to address you on that because one knows that you know that better than I do. But, bearing in mind that there are other members of the Committee who are not lawyers, obviously that is so. You have to have regard to the document, construing it from the actual words used.

Sir Frederick Hopkinson.—And what is the obvious intention of it, and what is the obvious meaning of the two parties, so far as we can arrive at it.

Sir H. Courthope-Munroe.—Yes; but may I add that the meaning is to be gathered within the four corners of the document, not what you and I as men of the world may say that the parties meant? That is the trouble.

Mr. Billimoria.—I quite agree with the Chairman, but may I point out that before the document takes birth, if there are any conversations or interviews on which this document has been based, that is to be treated as the foundation to imply the meaning of several Clauses in the document?

Sir H. Courthope-Munroe.—No. For the purposes of this enquiry I am prepared to go with you, but as a matter of law I venture to say that that is not material.

Mr. Billimoria.—That is often said in a court of law.

Sir H. Courthope-Munroe.—If you were in a court of law on a question of damages, and you were proving the matter before the court of law, it would be simply this document and nothing else. You would not be allowed to look at what somebody said before the document. You could not go into that at all.

Sir Frederick Hopkinson.—That is why I said this enquiry is different from a case of bringing an action for damages.

Sir H. Courthope-Munroe.—It is; but the strong point I want to make is this : If you examine all the earlier history, if you examine the scheme, if you read what Lord Lloyd said was intended, if you follow what the agreement actually did, it all works in the same way. It was intended not, of course, to produce these results, but it was intended that the control and direction of the work, the smooth running and efficient working of it should be with Sir Lawless Hepper. It has been disastrous. You will hear from Sir George now if he were called upon to say which it should be, contract or Government work, he would plump for contractor's work straight away. In fact, he said so. But the intention of everybody at the start was to put the designing of the work with Messrs. Meik & Buchanan, and the carrying out of the work with the chief engineer. The director was responsible for the smooth and economical working, and also for obtaining the plant, subject to specification. That was all intended, and the agreement does it. In the events which have happened in India, apparently, when this disastrous state of things came about a scapegoat was wanted.

Mr. Billimoria.—The agreement goes further than that, because the agreement says : " shall at all times assist and advise the Government of Bombay."

Sir H. Courthope-Munroe.—That is what he was to do : to assist and advise and supervise. But the gravamen of the charges against him, in point of fact, is that he did not superintend all these details, which was somebody else's job.

Chairman.—I am not at all sure that that was any part of his duty.

Sir H. Courthope-Munroe.—That is my trouble.

Chairman.—That is the actual execution of the work in Bombay. It was his duty to advise on, and supervise, these works, but I am not at all sure how far that goes.

Sir H. Courthope-Munroe.—I do not quarrel with any of the questions put to, or the attacks made upon, Sir George Buchanan with reference to his design or his estimates, or those sort of things, but with regard to all this odd work such as the Kandivli Quarry, the dredger, the making of these cross-bunds, all the local work and all this mass of detail in regard to which the greater part of the trouble has arisen, I do say it is altogether wrong to lay it at Sir George's door. That is what I want to emphasise in connection with the agreement. I do not think there is very much more I need say in connection with the agreement.

Chairman.—No, I think that practically exhausts the agreement.

Sir H. Courthope-Munroe.—Paragraph 4 only deals with the question of the payment, which is not in dispute.

Chairman.—My difficulty is this: I cannot understand how any man would have accepted responsibility for the execution of works unless that man was going to be on the spot the whole of the time, or unless he had somebody there in whom he had the most implicit confidence. It seems to me heading for disaster otherwise.

Sir H. Courthope-Munroe.—I am not prepared to answer that. All I can say is that Sir George was acting in this case under the aegis of Lord Lloyd, and he did not realise that Lord Lloyd's day would come to an end sometime.

Sir M. Visvesvaraya.—Two or three people were jointly concerned. It was the team-work which failed. And all this disaster has resulted from that. It was the business of every member of the team to insist that he was given his share of the work according to the terms of his contract. Did your client insist on that?

Sir H. Courthope-Munroe.—I am sorry, but I do not quite follow.

Sir M. Visvesvaraya.—According to the terms of the contract there were certain duties binding on your client, and he ought to have made sure that he had the necessary opportunities at every stage of the scheme for the performance of those duties. If he was missed out at any time he ought to have insisted on his opportunities being restored to him. What has happened seems to be this: An estimate was prepared. It was found under the mark. Then a revised estimate was prepared. The Government ignored him and prepared a separate estimate themselves. Detailed plans and estimates for the complete scheme were not prepared by your client. With regard to the dredger, the specifications were apparently unsatisfactory and faulty. Then when the dredger was built according to the specification and brought on the scene, it failed to give the promised output. When all this happened the local chief engineer eventually took over some of your client's duties, and his word prevailed over that of your client. That seems to be what has happened, and the responsibility must be on your client in not securing opportunities to fulfil the terms of his contract. I only put this view before you. What have you to say to it?

Sir H. Courthope-Munroe.—I cannot accept that. I think the utmost which could be put against my client is what the Chairman has just said. It is a wonder that a gentleman of his position put his hand to the document. I think that is a perfectly fair observation, but I cannot agree that there was any sort of responsibility upon Sir George. He was writing innumerable letters one after the other—to go back to Lewis.

Sir M. Visvesvaraya.—There have been innumerable letters, but we have not got one comprehensive memorandum which was put forward as a convincing argument that things were going wrong and that matters should be handled differently. If such a memorandum had been given to the Bombay Government, they would certainly have acted on it.

Sir H. Courthope-Munroe.—But can you, in fairness, extract that from the documents? Assume an extreme case. Assume you were satisfied for the moment that my client had done everything he had contracted to do within the four corners of this document. Could you then blame him because he had not done something outside the document?

Sir M. Visvesvaraya.—Many things have not been done within the terms of the document because he did not assert himself.

Sir H. Courthope-Munroe.—What is it which he bound himself to do under this contract that he has not done?

Sir M. Visvesvaraya.—For instance, detailed plans and specifications. Do you know, Sir Harry, that the sanctioned estimate which has been in operation since 1922, was not prepared by your client? Why is that?

Sir H. Courthope-Munroe.—I do not follow. If it is said that he ought to have prepared certain plans and that he has not done so, very well, then I should like to put

that to Sir George at once. I agree that if that is so, obviously it requires answering, but I say that he has done everything he contracted to do.

Sir M. Visvesvaraya.—There is one more question I want to put to you. The Government with whom you were under contract to carry out and help in this work——

Sir H. Courthope-Munroe.—Do not use the phrase " Carry out "; I object to that.

Sir Visvesvaraya.—To carry out in association with the Government. It is team work. Many big works have to be carried out by several heads co-operating. That co-operation should have existed but did not exist here. The reason seems to be that in some cases the work done was not satisfactory and was not in sufficient detail for the people to follow, consequently they ignored the instructions and carried on in their own way.

Sir H. Courthope-Munroe.—I am not out to defend in any sense the want of co-operation. It is obvious that in a work of this kind only one result can happen if you do not have co-operation.

Sir M. Visvesvaraya.—If your client had prepared a complete memorandum of the situation at any stage and had offered it to Government, Government would have stopped the interference you complain of.

Sir H. Courthope-Munroe.—I am not prepared to controvert that. All I say on it, with very great respect to the Committee, is that it is rather a counsel of perfection. Can you call to mind any case where any one person has gone direct to Government and attacked a Government department and asked for their abolition?

Sir M. Visvesvaraya.—Many people have done that—Contractors usually do.

Sir H. Courthope-Munroe.—It is a big responsibility to suggest to a London engineer that because he is dissatisfied he has to invite a Government to wipe out an entire Government department. The result would have been that he would have been dead and buried by now.

Sir M. Visvesvaraya.—Under this contract the Department is one party and you, the engineers, are the other party. You have to work in unison. If you say " The other man prevented me from doing it; I have no authority; I cannot do anything," that will be an excuse, not a reason. You should go to the principal and say " This man is preventing me from carrying out my share of the work." If a convincing argument had been put forward in a memorandum, Government would have taken it up. What have you to say to that?

Chairman.—We are getting a little beyond the construction of the agreement now. We are getting in to the merits, and we had better not express opinions about them. Anyhow, that is how the thing stands. You have told us about this agreement. I think you misunderstood something I said if you thought that I said that I could not understand why Sir George Buchanan put his hand to this agreement. I did not say that. What I said was that I could not understand any man agreeing to be put into such a position that he would be responsible for the execution of the works—which is a very different thing.

Sir H. Courthope-Munroe.—I did not wish to put it too high, and I entirely agree with your view.

Chairman.—Suppose he is in England in May, and in May there is a complete breakdown of the Kandivli Quarry owing, if you like, to gross misbehaviour on the part of three or four people up there. Is he to be responsible for that? If when he said that he was appointed engineers in carrying out the scheme and in the construction and execution of all works connected therewith he meant he was taking the responsibility for the due execution of all works, I cannot understand his accepting that position. If he meant that as engineers he was responsible in all matters relating to the execution of the works, then I understand it.

Sir H. Courthope-Munroe.—I agree, Sir, but one cannot attempt to construe this agreement by reference to loose expressions in correspondence.

Sir Frederick Hopkinson.—Are we to draw any conclusion of any kind as regards to relations between the amount paid for the work done under this contract as to whether it could be held to cover bare supervision, or supervision and control. The amount paid is 2 per cent. on 700 lakhs, which is £105,000.

Sir H. Courthope-Munroe.—I am not going to discuss the question of quantum. That is a matter of the contract.

Chairman.—What Sir Frederick has in his mind is this—that an engineer employed to get out plans in a very big thing like 367 lakhs might be content with half per cent. or 1 per cent., but that if you are going to increase his responsibilities by putting on him duties that are wider than those ordinarily performed by engineers, you have got to increase his remuneration. I think Sir Frederick would like your view, or the opinion of Sir George Buchanan, whether the bargain to give him 2 per cent. on the 367 lakhs

did not imply that he had more duties to perform than would fall to the lot of the ordinary engineer.

Sir Frederick Hopkinson.—Under the narrow meaning of the word " supervision."

Sir H. Courthope-Munroe.—When I come to deal with the evidence I will put that, but as a lawyer I should say you cannot incorporate that into this agreement in any sense of the word. You would want a lot of expert evidence. Some people might say 2 per cent. was quite inadequate and that it ought to be 5 per cent. Look at the enquiry you would embark upon if you were going to construe this agreement by reference to the money mentioned in it.

Sir Frederick Hopkinson.—Happily I am not a lawyer.

Sir H. Courthope-Munroe.—You have the advantage of being an eminent contractor.

Chairman.—Does that conclude your argument on this point?

Sir H. Courthope-Munroe.—I am reminded by my friend of one other point which I wanted to make. In dealing with the agreement, I referred to what I called the modification of the agreement which is contained in a letter with an annexe to it of the 30th January, 1923. I said not quite accurately that I had exhausted the effect of that agreement by the insertion of those few words in paragraph 1A; but there is a point to which I want to draw your attention which is contained in paragraph C, the last paragraph of that modification, and it runs in this way: " The obligation which clause 1A of the agreement lays on the engineers to carry out certain work in London may, with a view to securing a workable arrangement, be held to be confined to the permanent works only of the reclamation, including the storm-water drains referred to in B." Now this is what I want to draw your attention to: " and in order to insure better co-ordination, all correspondence between the engineers and the Chief Engineer Reclamation Branch should in future be addressed through the Director of Development, a copy of each document being forwarded at the same time for record in the Director's Office." If anything was wanting to stamp the position that the resident engineer was, in no possible sense of the word, the servant of Sir George Buchanan, it is that. We are not even allowed to address him direct. We have got to address him through the Government Department and on one occasion when we did, after that, address him direct, we were hauled over the coals for doing so.

Mr. Billimoria.—Is not that a matter of convenience, or a matter of record, for the Government?

Sir H. Courthope-Munroe.—I am not complaining a bit about the Government action in doing it. That is entirely a matter for Government, but what I do say is that this emphasises beyond all question the position which I take up—that the effect of this document is entirely to remove the resident engineer from being in any sense of the word our servant or under our control. It is suggested that I should read the question to which this is an answer. The words of paragraph C on the preceding page are " and as to the relationship between Messrs. Meik and Buchanan on the one side and the Government and the Chief Engineer Reclamation Branch on the other." It was in answer to this question as to the relationship between the parties that at this stage in 1923 it was definitely stated that he was the servant of the Director of Development, and this provides that you shall not even write direct to him.

Mr. Billimoria.—That only meant that the Director of Development was a Post Office as between Sir George Buchanan and the resident engineer.

Sir H. Courthope-Munroe.—May I go back to the question you put to me about your clerk just now. He would not go through the operation of the Post Office. If he disobeyed your orders and got you into trouble you would get at him direct.

Sir Frederick Hopkinson.—It is a very common thing in Government works to have this Post Office system.

Sir H. Courthope-Munroe.—I do say that these two paragraphs emphasise the position which I say is the true construction of the agreement. I do not think, Sir, that I can usefully add anything to what I have said.

Chairman.—With regard to Monday, Monday is the last day on which we can have this room. You must get through then. You can get through most easily.

Sir H. Courthope-Munroe.—I think I may say I will do it.

Chairman.—I think we must do it.

Sir H. Courthope-Munroe.—I would only ask you to bear in mind that this is the 56th day, and that there were a large number of witnesses called in India, and some in London, and it is in consequence of the various things which were said in India that you have been good enough to allow me to intervene and deal with that evidence. You may take it from me that I shall be as brief as I possibly can.

Chairman.—I think you can manage it well within the compass of the day.

(Adjourned to Monday, 15th November, at 11 a.m.)

The Committee Assembled at 11 a.m. on the 15th November, 1926, all the Members being present.

Sir George Buchanan, recalled and further examined.

Sir H. Courthope-Munroe.—I think, Sir, I had better go straight to the Bombay evidence, and get through it as quickly as I can. You have made some extracts, Sir George, from the Bombay evidence, have you not?

A.—Yes, I have.

Q.—Just take the document in your hand, because it will conduce to my dealing with it fairly briefly. If I attempted to tackle the actual shorthand notes we should be here for another week. I will just go through the various points which you have extracted from the Bombay evidence, and in reference to which I think you desire to make comments and, in many cases, denials?

A.—Yes.

Q.—Is there anything in the first half-dozen pages with which you want specially to deal? Do not touch on anything we have discussed, because it is no good going over old ground again.

A.—No.

Q.—The evidence you are now dealing with is that of Captain Headlam. He is the first witness?

A.—Yes.

Q.—I see that the second witness is Sir Lawless Hepper. He is the important witness whose evidence you want to deal with in some detail. Is there anything you wish to mention until you come to page 7? Page 7 deals with the escape of material through the rubble wall.

A.—I should like to deny the allegation of Sir Lawless Hepper that I was of opinion that the scheme would prove to be a great financial success.

Q.—I was going to deal with that a little later on. I have that in mind, and I will mark it so as not to deal with it twice. On the following page there is a reference to the working of the dredger, but the Committee know all about that, and what your contention is. That brings us to page 7.

A.—I think we can pass page 7. All that has been dealt with.

Chairman.—Surely, Sir Harry, Sir George Buchanan has modelled his statement on the previous evidence which was sent to him from Bombay and received in England? You are surely not going over it page by page?

Sir H. Courthope-Munroe.—No. I particularly want to avoid doing anything like that, because obviously that would be a waste of time; but where witnesses have made statements which are in conflict with what Sir George says happened, or where they have said that Sir George has done certain things and said certain things which he says he did not do or say, I want to give him the opportunity of dealing with them.

Witness.—I think we can go on to page 14.

Sir H. Courthope-Munroe.—I think first of all you want to refer to some matters on page 11?

A.—Yes, I do.

Q.—Some questions were put by Sir Frederick Hopkinson to Sir Lawless Hepper. I see that Sir Frederick puts this question: "Therefore you are entirely responsible for the scheme as Director?" The answer given by Sir Lawless Hepper is: "I am not in any way responsible for the technical details of the scheme." Then Sir Frederick Hopkinson says: "For the design or the carrying out."—(A.) "No, I am not responsible." You wish to emphasise what I said on Saturday, and refer to the scheme itself?

A.—Yes.

Q.—Then it is said, "Who is?" and the answer is: "Sir George was." You deny that, for the reasons which I put in some detail on Saturday?

A.—Yes.

Q.—Then Sir Frederick asks: "Who is since he left?" He says that nothing has been said about that. "Do you mean there is no one in sole charge of the whole scheme?" Sir Frederick says: "I thought, as Director, you would have been responsible from the beginning." That, according to your view, is the true way of looking at it?

A.—He was responsible for carrying out the work.

Q.—Passing rapidly down that page, I see that Sir Frederick again comes forward and says: "Surely, as Director, you are responsible?" Then the answer is: "I have

always assumed that for the technical details Messrs. Meik & Buchanan have been responsible as engineers." I observe that that is the second time he has ridden off on the word " technical." A little lower down Sir Frederick Hopkinson puts it to him : " They are purely the engineers? You have the sole responsibility. They act under your instructions," and then, for the third time he says: " No, not in technical matters. I have never considered I am competent to give them instructions in technical matters." Then Sir Fredericks says: " They sent their reports to you." That you did?

A.—Yes.

Q.—And then he says " Yes, every time Sir George Buchanan came out he made reports to the Government—(A.) To you, or to the Government. It was all addressed to you." In answer to a question by Sir M. Visvesvaraya, Sir Lawless Hepper says: " Yes, I think it is addressed to me, but I have never assumed that I was in the position to dictate to them in any way as regards engineering technicalities." There we are, off for the fourth time on the word " technicality." Are you able to gather exactly what he means by that?

A.—I have nothing much to add to what you said on Saturday. He and his Chief Engineer were responsible for the technicalities in connection with the carrying out of the work.

Q.—But, as we have heard in this case, not once, but a dozen times, the major part of this affair which has caused the loss is the dredging, and Sir Frederick Hopkinson, as I pointed out on Saturday, made this very clear at page 59 of the meeting of the 3rd November, where he said : " But circumstances are not quite the same in that case and in Bombay. Take the dredging, for instance, which is the major part of the scheme in Bombay. There is no designing there, having once bought your dredger.—(A.) The actual designing required for the Back Bay work is very small.—(Q.) Is there any in the dredging work in Bombay.—(A.) No actual designing." Then there is a very pertinent question put by Sir Frederick : " Is there any engineering in it beyond buying the dredger—there are no plans to make.—(A.) There are no plans to make.—(Q.) There is nothing to supervise. All you have to do is to get your output?—(A.) All you have to do is to get your output.—(Q.) There is no engineering about it at all.—(A.) It is in the wall that there is engineering." If, as we have been told, that the major part of the affair which has caused the loss is the bad management and working of the dredger with regard to this point which Sir Lawless Hepper is making on four different occasions about not being answerable for technicalities, would this ordinary work of cleaning out the mud in this place be regarded as an engineering technicality, or not engineering at all, in your view?

A.—It all comes under the head——

Sir H. Courthope-Munroe.—Can you conceive anything which is less of an engineering technicality?

Chairman.—You would put it on the same ground as the Khandivli quarry, would you not? Is there any substantial difference between the excavation at Khandivli quarry and the excavating of the mud in the harbour?

A.—No, I should say they could be put on the same lines.

Sir H. Courthope-Munroe.—It is a little difficult to trace from this evidence what Sir Lawless Hepper did regard as his work. He kept on saying that the engineering technicalities were nothing to do with him. Could this main thing—the dredging—be in any case deemed to be an engineering technicality?

A.—He was responsible for all the administrative work in connection with the dredgers—putting them on double time, the paying of bonuses, and generally seeing that everything was done by proper team work.

Q.—Let me go to one other matter of some little importance. I will turn to page 14 of your extracts. This question was put to you by Sir Frederick Hopkinson, "Did you in fact get tenders for building the wall? " You say, " Tenders were called for for the first 8,000 feet from Colaba.—(Q.) On what date.—(A.) It was, I think, December 1920, or January 1921, very soon after the work started.—(Q.) Sir George Buchanan says on 7th February he was not in favour of accepting any tender." I think you dealt with that on page 92 of your statement.?

Chairman.—Yes, we have all that in the statement. Is there any new fact, Sir George, which you want to add now which is not in your statement, because we know your statement?

A.—No ; there is no new fact which is not in my statement.

Sir H. Courthope-Munroe.—You were in favour, at the start, of the matter being put out for contract?

Chairman.—He said definitely that he strongly wished Colonel Grisewood to have the contract ; that Lord Lloyd wanted him to have the contract, and that if the contract

had been given out to Colonel Grisewood, the work would have been begun in October, 1920. We know all that.

Witness.—Excuse me, Mr. Chairman, but Colonel Grisewood's tender was in October, 1920. This Colaba contract was another matter altogether.

Chairman.—A later one.

Sir H. Courthope-Munroe.—What I was coming to was this. Sir Frederick Hopkinson put this question to you about these tenders: " It is a fact, is it not, as appears from your evidence on page 92, that the tenders were received from Messrs. Pauling & Co., Messrs. Pearson & Co., and the Indian Construction Company "—that is Colonel Grisewood's firm to whom the Chairman has referred?

A.—Yes.

Q.—What I want to ask you on this point is this. It was put by Sir Frederick to Sir Lawless Hepper. He says this: " Actual tenders were asked for in 1920. I cannot give you the exact date. I believe tenders were sent in. I think there were about six tenders." Then he says, " And declined by Sir George Buchanan on February 7th," and Sir Lawless Hepper answers, I fancy somewhat ingenuously, " Yes." I think in that connection you wish to refer, do you not, to a note which you have found in your diary?

A.—Yes, I am producing that.

Q.—What happened was this, was it not? When these tenders were sent in you, Sir Lawless Hepper the Director of Development, and the Resident Engineer, Mr. Lewis, all met and discussed this matter?

A.—We did.

Q.—And then, having come to a decision, or, rather, having thought the matter over, you met again and had another consideration, and it was at that second meeting that the whole three of you came to the conclusion that, in the best interests of the work and of economy, it should not be done by contract?

A.—Yes.

Q.—Is it wholly misleading to suggest here that you, having got these contracts, of your own turned them down?

A.—It is wholly misleading. The extract from my diary says, " 8th February, 1921. Meeting with Hepper at 11 a.m. to discuss the tenders for Colaba contract. Lewis present, and all agreed it should be departmental."

Chairman.—You have already told us that.

Sir H. Courthope-Munroe.—I am sorry. It is not as I read it, and it is on the notes of the Bombay evidence.

Chairman.—Sir George Buchanan, since he came into this room, has referred to that in most definite terms. I knew that.

Sir H. Courthope-Munroe.—I did not appreciate it. It seemed to me that it stood that Sir George had done that.

Chairman.—No. He has already told us about it.

Sir H. Courthope-Munroe.—If that is so I will pass from it at once. While we are on this, let me clear up one other matter in connection with the tenders, and that is the tender for the dredger. I will take it quite shortly. Can there be any two opinions, Sir George, that Messrs. Simons, as dredger builders, are an eminent firm?

A.—No.

Q.—They are a well-known firm?

A.—They are a well-known firm.

Q.—You invited tenders, I think, and you got them from, how many people?

A.—The actual comparison which Mr. Meik prepared was that between Simons and Lobnitz.

Q.—Were they the only two it went out to?

A.—No, it went out to Fleming and Ferguson and Ferguson Brothers.

Q.—Tenders were asked for from Simons, Lobnitz, and who else?

A.—Fleming, and Ferguson and Ferguson Brothers—four firms.

Q.—On Friday I think it was Sir Frederick put to you a great many questions dealing with the tender made by Messrs. Lobnitz?

A.—Yes.

Q.—As far as I gather there were no questions put to you by him in connection with tenders of any of the other firms?

A.—Yes, there were. He asked why Fleming and Ferguson had not received full particulars.

Chairman.—Fleming and Ferguson asked for five rather simple answers to simple questions. For some reason which is not very apparent, Mr. C. S. Meik said he would have to send a letter to India. I can give you the document.

Sir H. Courthope-Munroe.—One can quite understand Sir Frederick's preference for the eminent firm of Lobnitz. In most of Pearsons' contracts, if there is any dredging work to be done, Lobnitz do it. Will you just tell the Committee why it was that you, in your honest judgment, gave preference to Messrs. Simons? What were the figures?

A.—Mr Meik took in the tenders and the result of his comparison showed that Lobnitz's tender was £840,000 and Simon's tender was £496,650, including the 10 per cent. for the extension of time.

Q.—Let me see if I have got it right. £496,650 as against £840,000?

A.—Yes.

Chairman.—And two dredgers as against one?

A.—Yes. I say that on the facts before him at that time we were surely justified in considering Simon's tender the most satisfactory? I am putting it on the facts before us at that time. Supposing we had recommended the very much higher price of Lobnitz, unless there were overwhelming reasons, which we do not admit there were at that time, what would have been said?

Sir H. Courthorpe-Munroe.—There is something like 75 per cent. difference between the tenders.

Sir Frederick Hopkinson.—Surely you have your figures wrong.

Chairman.—We have the whole documents. As it has been presented to us it conveys a wholly inaccurate impression. The figures are not right even.

Sir H. Courthope-Munroe.—Can you answer that question at once, Sir George?

A.—No, I cannot.

Q.—I am asking you to give the particular reasons which led you to prefer the tender to Messrs. Simons to the tender of Lobnitz?

A.—That is the reason I give—that according to the figures prepared by Mr. Meik, whom we cannot re-call, Lobnitz's tender was £840,000 and Simons' tender was £496,000.

Sir H. Courthope-Munroe.—No doubt you will be asked by Sir Frederick Hopkinson——

Chairman.—Let me help you, Sir Harry. The fact was that Sir George Buchanan was in India at the time. These three firms were asked to tender. One said, " I have no small berth vacant " and he dropped out. Fleming and Ferguson asked five questions which were probably not difficult to answer, but Mr. Meik did not answer them, and he said he would send the letter to India to Sir George Buchanan. Sending the letter to India was not of great help because the matter was urgent. However, that is how Fleming and Ferguson dropped out. Lobnitz were left. Lobnitz send on 22nd January a very full, long tender, and, as Sir Frederick Hopkinson worked it out, he showed you that on the price per ton Lobnitz' was a better one than Simons'.

Sir Frederick Hopkinson.—Horse power.

Chairman.—He also pointed out that there was double stage pump and 14,000 feet of pipe line.

Sir Frederick Hopkinson.—19,000 feet of pipe line.

Chairman.—The letter of Meik and Buchanan asked for 14,000 feet. Apparently Lobnitz specified for 19,000. None of those facts were ever conveyed to Sir George Buchanan. All the information he got was a very short concise telegram from Mr. Meik not giving particulars which would have enabled him to form a sound judgment. It is not his fault, but that is the fact. Nothing can get over those facts.

Sir H. Courthope-Munroe.—I am much obliged to you. (*To the Witness*): Could you at this juncture put before the Committee, if they have not got it, the actual letter that started the ball between you and Simons. It is the 25th July?

A.—They have got it.

Sir H. Courthope-Munroe.—You wrote that letter, and then in answer to that they sent you a tender?

Chairman.—Let us get it right. Letter of 25th July. A day or two prevous to that, an interview with Mr. McMurray. Letter 25th; visit to Renfrew, August 29th; letter September 12th. Those are the material dates.

Sir H. Courthope-Munroe.—With that letter I see you sent them a plan asking for the dredger plant required, which was to carry out the work on the plan. The Committee have got it and therefore I pass from it. Let us get on to the next matter. I see Sir Frederick Hopkinson asks questions of Sir Lawless Hepper again about the commencing of the wall from both ends, but you have dealt with that?

A.—Yes, that has been dealt with fully.

Q.—On page 19 I see that Sir Frederick Hopkinson is again trying to get light on the question of responsibility. He says to Sir Lawless Hepper, " What is the actual

chain of responsibility? When Sir George Buchanan was in charge he was supposed to be chief engineer directing all the operation?—(A.) Yes." You have dealt with that. It is on page 19 of your extracts, and it is in the examination of Sir Lawless Hepper. His answer is " Yes "—that you were in charge directing all the operations. You altogether deny that?

A.—I deny that absolutely.

Q.—It is quite inconsistent with the evidence given by Lord Lloyd, which the Committee had before them at a subsequent date. There is another matter which somewhat hurt your feelings. Sir Frederick Hopkinson, putting these questions to Sir Lawless Hepper, though possibly not with the view of the agreement which we now have before us, put this : " If you look at the agreement, it was definitely settled there. It was laid down that such works shall be commenced forthwith, and all such drawings, specifications, schedules and estimates, and any fresh or amended drawings, specifications, schedules of quantities and rates or estimates as may from time to time be required during the progress of the work shall be promptly prepared and forwarded to the Government of Bombay, and shall become the property of the Secretary of State." I am reading from page 20. So far as Sir Frederick read the document I make no complaint, but what I am venturing respectfully to complain of is his summing-up of the position, because he says there: " So it is all laid down definitely. Actually you were doing Buchanan's work out here." I think that is a thing you absolutely deny, Sir George?

A.—I absolutely deny it.

Chairman.—One moment. Was that with regard to storm water drains?

Sir H. Courthope-Munroe.—I think it was with reference to the general position.

Witness.—It was with reference to the general position.

Sir Frederick Hopkinson.—No.

Sir H. Courthope-Munroe.—If you say no I accept it, of course, but the general paragraph is read, and then Sir Frederick sums it up (it might be justified in one view of the agreement, but when you sit down and read the agreement I suggest it is quite a misapprehension) : " So it is all laid down definitely. Actually you "—that is, Sir Lawless Hepper—" were doing Buchanan's work out here?—(A.) Yes."

Sir Frederick Hopkinson.—The evidence given was that they were designing the storm water drains.

Chairman.—And, if you remember, on the 4th January, 1923, there was an interview with Sir Chimanlal Setalvad, and he commenced by saying : " Why have we got a staff of draughtsmen here. What does all this mean." That is how he commenced the interview.

Sir H. Courthope-Munroe.—You have had the advantage of seeing the witnesses at the earlier stages of the proceedings.

Chairman.—That is in Sir George Buchanan's statement. He sets out an interview of the 4th January, 1923, and he himself says that it commenced by Sir Chimanlal Setalvad saying : " Why have we got a staff of draughtsmen here? Is not that your work?"' That resulted in the agreement, if you remember, by which it was arranged that as regards permanent works Sir George should design them.

Witness.—That was right, yes.

Sir H. Courthope-Munroe.—As long as it is understood that we repudiate altogether the suggestion that Sir Lawless Hepper ever did any work on behalf of Buchanan, it is all right. It is quite possible there might have been a mistake. It is a little difficult to find out exactly what Sir Lawless Hepper's work was.

Chairman.—I wish you would tell us.

Sir Frederick Hopkinson.—Is not that why I pressed it so hardly?

Sir H. Courthope-Munroe.—I am not complaining. I started by saying that one must remember in reading this book through, that it was a different agreement pronounced upon by the Chairman—Sir M. Visvesvaraya taking one view and you taking another view. No doubt your questions were put in support of your own view.

Sir Frederick Hopkinson.—My questions were put in order to find out the facts.

Chairman.—If you will tell us from the evidence what Sir Lawless Hepper professed to be doing, we shall be very grateful to you.

Sir H. Courthope-Munroe.—That is my puzzle.

Chairman.—I do not pretend to know at present.

Sir H. Courthope-Munroe.—That is my difficulty. Here was a gentleman whom Lord Lloyd said was to be a watch dog, and was in charge of everything to see the

smooth and efficient working of the scheme, and whenever he is cornered by Sir Frederick Hopkinson or by you or by any member of the Committee he says (as I have pointed out four times) that he is not responsible for technical details. The big thing, as far as I can see, was the dredging, and obviously there is nothing less technical than dredging. I cannot discover from this what his particular job was.

Sir Frederick Hopkinson.—You will probably agree that I really tried to find out the position.

Sir H. Courthope-Munroe.—You did, Sir.

Chairman.—We all did.

Sir H. Courthope-Munroe.—And your only success at this stage appears to have been that it seemed to emerge indirectly that he was doing his own work and Sir George's. That is all I want to point out. At the bottom of page 20, Sir George, there is one matter I want to mention in order to pass it. It is suggested that you took what Mr. Kidd had done blindly. I think you have gone into that?

A.—Certainly, I took his soundings.

Q.—Shall we pass on to page 22—management. There again Sir Frederick was trying to find out the chain of responsibility, and he puts some very pertinent questions here. He says, " Do you think that it had a management of that character?—(A.) I think it had the management it deserved. I do not know how far I am personally concerned in this." I should have thought pages 19 and 37 of the scheme would have been enough for that—what is stated there, apart from Lord Lloyd's evidence. Then he says, " I put you aside. Meik and Buchanan were doing the work." That is based on the other view of the agreement. Then Sir Frederick puts this very pertinent question: " Had they decided to do it departmentally, do not you think the proper procedure would have been to search the world and offer £20,000 or £30,000 a year to manage the thing? " He says he cannot imagine the Government doing that.

A.—Sir Lawless Hepper was undoubtedly the manager.

Q.—In dealing with the management he says: " I do not know how far I am personally concerned in this." He has obviously stripped the board entirely of anything that can be, by any stretch of the imagination, called " technical," and our difficulty is to find out what is left. Then on page 24 there is this question about the suggested antipathy between you and Mr. Lewis, but I will pass that by because we have dealt with it at some length. On page 25 there are some questions put to Sir Lawless Hepper about the laying out of the site as distinguished from filling in?

A.—I have already discussed that.

Q.—Then at page 28 the question is put by Sir M. Visvesvaraya about the pumping: " Of course, had Sir George Buchanan's ideas been satisfactory there would have been no other dredger required but the " Lloyd " and the " Colaba "? There is no provision in his scheme for pumping from Back Bay?—(A.) No, there was not." The pumping from Back Bay was initiated by Mr. Lewis, was it not?

A.—By Mr. Lewis, in conjunction with Sir Lawless Hepper.

Q.—It had nothing to do with you?

A.—Not the initiation, no.

Q.—Then I see that at the bottom of the same page questions are put by Sir Frederick Hopkinson to Sir Lawless Hepper about the staff. He says: " I am going to ask you a rather delicate question. Are all your staff connected with the dredging in a happy or in an unhappy state of mind "? He says: " I thiuk myself they are in a happy state of mind. I have heard nothing to the contrary." How does that fit in with your recollection when you were there?

A.—Certainly it is not in accordance with my recollection. I do not think I ever went to Bombay without receiving memorials from the crews of the dredgers making numbers of complaints. It was no business of mine to receive memorials, and I naturally handed them back to the superintendent of dredging for him to see the Director about it.

Q.—I think one of the witnesses pointed out that in one case the crew had to be got rid of and a fresh crew got?

A.—They were not happy, and when men are unhappy and there is no team work, naturally the work suffers.

Chairman.—Was it not your duty to advise the Bombay Government that that state of things was going on?

A.—I do not conceive that to be my duty. The Director was the manager.

Q.—But if you believed that there was such disaffection amongst the crew so that they were not really turning out their work, as the adviser of the Bombay Government, ought you not to have looked into the matter? You had to assist and advise and supervise. Those are the three words?

A.—But I had not to interview dredging individuals who had grievances.

Q.—No, but if you came to the conclusion that the work was suffering because there was discontent amongst the crews, ought not you to have taken it up with Sir Lawless Hepper?

A.—Well, I probably did discuss it with Sir Lawless Hepper. I certainly have not put anything in writing about it.

Q.—And further, if you got no satisfaction from Sir Lawless Hepper, ought you not to have gone up to the Governor or to Sir Cowasji Jehangir?

A.—There we are coming back to the old question.

Q.—I know, but you and I know how perfectly easy it would have been to have got an interview with Sir Leslie Wilson or Sir Cowasji Jehangir. You and I know how ready both of them would have been to have helped you in every passible way?

A.—I cannot subscribe to that view, Mr. Chairman. What happened, for instance, in connection with Mr. Lewis? What happened after I had spoken to the Governor of Bombay and written to the Governor of Bombay and spoken to the Honourable Member? What happened after all this correspondence. With all the papers before him, all the Honourable Member did was to say: "Well, Mr. Lewis must in future direct all his correspondence through the Director of Development."

Q.—Have you any letter which you sent to the Governor and to Sir Cowasji Jehangir?

A.—I can put in the correspondence.

Q.—The letter I want, if there is one, is a letter in which you spoke about the necessity of Mr. Lewis leaving. That is the matter you are referring to, is it not?

A.—That is the matter I am referring to.

Q.—If you have a letter of that kind will you let Mr. Ewbank have it, because we would like to see the terms of it?

A.—I will put in all the letters.

Sir H. Courthope-Munroe.—Do you want the letter to which I referred? There are four or five.

Chairman.—It seems to me we shall want them. I have made a note of one or two documents which we were promised.

Sir H. Courthope-Munroe.—I want you to have them. I referred to four or five. If those are the ones you want I will see that they are put in.

Witness.—Is the one you refer to the letter of the 3rd June, 1922? It is the one I refer to in my note, I think. After going at some length into the matter it finishes up by saying that there can be little doubt that Lewis's health has broken down seriously and "in the opinion of Mr. Meik and myself you would do well to have him examined at home by a Medical Board for an expression of opinion as to his fitness to continue hard work in the East."

Chairman.—Was that to the Governor?

A.—That was addressed to Sir Lawless Hepper. The letter to the Governor was put in.

Sir H. Courthope-Munroe.—Let us get it right. What is the date of that letter?

A.—3rd June, 1922.

Sir H. Courthope-Munroe.—I also read one of the 8th June. Have you got that, Sir?

Witness.—The letter to the Governor was on the 31st July, 1922.

Sir H. Courthope-Munroe.—I referred to that.

Secretary.—They have not reached me yet.

Witness.—I read it out.

Chairman.—Then it is on the shorthand notes?

A.—It should be.

Sir H. Courthope-Munroe.—If you have not got it you ought to have it. I seem to have a little bundle of correspondence here. I will hand them in. (To the witness) This is the letter of the 31st addressed by you to Sir George Lloyd?

A.—That is the one.

Q.—What did you say in that letter?

A.—I read the letter out at a previous meeting of the Committee. It is to the effect that there seemed to be some misapprehension as to our position and that we were very much concerned about the absolute cessation of all letters and reports from Mr. Lewis and so on.

Chairman.—This is one where you start by saying "At our last meeting in Bombay I told Your Excellency that there seemed to be some misapprehension as to our position. Mr Lewis appeared to be regarded as the chief engineer in fact as well as in name, and at the meeting of the Advisory Committee I was not even introduced to the members"?

A.—Yes, that is the letter. Then there were enclosures which I promised the Chairman I would put in, and I am putting them in.

Sir H. Courthope-Munroe.—You conclude by saying " I have written this letter because I know how very interested Your Excellency is in everything connected with the Back Bay scheme and believe you would like to hear of any difficulties direct from me." You have got the letter of the 3rd June, have you not, Sir?

A.—I am afraid not.

Sir H. Courthope-Munroe.—If you have not I can give it to you.

Witness.—We have got notes of these letters.

Sir H. Courthope-Munroe.—It may be more convenient if I hand this bundle in.

Witness.—I have a bundle here. I can hand in the whole lot.

Chairman.—If the 3rd June letter begins " We desire to address you on the subject of the relationship," it is what I call the veil letter—" The veil appears to have dropped." I know that one.

Sir H Courthope-Munroe.—I am told there are two letters of the same date.

Chairman.—Sir George understands that it is the " veil " letter.

Witness.—Yes.

Sir H. Courthope-Munroe.—I think you have got all the letters you want now on that, have you not, Sir? Have you got the final letter of the 30th August, 1923?

Chairman.—No.

Sir H. Courthope-Munroe.—You ought to have that. That completes the chain of the four letters I have referred to. While my solicitor is finding it I will go on. (*To the witness*) I see, Sir George, that at the bottom of page 29 Sir Frederick Hopkinson puts this question to Sir Lawless Hepper, to which he readily assents: " I gather from this volume of correspondence and notes regarding the determination of the agreement with Messrs. Meik and Buchanan that Sir George Buchanan had really very little to do with the construction of the reclamation. Evidently they got out the original designs and thereafter practically did nothing?—(A.) That has always been my view." What do you say to that?

A.—I say that I think it has been stated here over and over again that the actual carrying out of the work was done by Sir Lawless Hepper as Director of Development, with Mr. Lewis as chief engineer.

Q.—It was not your job?

A.—It was not my job.

Sir H. Courthope-Munroe.—So it is true to say you did nothing. You got out the designs and thereafter did nothing. The carrying out of the work was their job and not yours.

Sir M. Visvesvaraya.—I asked for a list of plans and important reports or memoranda on technical matters prepared by Sir George after his preliminary report of 1919 was submitted. I have not had any definite reply. I do not know whether Sir George can enlighten us.

Witness.—We will supply anything we have.

Q.—I mean the list?

A.—We will give you the list.

Sir M. Visvesvaraya.—I want to know the definite work your client did for the scheme after that preliminary report was submitted. One of the criticisms is that after that preliminary report there was no important plan or estimate prepared by Sir George Buchanan.

Chairman.—All you want, as I understand it, is an index with the date and such and such a plan and another date and such and such a plan?

Sir M. Visvesvaraya.—Yes.

Sir H. Courthope-Munroe.—(*To the Witness.*) Do you understand that?

A.—Yes, I quite understand it.

Q.—Will you try to give it to Sir M. Visvesvaraya?

A.—Yes. It will take a few days, because I am afraid there are a great deal more than half a dozen or a dozen or two dozen, but it will be done.

Sir M. Visvesvaraya.—Only the important ones. I do not want many details.

Sir H. Courthope-Munroe.—Passing on, at page 30 there is a reference to the preparation of the estimates for the roads and for the storm water drains. You have explained the difference between the two estimates?

A.—I have explained that fully.

Q.—You always estimated for the storm water drains, but you did not estimate, except in the second case, for sewers?

Sir H. Courthope-Munroe.—There has been a little trouble there as to the meaning of the word " drains."

Chairman.—Again, Sir Harry, the matter is not quite so simple as that. Mr. Kidd got estimates from the Public Works Department showing that roads, lights and drains could be done for 59 lakhs. It is a most curious thing, but we have those estimates, and we cannot find that figure of 59 lakhs. We find the figure of 95. Whether that was a transposition in Mr. Kidd's report of 1912 we shall not know, but it is a very curious thing. The documents are here. The only figure we can find is 95. In Mr. Kidd's report it appears as 59. Sir George Buchanan neved saw those P.W.D. reports, but he put on an arbitrary amount of some 16 lakhs, and made it 75 in his report of 1919. He assumed that in the P.W.D. estimate were included storm water drains, I suppose?

Witness.—I did, certainly.

Sir H. Courthope-Munroe.—But you never intended to estimate for sewers, and you did not?

A.—Never.

Q.—But you intended the word " drains," where you use the simple word " drains," to include what we understand by drains plus storm water drains, but not sewers?

A.—I never intended it to include sewers.

Sir H. Courthope-Munroe.—If the figure you mentioned, Mr. Chairman, of 95 is a transposition of 59, then if Sir George, in making his estimate, merely added a percentage as an arbitrary figure, it ought to be added to the 95 and not to the 59.

Chairman.—That is the explanation that suggests itself. There is no figure of 59 lakhs in these original P.W.D. estimates which we have, but there is a figure of 95. Therefore one might possibly think that there had been a transposition of 5 and 9; but Sir George Buchanan never himself went into that estimate, nor did he ask for any revised estimate from the P.W.D. He took 59 as it was printed in Mr. Kidd's report.

Sir H. Courthope-Munroe.—Taking 59 and 95, there is over 50 per cent. increase straight away.

Chairman.—The increase was from 59 to 75, and subsequently the 75 was increased to 135, and there was added in pencil on that original document the words " storm water."

Witness.—And sewerage.

Sir H. Courthope-Munroe.—In any case, Sir George, this was a mere arbitrary figure, because your case is that until the scheme was developed and the site laid down any exact amount for drains could not possibly be got at?

A.—That is my view.

Q.—You want to know the length of the streets and the number of the streets, and various other things, before you can get an exact estimate. The next thing is at page 32. Again, continuing his search, Sir Frederick asks Sir Lawless Hepper, " if anything went wrong it was Mr. Lewis who would be responsible and not you, or the Government of Bombay? " Sir Lawless Hepper says: " No, I take it it would be Meik & Buchanan ". He will not take it himself; he will not take even the Government—it is you. Again you reply: " Scheme and agreement ".

A.—Yes.

Sir H. Courthope-Munroe.—Then I see Sir Frederick Hopkinson follows that up by saying, " And so it is Sir George Buchanan who comes in for the blame, and not the Government. I am asking you who is responsible?—(A.) I think the engineers." Here is one matter which is a little important to you, on page 33. I think, Sir M. Visvesvaraya was under a misapprehension as to the standing of your firm. He says the firm is only of a few years' standing.

Sir M. Visvesvaraya.—I understood that he had joined it recently.

Sir H. Courthope-Munroe.—In point of fact, your firm has been in existence for over half-a-century?

A.—Yes.

Mr. Billimoria.—Not as Messrs. Meik & Buchanan?

Chairman.—Sir M. Visvesvaraya no doubt had in his mind the fact that there had been a recent partnership of Meik & Buchanan.

Sir M. Visvesvaraya.—" Meik & Buchanan " was recent.

Chairman.—If you look at the original transcript you will see that Sir Frederick Hopkinson jumped in at once and said that the firm was of very old standing.

Sir H. Courthope-Munroe.—I am not complaining; I only wanted to clear it up. Following that the financial question was gone into. I think you have said, time and again, that finance was entirely outside your province, and that you never advised the Government on the financial question?

A.—That is correct.

Chairman.—Well, Sir George, finance was not entirely outside your province, at all events when you were dealing with Sir George Lloyd at the outset, because, if you remember in his letter he wrote to you and said that the two things he wanted you to advise him about were the feasibility of the scheme and whether, on present prices of dredgers, it would be a reasonable proposition?

A.—Yes, but I prepared my estimate. I had nothing to do with the advising as to the financial proposition. I never made any calculation whatever as to the profits.

Chairman—As long as that is made clear.

Sir H. Courthope-Munroe.—There is one other matter which I think you want to put before the Committee in some different way to that in which it has been presented hitherto, and that is this. It was put to you by Sir Frederick Hopkinson—I forget the exact language, but in effect it was that the scheme was a failure before it commenced. Sir Frederick Hopkinson will recollect the reference. Then Sir Frederick drew certain lines on the map and pointed out (correct me if I go wrong) that with the provision of 10,000 feet of piping, and with the provision of the dredger and the booster, there were certain parts of the land which had to be reclaimed which could not be reached. I think I have put it more or less accurately?

A.—That is right, yes.

Q.—That, as a proposition is true. I mean that there were certain portions of the reclamation scheme that could not be reached by the 10,000 feet, plus the dredger, plus the booster?

A.—Quite.

Q.—I want to get this: the actual area which you had to fill was 25,000,000 cubic yards?

A.—Yes. That is right.

Q.—There was a certain small portion on what is called the Marine Lines? There are two ends—the Colaba end and the Marine Lines end?

A.—As a matter of fact, I told the Chairman I would put in a statement about that.

Q.—Just follow me. I want to get it clearly. You have got to deal with a whole area of 25,000,000 cubic yards, is that right?

A.—That is right.

Q.—There was a portion of what I have called the Marine Lines which comes to 150,000 cubic yards?

A.—No, more than that.

Q.—How much is it?

A.—About 1,000,000 cubic yards.

Q.—That is a different figure from the one you gave me, but give it in your own way. What I want to get at is this. There are two points—the Colaba end and the Marine Lines end, where admittedly you cannot reach with the existing 10,000 feet and the dredger and the booster, but do they total up to a very small percentage of the whole?

A.—No, I do not say that at all.

Q.—What is the percentage?

A.—I cannot tell you at the moment.

Chairman.—You have given us a statement, have you not, Sir George?

A.—Yes. I do not know whether the statement is in yet, but I promised you a statement.

Sir H. Courthope-Munroe.—Then I will leave it.

Chairman.—You have certainly given us a statement with regard to it. I do not know if you propose to put in a supplemental one, but you have dealt with it in a statement you have given us?

A.—I should like to see that. I do not know which statement I have put in.

Sir H. Courthope-Munroe.—If you have put it in I do not want to take it in detail.

Chairman.—Leave it like that. Will you add anything you would like to about the matter, because if it is suggested that there was a very small area that could not be reached by the 10,000 feet we ought to have it scaled off and seen?

A.—Yes, I am perfectly prepared to do that.

Sir H. Courthope-Munroe.—Leave it for your statement, but take it on broad lines. Admittedly there was a portion of this area that could not be reached by the plant that you specified for. As a practical proposition, would any engineer specify for a plant,

especially when the plant is running into something like a quarter of a million for the dredger, which would definitely do a particular range all the way round? Would you not sort of strike an average?

A.—All I can say is that we did the best under the circumstances, and I prefer to leave it in that way and put in the statement.

Sir H. Courthope-Munroe.—If, when your machine has done its utmost with its 10,000 feet, there does remain here and there small portions——

Chairman.—33 per cent. and 25 per cent.

Sir H. Courthope-Munroe.—That is not my percentage? Is that your percentage?

A.—I should say that was about the percentage.

Q.—One-third. What is your answer to that? You spoke of having a second booster?

A.—I have put it all in the statement.

Q.—If it is there I will leave it.

A.—I will leave it at the statement.

Q.—On page 38 some questions were put by Sir Frederick Hopkinson to Mr. Brims. Sir Frederick asks: "Did he ask you to work 24 hours a day?" and Mr. Brims says: "Yes; before I came out here I said it was my intention to work 24 hours, if possible.

A.—That has been admitted. That is in the evidence. I do not think we need go into that.

Q.—Turning over to page 39, Sir Frederick asks him about the possibility of working 24 hours, and then he says: "During last year we were working nearly 18 hours a day, and we did 1,821 cubic yards per pumping hour for one week." I think upon that you say if he could do it for one week, why not for two weeks or more?

A.—Yes. He said in his evidence he had done 2,000 cubic yards. I say if he had done it for a week he ought to have done it for two months.

Chairman.—If the material of the same depth and same consistency of face was there.

Sir H. Courthope-Munroe.—Yes; but it is the fact that there was heaps of material, though not in any particular spot. Sir George accuses them of getting on to one spot and sticking there. That is the point you have been endeavouring to make?

A.—We have gone into that in great detail.

Sir H. Courthope-Munroe.—The letters show that.

Sir Frederick Hopkinson.—He would have to satisfy us that he ever did that quantity in that given time.

Sir H. Courthope-Munroe.—Mr. Brims would?

Sir Frederick Hopkinson.—Yes.

Sir H. Courthope-Munroe.—Sir George wanted to comment upon that. If the man says that with this much-maligned dredger, in point of fact they did over 1,800 cubic yards per hour in one week, on the face of it, why should not that go on?

A.—That came out in my evidence.

Sir H. Courthope-Munroe.—If the stuff was not there, obviously it could not go on.

Chairman.—You must not assume that we accept everything that Mr. Brims said.

Sir H. Courthope-Munroe.—I do not know what impression Mr. Brims made, as I did not see him. I do not know what impression he made on you.

Chairman.—Not a very good one, I am afraid.

Sir H. Courthope-Munroe.—Is there anything else in Mr. Brims' evidence you want to refer to?

A.—No; except Mr. Brims did not give nearly the whole of the experience he had in dredging.

Chairman.—That is unfortunate, because as he left it he seemed to be a man of practically no experience at all. You have seen that in his evidence?

A.—Well, we would like to put in a statement of Mr. Brims' experience showing he had enormous experience in dredging.

Q.—I think we should like to see that.

A.—We would like to put in his application for the appointment, in which he showed that he had very great experience in dredging.

Q.—Your firm so stated in letters to India—that he was a dredging master of great experience?

A.—Yes.

Chairman.—I have been rather puzzled about that because when he was asked his own experience he told us very little, and that experience began when he was a boy of 22, and seemed to have ceased very suddenly.

A.—We would like to put in his application.

Sir H. Courthope-Munroe.—Can you put your hand on it now?

A.—Not now.

Chairman.—Mr. Ewbank will make a note of that. We ought to see it.

A.—If Mr. Ewbank makes a note of any papers we shall be delighted to produce them.

Sir H. Courthope-Munroe.—I see on page 43 you have marked a question put by Sir M. Visvesvaraya: "When the scheme was embarked upon were you at all consulted by the Development Department or by the Government?" That was put to Mr. Neilson, and his answer was No. Do you wish to say anything about that? You have marked it in my copy as being important.

A.—No; I have nothing at all to say about that. In fact, vary many things have been dealt with in the evidence since we prepared this document.

Q.—That is why I am skipping page after page.

A.—I do not think there is very much more to say.

Chairman.—Really, at this moment, there is very little you can tell us. If there is anything Sir George can tell us now we are most anxious to have it.

Sir H. Courthope-Munroe.—I am doing it in this disjointed way to avoid taking up time. Will you look at page 45, where there is a question about this Wilson shovel? Is that anything to do with you?

A.—Nothing at all. That is all on the record, if I may say so. We have discussed that.

Q.—You want to draw the Committee's attention to the fact that the Wilson shovels were bought against your specific advice?

A.—Yes.

Chairman.—I have made that point; but is it Wilson or Whittaker shovels? Is not it Whittaker shovels?

Sir H. Courthope-Munroe.—They are called Wilson here.

Chairman.—They are called Wilson and Ruston, but I believe they are Whittaker.

Sir H. Courthope-Munroe.—Still, having got them, you do not see why they should not have made some use of them?

A.—No; I do not think they could make any use of them.

Chairman.—As shovels?

A.—As shovels.

Sir Frederick Hopkinson.—I believe they are Whittakers, from my recollection of their appearance; but the plant list does not show which they are.

A.—We can find out.

Chairman.—It is only to get it right?

A.—Yes. Then the next thing is at the bottom of page 46.

Sir H. Courthope-Munroe.—You draw attention to a question put by Sir Frederick to Mr. O'Rorke: "Do you think any contractor would have given a price for doing the work upon the materials available in 1919?" What do you want to say about that?

A.—No one suggested that a contractor should go and give a price upon the report of 1919.

Q.—On page 48 I think you ought to say a word about the costing account.

A.—Well, I think we all know about the costing account.

Q.—You have letters here in which you were complaining about the absence of costing accounts?

A.—Yes.

Sir Frederick Hopkinson.—Any language Sir George could use in connection with that matter would not be half as strong as the language I should use.

Sir H. Courthope-Munroe.—I say no more, and I pass from it.

Sir M. Visvesvaraya.—I wish to endorse that statement also.

A.—There is our letter on the subject.

Sir H. Courthope-Munroe.—Do you remember the date of it?

A.—No. We can put it in. In one of my reports I wrote and pointed out there were no costing accounts. My firm then rubbed it in by writing another letter to Sir Lawless Hepper emphasising the fact that there were no costing accounts.

Sir Frederick Hopkinson.—I think we have got those letters.

Sir H. Courthope-Munroe.—That is a letter of the 13th April, 1922, in which you say: "While concurring generally with the report, we particularly desire to notice and emphasise the paragraph concerning the engineering staff and engineering accounts. It is impossible to carry out efficiently large public works without adequate engineering staff, and it is equally impossible to exercise economy without a proper system of costing accounts." Is that the letter you mean?

A.—Yes.

Chairman.—We have not that actual letter of the 13th April, 1922.

Sir H. Courthope-Munroe.—It is an important letter sent by the firm to the Director of Development. Then in the concluding paragraph he says: "We received by the mail which arrived here on the 3rd April the chief engineer's letter dated the 17th March, enclosing an indent for additional plant and machinery. Tenders are being taken in for the whole of the indent, and we have in our letter to the chief enginner dated the 11th April, 1922, questioned the necessity for some of the plant, and have asked him to take our orders." That is what you want to lay stress on?

Chairman.—We have brought all that out, but we ought to have that letter.

Sir H. Courthope-Munroe.—I will have a copy of it made and let you have it. Then on page 15 you have marked something about moorum. Do you want to add anything to that?

A.—No; so many things have been dealt with since we prepared this on the Bombay evidence, and it is all on the note.

Q.—If you say no I will pass on at once. Turning to page 51, I think there is a point which has not been put. Sir Frederick Hopkinson asked Mr. Elgee: "Do you not have any specification giving particulars of the constituent parts of the concrete?" and the answer was No. What do you say about that?

A.—We have already said that there are specifications. If they were not used it was the chief engineer's fault.

Q.—This answer, to put it no stronger, is absolutely incorrect?

A.—Absolutely incorrect.

Sir Frederick Hopkinson.—My question was to Mr. Elgee, who was in charge of the construction of the sea wall.

Sir H. Courthope-Munroe.—I am not complaining of your asking the question, but the answer given is incorrect. I do not want to use the word "untrue," but it is absolutely wrong. There are specifications, and they were pigeonholed somewhere in Bombay.

Sir Frederick Hopkinson.—What Mr. Elgee said was that he had not had it.

Sir H. Courthope-Munroe.—You asked him: "Do you not have—— "

Sir Frederick Hopkinson.—"Did you not have—— "

Sir H. Courthope-Munroe.—"Do you not have any specifications giving particulars of the constituent parts of the concrete?" and he says "No." He does not say he has not individually got them.

Sir Frederick Hopkinson.—That was a staggering answer to me.

Sir H. Courthope-Munroe.—I should think so, but the answer to it is that they were supplied.

A.—They were supplied with the specifications to the resident engineer——

Sir H. Courthope-Munroe.—Whether they got into the waste-paper basket or a pigeonhole you do not know.

Chairman.—When you are giving an index of the plans and specifications you might star the one which contained the specification for concrete, so that we shall know.

A.—I will.

Q.—Just put a little note in the margin: "This is in relation to the concrete."

A.—Yes. Then go on to the bottom of page 54.

Sir H. Courthope-Munroe.—What do you want to say about that?

A.—That is estimates.

Q.—Do you want to say anything in passing about this caterpillar business?

A.—No.

Sir H. Courthope-Munroe.—There has been a misunderstanding about that. Sir Frederick let himself go at the Witness on that, but it is probably a misunderstanding as to what actually took place.

Chairman.—We will pursue it if you like, because I have taken great pains to find out how a caterpillar tractor functions, and I can explain it to you; but I think it would be better to pass it by.

Sir H. C. thope-Munroe.—Obviously. I am not in the least desirous of going into that. It is simply a misunderstanding about it. Going to the other point about Mr. Kidd, that is at the bottom of page 54?

A.—Yes.

Q.—What do you say about that?

A.—I would like to say a word about the caterpillar. The way it arose was that the Chief Engineer wanted to spend more money. He came to me with proposals for buying this caterpillar.

Chairman.—It was the Bucyrus?

Q.—What happened was they got the Bucyrus, and they wrote that there is some difficulty about this, because the tractor, the Bucyrus, we have got is not the same as the track and they suggested for something like 11,000 rupees it could be converted into a caterpillar tractor; and then they discussed caterpillar tractors; that is how it arose.

A.—The Chief Engineer asked me to get it at home. It was more expenditure on plant. I did not want to get it. I went up to the man at the quarries, O'Rorke, and asked him what use he could make of it That is the whole thing in a nutshell. Then I come on, at the bottom of page 54, to the details of estimates.

Sir H. Courthope-Munroe.—What do you want to say about that? This is the old question as to whether your report was in more detail than Mr. Kidd's?

Q.—Just put that in a few words, if we have not exhausted it?

A.—I will.

Sir Frederick Hopkinson.—We have got both, and we can compare them?

A.—No, I disagree. I would like to say something about the preparation of my 1919 report and about the comparison with Mr. Kidd's. I would like to talk five minutes about my 1919 report, as I think it would be useful.

Chairman.—Please do.

A.—Some Engineers are frequently asked to report upon others' schemes; and in this case I was asked to report upon Mr. Kidd's scheme. Very well. When I received Mr. Kidd's scheme, I found it was extraordinarily lacking in detail. There were no quantities, and there was nothing by which I could find out how many hundred cubic yards of concrete, or how many million tons of stone, and so on, were required. His report said " so many lineal feet of wall " ; but there were no particulars given about the dredging plant whatsoever. For a report which had been accepted by the Government of India as so full of detail that work would at once be proceeded with upon that report, I found it exceedingly deficient in detail. I had to take Mr. Kidd's report, and I had to take out the whole of the quantities from Mr. Kidd's drawings and from my own schedules; so that my report, which was not supposed to be a detailed report, was crammed full of details in comparison with Mr. Kidd's report. I would like to point out that Consulting Engineers, when they write reports of that nature, do not write detailed reports. The only fault I have to find with my 1919 report is, that it is extraordinarly full of detail. In fact, it has got a very great deal too much detail for a report of that nature. The scheme had not been sanctioned. It was in contemplation. An Engineer writing a report on a scheme which has not been sanctioned, as a rule puts as few details as possible. I thought it would interest the Committee if I gave you two examples. You have not had the advantage of taking any evidence from Consulting Engineers in Westminster, so that you have only to take my opinion of their practice. But here is a report which Mr. Meik wrote in 1897 to Sir Weetman Pearson, who was proposing to build a large harbour at Santa Cruz. He is reporting on another Engineer's report, but here is the report. I suppose it was satisfactory. There is no single detail of costs in the report. (*Document handed in.*)

Sir Frederick Hopkinson.—What is the date of that?

A.—1897. Here is another report. I would rather not mention names. This is a report from a very famous firm of Engineers on a very large public works, and as far as costing is concerned you will see there what details of costing are given. (*Second document handed in.*)

Mr. Billimoria.—Could these reports be said to be on all fours with the report you made? Surely the position and the circumstances at Bombay were different?

A.—The report is on all fours.

Q.—The Governor had been entirely dependent on your report, and he wanted an exhaustive report with advice from you?

A.—The report would have been just as exhaustive with so many figures. I should like to clear up several points in connection with this report. I have been examined repeatedly as to the time I spent in Bombay. I suggest that there is some confusion in the minds of the Committee as to what constitutes an Engineer's estimate and what constitutes a Departmental Contractor's estimate. I was not preparing a Contractor's estimate. It was not any part of my business at that stage, when the scheme was

under consideration, to go into questions in detail about where the stone is obtained, and analyse the cost of labour in detail. We never do. You can get evidence from all Westminster on that point. The scheme was not even sanctioned. Obviously after my report had been received, then if the work had been let by contract, the contractor would have done all that work before he put in a price. As it was done departmentally, the work which ordinarily would have been done by the contractor fell to the Development Directorate through their Chief Engineer and their Director. My report was an Engineer's report upon Mr. Kidd's scheme. I had his surveys and all his data, and the Government of India had approved of them up to the hilt. Then when I arrived in England, I took out, as I have already described, all the detailed quantities and material from Mr. Kidd's drawings, not from his report, because they were not in his report at all. I had to take them out from his drawings, in order to analyse his report. I affixed prices to the schedule in accordance with our experience of similar work, and the data I had obtained in Bombay. That is the universal way in which an Engineer prepares his estimates. We do not go into details. We consider the less detail as a general rule that we put in our preliminary reports the better. That is all. I merely wanted to describe the procedure in preparing these reports.

Chairman.—You have given us much the same evidence on the third day of your evidence at page 9, in which you gave us the figures, and told us exactly how you got your totals out.

A.—Yes. I wanted to emphasise it, because I feel very much the suggestion that I in any way whatsoever neglected the preparation of that report.

Sir M. Visvesvaraya.—May I ask you one or two questions in this connection? Mr. Kidd's report and estimate were not intended to be final. A detailed estimate was to follow.

A.—They were so final that the contract was going to be let upon them.

Q.—But it promised a detailed report later on at Bombay.

A.—No, I think not.

Sir Frederick Hopkinson.—There is a paragraph in which Mr. Kidd said he would want 5 per cent. after the estimate had been checked—after the final estimate had been made and checked.

A.—At all events the Government of Bombay said that the report was clear and complete. All the detailed points had been settled, and the revised estimate might be accepted as completely trustworthy and ample. My point is that the Government of Bombay could not possibly have criticised it as trustworthy and ample unless they did what I did, and took out all the quantities.

Sir M. Visvesvaraya.—Mr. Kidd did not give the details of the project to the Government of Bombay.

A.—It was purported to be detailed.

Q.—He withheld details from the Government of Bombay; he did not give them.

A.—No, he did not give details; but the Government accepted it.

Q.—How could they accept the estimate without the details as a final working estimate?

A.—The Government of Bombay, on the 7th August 1912, wrote to the Government of India and said: "With reference to Messrs. Lowther & Kidd's report, the drawings might be considered as complete working drawings. They would give sufficient information for the examination of the designs and the immediate commencement of the work. The investigation had been most carefully made, and might be accepted as exhaustive. The report was clear and complete. The revised estimate might be accepted as completely trustworthy and ample."

Sir M. Visvesvaraya.—But details were to follow. That was not to be the working estimate.

A.—I do not know. There is nothing in that letter to say that.

Sir M. Visvesvaraya.—The details were not given.

Mr. Billimoria.—Did they not conclude that letter by saying: "It will require further detailed investigation"?

A.—That came much later on, with another Government in Bombay; and I pointed out at the time to the Chairman that it was inconsistent. In fact, when you were examining me, we discussed the question of inconsistency.

Q.—That is what I recollect.

A.—I have nothing more to say on that point.

Sir M. Visvesvaraya.—Anyhow, the details were not given, and without the details no estimate could be considered as final and complete. Another point is this: You stated in your report that the estimates given by you were reasonable and reliable.

A.—Yes; and I still say they were reasonable and reliable.

Q.—Reasonable and reliable?

A.—Yes.

Q.—But the details were not there?

A.—The details were there. The details were all in my report which were not in Mr. Kidd's report, which should have been in Mr. Kidd's report. I furnished the whole of the quantities.

Q.—But as soon as your report was furnished and the work was begun, did you also give to your Resident Engineer or Chief Engineer independent orders to proceed with detailed estimates and plans?

A.—We at once proceeded with what we had intended to do—working out the contract drawings, the rates, and so on, with the Colaba contract, and the Director of Development and his Engineer went on with detailed estimates on the basis of Contractors' estimates for the Kandivli quarry.

Q.—I want to know whether it required such a long time as nearly two years to prepare a detailed estimate for a project where there was one sea-wall and some amount of filling?

A.—Sir Frederick Hopkinson asked me that question, and he said that a contractor would do it in a few months. I said: Yes, a contractor would do it in a few months, or a few weeks; but the way the things were done in Bombay, under the rules of the Government of Bombay, it would probably take two years.

Sir Frederick Hopkinson.—The real point of the matter is this: As you know, prices were jumping about in 1920 and 1921?

A.—Yes.

Q.—An estimate made in January 1920 might be absolutely useless by the end of the same year?

A.—Yes.

Sir M. Visvesvaraya.—But you must have estimates.

Sir Frederick Hopkinson.—I know; but if you take two years to get out the estimate, by the time you finish it the prices would be entirely different, and you have got to begin all over again.

A.—I am very glad to hear you say that and confirm what I have said on that point.

Sir H. Courthope-Munroe.—At this period of time, everything was absolutely abnormal. There has hardly been a period like it in the history of the world, I should think, so far as prices were concerned.

A.—That is all I want to say on the estimate.

Q.—Then going on, on pages 55, 56 and 57 there is nothing of any importance.

A.—As the Chairman says, we have covered so much ground in the examination that there is very little left.

Q.—That is why I am hurrying on. I do not think we are wasting time now. I have a note on pages 60 and 61 about this estimate and the 11 crores. I do not know whether you think that subject is exhausted?

A.—Well, I would like to say something about that.

Q.—Just tell me it briefly. This is the somewhat pertinent question put by Sir Frederick Hopkinson in dealing with these 11 crores. He says: "Then it is not an Engineer's estimate?" And Mr. Elgee says: "It is not. It was on a very pessimistic view. It was based on the season's dredging, which we knew could be improved. I do not call that an estimate, although we have put it up at that figure". Then Sir Frederick says: "Who wanted you to put it up?" And Mr. Elgee says: "That was prepared by the Advisory Committee". The only inference from that is that the Government, in the opinion of Mr. Elgee, is not entitled to accurate information. That is the corollary you draw from it?

A.—My point is that when the Government of Bombay began to get alarmed by the Back Bay scheme, they appointed a Committee of Investigation, under the Chairmanship of Sir Lawless Hepper, to go into the matter. This Committee, under the Chairmanship of Sir Lawless Hepper, had no difficulty in attributing the whole blame for everything that had possibly happened to myself, and they produced an estimate showing the probable cost of the works at 1,100 lakhs, and the date of completion to be 1944-45. Well, in view of what Mr. Elgee has said I say that this estimate of 1,100 lakhs—it is a nasty word to use—was in the nature of a fake. It was not an Engineer's estimate, it was not a proper estimate; it was not an estimate that ought to have been sent forth to the world as the final conclusion of the Government of Bombay as to the cost of the scheme.

Mr. Billimoria.—In that connection I asked you a few questions. I asked you what length of time you put for the completion of the scheme, and what would be the amount at which you would complete it, and you said it was impossible for you to answer those questions.

A.—I said it was impossible for me to answer those questions because I have ceased to have anything to do with the scheme, and I have not any of the data at all at my disposal. That is the reason.

Q.—I asked you that question particularly with regard to these remarks of yours.

A.—Yes, but I have not the data. The Chief Engineer of the scheme in reply to a question of Sir Frederick Hopkinson who says: "One gets nauseated with these figures. You are putting the Government in an awkward position," says: "It is not an Engineer's estimate. It was based on a very pessimistic view; it was based upon a season's dredging which we knew could be improved."

Chairman.—But the point may be that the Advisory Committee did not accept Mr. Elgee's optimism about the improvement. After all it was a figure put forward by the Advisory Committee. Mr. Elgee has now put forward a reduced figure of 1,000 lakhs.

Sir M. Visvesvaraya.—That is because the working of the dredger has improved.

Chairman.—Exactly, but the Advisory Committee pledge themselves to 1,100 lakhs even though Mr. Elgee thought that was a very pessimistic view. They said you and your dredger have done 1,020,856,959 yards on the three years' pumping hours instead of 2,000, and in working it out on a basis of 941 yards, the average, it will cost 11 crores, and it will take another 20 years.

Sir Frederick Hopkinson.—They were not satisfied they were going to improve upon it.

Chairman.—They did not believe in Mr. Elgee's optimism.

A.—They do not give all this in their report. They give it as an engineer's estimate, and the engineer comes along and says that it was not his estimate at all. However, I will not labour the point.

Q.—There is not much importance to be attached to the 11 crores.

A.—No.

Sir H. Courthope-Munroe.—As you have mentioned this report (I was going to deal with it at a later stage) I will put two or three questions on it to you now and get rid of it. This is a report of the Advisory Committee dealing with the Back Bay reclamation scheme. Curiously enough in view of the developments of this inquiry, Sir Lawless Hepper was the Chairman of it.

A.—Yes.

Q.—As the real victims seem to have been you, Sir Lawless Hepper and the Chief Engineer—those are the people who are to bear the brunt of it—it is curious that he was made the Chairman of this Committee.

A.—Yes.

Q.—Then I see the Committee reported by a majority of 1 that they were of opinion that " the main responsibility must rest with him "—that is you, Sir George—" for the predicament with which the Government is now confronted." Sir Lawless Hepper was one of them who signed that report of a majority of 1?

A.—Yes.

Q.—Then, like many other reports, I see it had a minority report—it is a minority less the 1—in which they say: " We cannot agree with the majority that the main responsibility must rest with Sir George Buchanan for the predicament in which the Government now finds itself. We are of opinion that the whole responsibility rests with the Government." That was the outcome of it. So if you eliminate Sir Lawless Hepper, the Chairman, it is honours easy. Do you want to say anything more about that?

A.—No, I do not want to say anything further about that; I have exhausted it.

Sir Frederick Hopkinson.—The only thing you might say about that bulky volume is, it is a pity that words will not dredge.

Sir H. Courthope-Munroe.—Then on page 62 there is another searching observation by Sir Frederick Hopkinson about these estimates. He says: " Supposing you are to make an estimate to Government to carry out certain work, and you were asked to give an estimate of what you thought it would cost, what would be your inclination?—(A.) It would be on the safe side.—(Q.) To make it high?—(A.) Yes. So that the whole estimate of cost would really be of little value because the Government would judge if you are going to carry it out departmentally on the nearness of the estimate to the actual cost."

Chairman.—Sir George has dealt with that.

Sir H. Courthope-Munroe.—Very well. Anyhow, you wish to stress that?

A.—Yes.

Chairman.—If the man who estimates is the man who has eventually to do the work, it has been suggested—and we accept it—that it is human nature to be on the safe side.

A.—Yes.

Sir Frederick Hopkinson.—I am simply criticising the principle of it.

Sir H. Courthope-Munroe.—Sir Frederick points out it destroys the meaning of the word " estimate."

A.—The only point I would like to stress is this. Having made this very legitimate criticism of the methods in India of making very, very ample estimates, which I think Sir Frederick called a comic opera business, the harmless remark in my report, " that I never over-estimated because I did not think it was conducive to economy," Sir Frederick was equally discontented with. I say, he cannot have it both ways. That is all I wish to say.

Q.—When you are cross-examined you want it both ways. Then on page 64 you deal with extravagance and inefficiency, and we have heard enough on that. Then on page 66 do you want to lay any stress on that at all?

A.—No; we have dealt so fully with all these points.

Q.—As Sir Frederick put it to the Witness, under the old state of things was not the Chief Engineer in direct control of the whole scheme? Then you refer to the wording of the agreement in Lord Lloyd's evidence, and to the scheme itself.

A.—That is page 67.

Sir H. Courthope-Munroe.—That puts it in another way, as Sir Frederick himself put it to Mr. Elgee, " he was in fact "—" he " is " you " in the context—" just in the position of a contractor, and the Chief Engineer is in the position of a contractor's agent." That is the whole point I was trying to hammer on Saturday.

Chairman.—We heard your argument on that.

Sir H. Courthope-Munroe.—That is the view I expressed on Saturday: do you agree with it?

A.—Yes.

Q.—In no sense could Mr. Lewis, or subsequently Mr. Elgee, be deemed to be your agent?

A.—No. I would like to make one or two remarks on this question, because I think the Chairman was not quite clear that we did not have some contractual obligations.

Sir H. Courthope-Munroe.—I do not think you need say that after what the Chairman said on Saturday.

Chairman.—You mean some obligation in the nature of a contractor's obligation, not contractual?

A.—Of the nature of a contractor's obligation?

Q.—Yes.

A.—I should like to say a few words about that. Sir Frederick Hopkinson when he examined me gave me a number of examples—I forget what they were in detail—as to how the firm really took the place of a contractor. He said we designed the gantry for the sea wall, temporary work which would be done by a contractor in a preliminary report before the scheme was sanctioned. I certainly suggested a plan of operations involving a gantry. Again I showed greater interest and gave more information than was absolutely necessary. In future I must cut my reports and not give nearly so much detail. But supposing the work had been let by contract, obviously it would have been open to the contractor to make any alternative suggestion he chose, but the work being done departmentally, my advice was followed and the work carried on. Then we were told we purchased plant and machinery, that being a contractor's job. We purchased plant on indents furnished by the Development Directorate, and that practice is followed by every consulting engineer in Westminster. To my certain knowledge the Bombay Port Trust and the Calcutta Port Trust have their consulting engineers in Westminister. Whenever the Port Trust require machinery and plant they indent on their consulting engineers who do exactly the same as we did for the Development Directorate. The Calcutta Port Trust are carrying out a large part of a dock scheme departmentally—that is, they are their own contractors—and when they require plant, their consulting engineers in Westminster purchase on indents and send it out. Then we are told because we engaged the staff, a contractor would also engage staff; but the same analogy applies. The consulting engineers to the Calcutta and Bombay Port Trust, and all consulting engineers in Westminster, engage staff for their clients and send the staff abroad. The difference between the usual consulting engineer and ourselves is that as a rule they purchase the plant and send out the staff entirely on their own discretion when asked to do so by their clients, whereas we worked through the High Commissioner for India and the Director-General of Stores. Where we differ essentially from contractors is that we order plant on requisitions; we had no power of discretion, and when as advisers to Government we protested against what we thought extravagance we were

overruled by the Director of Development. We had no control over expenditure in any shape of form; we had nothing whatever to do with the employment of labour, the rates of pay, the letting out of the numerous sub-contracts, the purchase of local materials and stores, and, lastly, we had no power to appoint or discuss any member of the staff or the workmen. That was done by the Chief Engineer in consultation with and taking orders of the Director of Development, and we simply did not come into it at all. Repeatedly in addressing the Chief Engineer or the Director we emphasised the fact that they took the place of the contractor. We used these actual words: " In matters connected with the actual execution of the work we have no authority to interfere with the Chief Engineer's discretion."

Chairman.—Where do you use that phrase?

Sir H. Courthope-Munroe.—I can give you the reference.

A.—It is page 82 of my statement.

Sir H. Courthope-Munroe.—It is on page 91 of the evidence given on Tuesday, the 2nd November. It is only a few questions, and I would like to read it because it is an important point.

A.—There is one more point. In my annual report dated 11th February, 1922, where I went very fully into matters, I made an excuse for expressing my opinion freely by quoting our agreement, which says: " The firm shall at all times assist and advise the Government of Bombay in all matters relating to the execution of the work." That is all.

Q.—Let me just read half-a-dozen questions, and then see if you have exhaustively dealt with it. Sir Frederick Hopkinson said this: " On this question of control I should like to ask you this. In the case of a work of that kind let to a contractor would he design and buy the dredger and take it out in the ordinary way? Suppose you let the work to a contractor, he would design and purchase the dredger?—(A.) That is a matter of arrangement. (Q.) Suppose you let anyone the contract at so much a yard?—(A.) Yes, of course he would. (Q.) He would have a dredger designed, and would buy the dredger?—(A.) Yes. (Q.) He would design the gantry for building the sea wall?—(A.) He would. (Q.) He would settle on what plant was to be used generally throughout the work, locomotives and cranes?—(A.) He would. (Q.) He would also purchase all the plant?—(A.) Yes. (Q.) Or requisition it?—(A.) Yes. (Q.) And he would engage all the staff?—(A.) He would. (Q.) Settle their duties—he would make the dredging programmes?—(A.) Yes. (Q.) He would decide where and how the dredger were to work?—(A.) He would; he would do all those things. (Q.) He would approve or disapprove of buying more plant if it were required?—(A.) Yes. (Q.) All those things you have done." That is what you were on?

A.—Yes.

Q.—You have exhausted that?

A.—I have nothing to add to what I have said. The crux of the whole matter is that the contractor has command of the purse strings.

Q.—Let us leave that and pass on to page 68. There is a matter you wanted to put before the Committee about the moorum. Somebody suggested at some stage that the excavation should be filled up by moorum instead of dredging, and there was a point you wanted to mention about the transport of moorum to the place. It is a question put by Sir Frederick to Mr. Elgee. He refers to your letter in which you say: " We cannot say that we are surprised at the figures and quantities. Calculations made some time ago in this office show that at the present rate of progress the reclamation will be completed in 35 years." You wrote that as a bit of witty sarcasm?

A.—Certainly.

Q.—It rather shows the danger of written sarcasm. Verbal sarcasm may be all right, but when you put it down in black and white it may be misunderstood. You never suggested for a moment that you were going to be a party to this thing taking 35 years?

A.—No.

Q.—You put it in that lurid way in order to draw attention to it?

A.—Yes. It was an attempt to spur them on.

Q.—It was an attempt to spur them on; but written sarcasm is a dangerous weapon. Then you draw attention to this: " There have been two figures, among others, mentioned in connection with the estimates, the figure of 688 lakhs, and 702 lakhs." Sir Frederick says in a lordly manner that there is not much difference between 688 and 702 lakhs; but you point out in round figures it is a quarter of a million of money.

A.—I do not think we need labour that.

Chairman.—We went into that—688 plus 5 per cent. is 702. It was only 5 per cent. difference between Sir George Buchanan's and Mr. Lewis's.

Sir H. Courthope-Munroe.—On the note it runs: " Sir Frederick saying: ' There is not much difference betwen 688 lakhs and 702 lakhs'."

Sir Frederick Hopkinson.—5 per cent.

Sir H. Courthope-Munroe.—It actually works out at something like a quarter of a million of money. A quarter of a million is an important figure even for a contractor to to take notice of.

Sir Frederick Hopkinson.—But when you are dealing with large figures you must take the percentages.

A.—I do not think we need deal with that.

Q.—All right. Then as to the " Kalu " and " Jinga," you told us you did not recommend their purchase, and I think in connection with some part of the work you used the word " disgraceful."

A.—I did.

Chairman.—About the " Kalu " I think Sir George did agree that he recommended its purchase, but that was probably for the East Colaba reclamation which fell through, but in terms he eventually agreed that he recommended her as a suction dredger, but he qualified it by this, that before she was agreed to be purchased she ought to have been examined. That is the point?

A.—Yes.

Sir H. Courthope-Munroe.—Am I right in saying that for the cost £75,000 plus £25,000 repairs, you could almost get a new one?

A.—Yes, you could.

Sir Frederick Hopkinson.—Not at that time. She originally cost £65,000.

Sir H. Courthope-Munroe.—You know more about these things than I do, but I thought that was the fact. If Sir George had known it would cost £75,000 and you had to put on £25,000 repairs to that, he would have said no.

Sir Frederick Hopkinson.—She originally cost about £65,000.

Chairman.—I think it is £56,500.

Sir H. Courthope-Munroe.—It is another example of the way that prices were jumping up.

A.—Then shall we go on to page 78?

Sir H. Courthope-Munroe.—Anyhow, you say apart from the purchase of it the management was absolutely and entirely a matter for the dredging masters?

A.—Yes.

Q.—There is something in Mr. Speirs's evidence about working the dredger?

A.—We have dealt with that.

Q.—And Mr. Merrett's also?

A.—Yes. Then page 78.

Sir H. Courthope-Munroe.—Then on page 82 this same sarcastic observation of yours crops up: " That the work would go on to 1960."

A.—Yes.

Q.—You did not suggest that was business. Then on page 38 there is a mistake. It is suggested that you were the man who selected the site. Is that right?

A.—No; I did not select the site. I understand through the Chairman that the Committee see that I was not responsible for the site on which the dredging operations were to take place, and the neglect of the Government to ascertain that the Port Trust had certain powers.

Q.—Then on page 85 you have commented upon whether there should have been a land station, or whether the booster should have been on the water.

A.—I do not think I have anything more to say about any of those points.

Q.—Then there is a reference on page 86 to the wonderful natural siltation referred to in paragraph 19 of the Sub-committee's report. Do you want to say anything about that?

A.—No; I have already expressed my view about that. There is a great deal of repetition here.

Q.—That is why I am running it through rapidly. Is there anything on page 87?

A.—No.

Q.—Do not touch on anything which you do not think is necessary. On page 89 there is a reference to the moorum and to the railway facilities. Sir M. Visvesvaraya put a question about that, and at one time you thought that it wanted a little clearing up. Will you just see whether you want to say anything more about that?

A.—I have nothing to say, except for Sir M. Visvesvaraya's information I may point out that Mr. Lewis, the chief engineer—I hoped to have his letter here, but I

will put in his letter—wrote a letter on the subject of moorum and went into the question of the number of trains required and the quantity that each train would take, and his figures were most disappointing. If it is of any interest I can put his letter in amongst the papers.

Chairman.—What date would that be?

A.—That would be somewhere about 1922.

Sir M. Visvesvaraya.—I should like to have that.

A.—Sir Lawless Hepper had prepared a scheme for doing it, and he was going to have a new railway and a large tunnel across the island. You have not got that, perhaps?

Sir Frederick Hopkinson.—We have got that somewhere.

Chairman.—We have had a suggestion of a tube railway which should be handed over to the people of Bombay as a further piece of the beneficence arising out of this work.

A.—Yes.

Sir Frederick Hopkinson.—A tube railway taking about 20 years to complete, and then the reclamation would be begun.

Sir M. Visvesvaraya.—There is a scheme for a tube railway in Bombay.

Sir Frederick Hopkinson.—But this was to bring the moorum down.

Sir H. Courthope-Munroe.—On page 93 I see an answer was given by Mr. Elgee which is a little illuminating. Sir M. Visvesvaraya says this: "If Sir George Buchanan did not give the specification why did the engineers on the spot not do it?" The answer given by Mr. Elgee is: "One reason is that at the commencement of the work Mr. Lewis was very busy, and he gave us a free hand, more or less, in the working." You might paraphrase that by saying that Mr. Lewis did nothing.

A.—He had the specification in his possession. Two copies were given to him.

Sir H. Courthope-Munroe.—For the man who is in charge to give a sort of, what is called, a free hand in working, is another way of saying he is doing nothing.

Chairman.—You must remember the reason. Mr. Lewis, immediately after his return from London, begun to get out his project estimate; and that was published early in 1922. It was a gigantic labour, and Mr. Lewis, instead of being able to go about the works and energise this man and push on the other man, and be at Kandivli in the morning and at Marine Lines in the afternoon, was chained to the office. To get out that detailed project estimate was an enormous labour.

Sir H. Courthope-Munroe.—I understand that. Of course you have had the advantage of knowing what has happened earlier on in this inquiry?

A.—If he had not been tied by the rules and regulations laid down in the Public Works Department, Code By-laws 1, 2, and 3, as to how the estimate should have been got out, he would not have been tied. There are heaps of large works—and Sir Frederick Hopkinson will bear me out—that are started on very meagre information, and the details are worked out step by step as the work proceeds. You do not necessarily do as the Government of India does. The situation may be changed entirely next year. The Government were insisting on their putting everything down on paper—"everything before we let you start," although it might be a waste of paper in six months' time.

Q.—Is there anything you want to say about page 96?

A.—That is a question put by Mr. Billimoria. Mr. Billimoria, on the information available in Bombay, suggested: How should an engineer of repute and standing make such colossal mistakes? With all due deference to Mr. Billimoria, I hope that he has changed his mind since he has heard the London evidence; and I wish to say I do not admit making colossal mistakes; and I hope Mr. Billimoria's opinion was framed on what everyone was saying in Bombay at the time. That is all I have to say about that.

Q.—That brings us to the end of this part. You have made a note about the evidence given by Mr. Walsh and Mr. Hirachand?

A.—I think we have dealt with that.

Q.—That concludes all I want to ask you about the Bombay evidence?

A.—Yes.

Chairman.—It had better be made clear that when you refer to page 3, or page 5, or page 8, and so on, you are referring to a document which no member of the Committee has, but which is a document which is brought into existence for your use in the examination of Sir George Buchanan.

Sir H. Courthope-Munroe.—Yes.

Chairman.—The reference which you have given will not be to these pages of evidence.

Sir H. Courthope-Munroe.—That is so. You will appreciate that the little book I have got before me has 98 pages, and the Bombay evidence has been boiled down to that. You will know the number of pages of evidence that I have dealt with. If I had waded all through that it would have been a question of days; therefore I purposely reduced it.

Chairman.—It is only that somebody reading the evidence should not hurriedly turn to page 18 of the transcript and not find the reference.

Witness.—The boiling down of the evidence was done before my examination, so that we were just going over it to see that nothing was missed.

(*Adjourned for a short time*).

Sir H. Courthope-Munroe.—I have had a copy made of the letter of the 13th April, 1922, and it will be handed in. (*Letter put in.*) (*To the Witness.*) We are now nearing the end of our labours. Will you turn to the London evidence. I think you have gone through it since lunch, and you have further reduced the questions. Will you turn to page 3. I think you want to refer to the question in the middle of the page?

A.—That is right.

Q.—It was suggested, I think, that you took Mr. Kidd's report holus bolus, and that is what is still rankling in your mind. What do you say about that?

A.—No, it is not rankling. I only suggest that the statement that I took Mr. Kidd's report holus bolus was made before I had given any evidence, and I think it is quite clear now from all the information that I have given that I did not take his report holus bolus. I have nothing more to say.

Q.—I think we can now turn on to page 7. I have referred to this already. This is what Sir Henry Lawrence said in answer to Sir Frederick Hopkinson?

A.—We have already referred to that.

Q.—I have referred to it, but it emphasises that there was some difficulty with the crew, some of whom had to be replaced?

A.—Yes.

Q.—Sir Henry Lawrence says: " Some of them had to be replaced on the vessel because their work was unsatisfactory in every way. Fresh men had to be trained in the following year "?

A.—Yes.

Q.—Now will you go to the middle of page 8?

A.—Yes.

Q.—It is the same old story?

A.—It is the same old story. I can hardly think that Mr. Billimoria, after having heard me, would still subscribe to the statement that I " followed blindly the report and figures of Mr. Kidd."

Q.—That follows the holus bolus suggestion. I think we can pass on?

A.—Yes.

Q.—You have given your explanation of that. We can now skip several pages. I think you desire to draw attention to one answer that was given by Mr. Kidd. The question was put by the Chairman: " And a scheme which might very well be a complete success if the dredger worked to expectations, might be a disastrous failure if she gave an output such as that of the ' Kalu ' and ' Jinga '?—(A.) Clearly. May I just mention one very important thought which is passing through my mind which is very well illustrated by the case of these two vessels and the figures you have just given. It is a question of the men who are working. It may be much more a question of the men who are working the machine than of the machine itself "?

A.—Yes.

Q.—That puts your own view in a nutshell?

A.—That puts my view in a nutshell.

Sir Frederick Hopkinson.—And the men controlling those who are working?

A.—The men controlling those who are working, obviously.

Sir H. Courthope-Munroe.—I think I can skip the next nine pages. The next reference I have is at page 19. What do you want to say about that?

A.—I agree with Mr. Kidd.

Q.—That is again a reference to the borings?

A.—That is a reference to the borings, and I agree with Mr. Kidd.

Q.—On page 19 this question is put by Sir M. Visvesvaraya: "Do you think that any changes have occurred in the bed of the harbour since the borings were taken in 1912?" and the answer is: "It is extremely improbable." Of course those are the borings upon which you were relying. " (Q.) Do you think that dependence could be placed on the surveys in 1912 in designing in 1919?—(A.) Surely. (Q.) You do not think there would be any deposits or erosion of the bed likely?—(A.) The only thing that might have happened in the interval would be a further accumulation of soft mud. Bombay Harbour is gradually shoaling, becoming shallower."

A.—Yes, I subscribe to that.

Q.—Then he goes on to deal with the question of the shifts. There is nothing more to which you desire to draw attention, is there. Can we pass to page 23?

A.—Yes.

Q.—Here, I think, you want to draw attention to the answer given by Mr. Kidd in connection with the matter of the bonus?

A.—That is the point. I have already stated it in my evidence, but I would like to emphasise what Mr. Kidd says: "But I have sometimes wondered whether the magical effect of a bonus would not have procured very much better results." Then he says that he took a Port Trust dredger on hire, and that he got outputs far exceeding the best which had ever been obtained by the Port Trust, and he attributed it solely to the fact that the boat crews had a bonus on results.

Q.—He says: "Yes, and I attribute those better results solely to the fact that I paid the crew a bonus on results."

Sir Frederick Hopkinson.—A bonus is paid for getting something above the normal?

A.—Yes.

Sir H. Courthope-Munroe.—It used to be.

Sir Frederick Hopkinson.—It should be paid for nothing else.

Sir H. Courthope-Munroe.—We may be living in different days now.

Witness.—With a bonus the men are always hoping to get something beyond the normal, and they get up to the normal.

Sir Frederick Hopkinson.—They are paid to do the normal.

Sir H. Courthope-Munroe.—Is there anything on page 26?

A.—No, there is nothing there.

Q.—I think you have dealt with that question, and I will leave it?

A.—I have dealt with that question. At the top of page 26 Mr. Kidd says: "I have always been amazed at the simple fact that Sir George Buchanan's original estimate after the war was a lesser figure, or an approximate figure to mine made in 1912. That has always been an incredible fact to me." I have explained that, and I adhere to it.

Q.—I think the Committee are in possession of your views upon that. Now we go to the evidence of Mr. McMurray at page 31. Do you want to refer to page 26 at all? I have nothing marked on that?

A.—No, I think that is all.

Q.—On page 29 you are dealing with Mr. McMurray's evidence, and your comment is: "It has been established, I think, that on their trials in Bombay these dredgers did 37½ per cent. above their guaranteed delivery."

A.—I have already spoken upon that subject.

Q.—I thought that that was what you wanted to refer to?

A.—Yes, but you understand that so much has happened since this compilation was made.

Q.—I thought that that was one of the pages that you marked?

A.—Yes.

Q.—You draw attention to page 31. What is it that you want to say with regard to that?

A.—Mr. Kidd emphasises, as it is recorded, that when he put the "Jinga" on to the blue clay she gave much better results than when she was dredging mud alone.

Sir Frederick Hopkinson.—I do not think we have any evidence at all that Mr. Kidd ever did any dredging there?

A.—He said that he persuaded Mr. Messent to do it, and he pointed to the figures which he marked in green as showing the better output when the "Jinga" was working in blue clay. Then Mr. McMurray remarks: "I cannot accept anything of the kind."

Sir H. Courthope-Munroe.—What is the next matter to which you desire to call attention? I have nothing marked in the next few pages.

A.—I have got to Mr. Lewis's evidence now, at page 42.

Q.—I have something marked on page 41. The question was put by Sir M. Visvesvaraya to Mr. McMurray, that the actual test with the dredger on the Clyde was farcical. What do you say to that?

A.—I have already said all that I can say. I was not present at the tests.

Q.—You did not superintend the tests. That was done by the naval architect in England?

A.—By the naval architect, and my partner was there, but I have said all that I can usefully say upon that.

Q.—If you were not there, that is a matter which more concerns him than you?

A.—Yes.

Sir M. Visvesvaraya.—Was it not necessary under the contract that you should pass the dredger? Was it not necessary that the dredger should be tested by Messrs. Meik & Buchanan according to the terms of the contract?

A.—Mr. Meik was present at the trial.

Q.—Mr. Meik was there?

A.—Yes, he was present at the tests.

Q.—At all the tests?

A.—At all the tests of both dredgers? I was in India.

Chairman.—He sets out the records at page 31 of this big book of correspondence.

Sir H. Courthope-Munroe.—At page 45 the question crops up again of beginning both ends of the wall at once, but you have dealt with that?

A.—I have got to page 54, and I cannot find anything to which I want to refer.

Q.—Do you want to say anything with regard to page 54?

A.—No, I have nothing to say as regards page 54. At page 55 Sir Frederick Hopkinson asks Mr. Lewis: "Had Sir George Buchanan a clearly defined scheme for doing every detail of this work? Did he tell you that he wanted a gantry here and he wanted to use so many trucks there, and locomotives here, and so on?" I say no, I was not carrying out the work; that was left to the Director of Development and to his chief engineer.

Q.—On page 58 there are two matters that you wish to clear up. I see that Sir Frederick Hopkinson, in asking some questions of Lord Lloyd, by error, no doubt, assumed that you had said certain things. At page 58 the question is put by Sir Frederick Hopkinson: "He (the Secretary) was casting doubt as to whether it was wise to do this reclamation by means of dredging, because the experience of the employment of suction dredgers on a large scale with limited and reclamations in a large scale were limited." That is the context. Then Sir George Buchanan rebuts that by saying: "I am therefore to point out that the large reclamations being carried out by the Port Trust afford exceptionally complete data for estimating work of this kind." I think, in point of fact, you never said anything of the kind?

A.—No.

Chairman.—That is a quotation from a letter.

A.—That is a quotation from a letter.

Sir H. Courthope-Munroe.—As it appears there it looks as though Sir George Buchanan had said it. It is quite clear that he did not say that.

Chairman.—I do not think it was Sir Frederick Hopkinson who asked the question. I think I put the question, and I have corrected it in the proof, because I realised that it was not right; it will be corrected.

Sir H. Courthope-Munroe.—On my notes it appears in that way.

Chairman.—I have got that in mind. I think it was I who put the question.

The Witness.—You have dealt with Lord Lloyd's evidence.

Sir H. Courthope-Munroe.—Yes. I am not going to touch upon that, because I have dealt with that fully. As I said on Saturday, I think you agree with every word of Lord Lloyd's evidence?

A.—Yes.

Q.—You are not in conflict with any of it. I think there is nothing that you want to say about Lord Lloyd's evidence beyond what I have already said?

A.—No, nothing.

Q.—I think that concludes your comment, in substance, on the London evidence, does it not?

A.—Yes.

Sir H. Courthope-Munroe.—I hope the Committee will not think that I have been too long in dealing with that?

Chairman.—No.

Sir H. Courthope-Munroe.—There remains only a few general matters to clear up.

Chairman.—There is one question I should like you to ask Sir George Buchanan on Mr. McMurray's evidence. Mr. McMurray made a very strange statement: That he had told Sir George Buchanan that whilst he was only giving him a soft clay dredger he must recognise that the dredger would work much more slowly in any other substance than soft clay. I should like to know if Sir George Buchanan remembers any conversation of that kind with Mr. McMurray.

Sir H. Courthope-Munroe.—Will you deal with that now?

Chairman.—He said it took place at Renfrew

A.—I think I stated in my evidence that when I was at Renfrew I had an interview with the firm. We discussed it with Colonel Brown, who is now dead.

Q.—That is quite right.

A.—Yes. Colonel Brown realised I had stated the material as clay and asked what I meant. Then we said it was the same material as the "Jinga" and "Kalu" had done, and we agreed that soft clay, which was the designation used for the material for the "Jinga" and the "Kalu," was the medium. Whether it was said or not, naturally anybody knows that if the dredger dealt with anything much harder than soft clay the output would probably be reduced.

Q.—Mr. McMurray in his evidence has made it clear to us that the reason why the firm would not give a test on site was because he knew that he would come up against material in the harbour that could not be described as soft clay. That he was concealing from you knowledge that he had in his head, if he was telling us the truth?

A.—There was no conversation on those lines with him. If he thought there was very much harder stuff in the harbour he certainly did not tell me so.

Q.—Yes. In answer to Sir M. Visvesvaraya he said definitely and plainly that the reason why he would not agree to a test was because he knew there would be hard stuff in the harbour, and he pledged himself to it all the way through, that they had given this soft clay description as regards the dredger obviously to limit their liability. Sir Frederick Hopkinson put to him whether he was not tricking you in relation to it.

A.—He certainly never gave me any suggestion of that kind.

Q.—He never gave you any hint that you might come up against hard material?

A.—He never gave me any hint in that respect.

Sir Frederick Hopkinson.—He claimed to have a thorough knowledge of all the clay in Bombay Harbour?

A.—So did Mr. Kidd. They were both out there when the "Jinga" and the "Kalu" were working. I understand that when they were working at Sewri there were a number of stones which had been deposited in connection with some quarrying operations. They were not part of the original soil, but a number of large stones had got on to the ground, and that gave a good deal of trouble to the dredgers; whether Mr. McMurray was guarding himself against anything of that kind I do not know.

Sir Frederick Hopkinson.—No.

The Chairman.—He did mention that it was the hardness of the material, the moorum and rock.

Sir Frederick Hopkinson.—And the clay.

Chairman.—And the clay. He may not have been playing very, very candidly with you either just before the 25th of July, or on the 29th of August, but that is how the matter seems to stand on the evidence?

A.—Yes.

Sir H. Courthope-Munroe.—I have not seen that part of the evidence to which the learned Chairman has referred, but I notice that in your letter which I read this morning, dated the 25th of August, 1919, when you opened the ball and asked Messrs. Simons for their estimate for this dredger you stated: "I shall be satisfied with a test in this country and your guarantee that the plant will do the work required"?

A.—Yes.

Q.—Rightly or wrongly, from your point of view, you never anticipated a trial elsewhere than in England?

A.—No, I did not.

Q.—It follows.

A.—Yes.

Sir Frederick Hopkinson.—That was never incorporated in the contract.

Sir H. Courthope-Munroe.—Yes. This is the letter that opened the ball.

Chairman.—No. What opened the ball, as you can see from that letter, was an antecedent interview with Mr. McMurray, because you will see that that letter says: "He and I are in general agreement about the nature of the plant required."

Witness.—That is correct.

Q.—That is what happened, and then the suggestion that there should be a trial at Bombay was turned down?

A.—Yes.

Q.—Then in the latter dated the 25th of July, 1919, you say: "I am willing to have a trial on the Clyde, and then I want a guarantee that the plant will do the work required." Mr. McMurray never gave a guarantee, nor did Messrs. Simons, that the plant would do the work required. They are too canny. They never gave that guarantee. They were giving no guarantee as to performance in Bombay. Mr. McMurray was quite definite about that.

A.—Yes.

Sir H. Courthope-Munroe.—In point of fact, the test did take place, I understand, on the Clyde.

Chairman.—Yes, that is right.

Sir H. Courthope-Munroe.—Does that conclude your question?

Chairman.—Yes.

Sir H. Courthope-Munroe.—(To the Witness.) I think there are only one or two general matters left now. This is not, as we know, the first big job that you have undertaken.

A.—No.

Q.—You have a job, I think, in Scotand now that is even bigger than this?

A.—We have a very large work in Scotland at the present time.

Q.—Is this the first time that it has been suggested that your work has turned out a failure?

A.—Absolutely—it is unique.

Q.—Has all your work, with one exception, been on the lines that I indicated to the Chairman as being the usual lines for foreign work, where the Resident Engineer has been your servant and your representative?

A.—No.

Q.—I think there is one case.

A.—No. There was one case where the Resident Engineer was appointed on similar lines to Mr. Lewis, and the work was a complete success; we had no trouble.

Q.—I think there is only one case where you have done work for a Government more or less on these lines?

A.—We have done one work for a Government on these lines, and we were fortunate in having no Development Directorate to deal with, and the work was an absolute success, and we were congratulated upon it. We have been doing another work exactly on these lines for a large private company in Italy, and there also the work was carried out to a complete success. We have two examples within my knowledge of works carried out on similar lines, but they were a success, and if we had suggested for a moment that our Resident Engineer ought to have gone he would have gone within twenty-four hours.

Q.—With those two exceptions, your work has been on the general lines of the Resident Engineer being your servant, payable and dismissible by you, and, as I say, your eyes abroad?

A.—Yes, and the work has been done by contract.

Q.—You have told us all about Mr. Lewis. There is one other matter only that you have noted here. Sir Frederick Hopkinson, I think, rather pressed the point that in this work you ought to have had what I think he described as a double stage pump?

A.—That was in the statements; I have dealt with that.

Q.—There are two sides to that question?

A.—My reply really is that the question is one which ought to have been dealt with by the Naval Architect, Sir John Biles. It was a technical matter. I am not an expert in pumps. I tell you that at once, and I think that Sir John Biles might reasonably have been asked that question.

Q.—Sir Frederick Hopkinson has put one side of that, but there is another side to it, is there not?

A.—I would rather leave it.

Q.—You have dealt with the question of your estimates, and I think you have expressed your regret that this Committee has not got a few Westminster engineers on it, as well as the present personnel. You are quite willing to hand over these estimates to any two or three Westminster engineers for them to say whether they were in the ordinary form or not?

A.—Certainly. I will welcome any investigation by a tribunal of Westminster engineers.

Q.—Is there anything that you have mentioned to me to which you wanted to refer? There is one little matter in Mr. Settle's Report. We took Mr. Settle's evidence at the end of the day, and his Report was put in, but I do not think very many questions were asked upon it. Is there anything on which you want to lay stress, and direct to the attention of the Committee upon that Report?

A.—I would like to stress the point that Mr. Elgee, in his evidence, I think, said that Mr. Settle had been there for only three or four days. As a matter of fact he was there for four weeks. He went out when I was very ill to do anything he could to help in this matter. I should have been there except for illness, and he was there for four weeks, not two or three days, and he reported to us. He made numerous suggestions, but I doubt very much whether any of them was given effect to.

Q.—Is there anything in the Report to which you want to call the attention of the Committee?

A.—He told them very definitely that they ought to devote less time to work unconnected with the dredging, and concentrate on the dredging. He showed them how to dredge. What I would really like to emphasise is that in my absence we did everything that we possibly could to help matters. We sent out Mr. Settle at our own expense. We were prepared afterwards that Mr. Halcrow himself should go out. We did all that human beings can do to get a move on when we found the way in which things were going.

Q.—Have we come to an end of this, or is there anything else?

A.—I should like to make one remark about which there has been some misunderstanding. Sir Frederick Hopkinson, at the close of the last hearing, asked whether I considered, putting it in bald language, we had earned our fees, or words to that effect.

Sir Frederick Hopkinson.—I do not think that is a fair way of representing anything that I said?

A.—I do not want to represent anything unfairly. That is my bald way of putting it. What I am going to say is that I think Sir Frederick Hopkinson knows that our fees for actual work done have been less than those usually charged by Westminster Engineers.

Q.—I am not prepared to agree to that.

A.—And considerably less than the Colonial Office pays for similar work. Those are matters that can be proved.

Sir H. Courthope-Munroe.—I do not think that it is a matter we need pursue very much.

A.—No. I merely wanted to point that out.

Q.—I suppose that the reason why they are less, as you say, is on account of the magnitude of the job?

A.—It is a matter of comparison; they are less.

Q.—Is there anything else?

A.—I should like to go on with that. I say that I carried out my bargain to the fullest extent. I let pass other equally remunerative work, and, so far as money goes, I should actually have been just as well off if there had not been any Back Bay Reclamation Scheme. It was not a money-making concern, particularly to me. It was a large work in which I was interested.

Q.—As far as money goes, you would have been better without it, and as far as vexation, trouble, and worry go, you would have been well quit of the whole thing?

A.—Absolutely.

Q.—Is that all?

A.—That is all. Sir M. Visvesvaraya was asking me about moorum, and I said before lunch that I would give him an extract from a letter from Mr. Lewis on the subject of moorum filling. I will read it, and then I will put it in with the other documents. It is dated the 14th of May, 1921: "I wonder whether you have ever considered the question of the moorum topping to the reclamation? I have just taken out a few figures. The amount of stuff to be shifted is approximately 100 millions of cubic feet, with trucks taking 400 feet, this means 250,000 trucks. 5,000 trains of fifty trucks each, and at two trains a day, would require 2,500 days, or some eight years. If the work is to be done in two years then we shall have 600 days to work in, and shall require 8·3 trains per day. The B.B. and C.I. what with their quadrupling, the rebuilding of Grant Road Terminal Station, and the electrification of the line, will probably be in a state of chaos for ten years to come, and will never be able to handle that amount of traffic. The problem is will the moorum be necessary, and, if so, will it be possible to get the amount of material and transport it in the requisite time?" Then we come on to Sir Lawless Hepper's idea of an underground railway.

Sir Frederick Hopkinson.—That deals only with moorum topping, not moorum filling.

A.—That is so, but what I want to point out is that if there is all this tremendous question with reference to moorum topping——

Chairman.—One foot of moorum.

A.—If there is all this tremendous question about one foot of moorum, what about your colleague's desire to fill up the whole area with moorum?

Sir Frederick Hopkinson.—He prejudices at once the statement that he makes by saying that the B.B. & C.I. will be in a state of chaos for 10 years. This is in 1921.

Sir M. Visvesvaraya.—Things are quite different now.

A.—Yes.

Sir Frederick Hopkinson.—He is prejudicing the statement that he makes.

Sir H. Courthope-Munroe.—Does that conclude the matter, or have you anything else on your notes to which you wish to refer?

A.—No, I have nothing more to say at all.

Sir H. Courthope-Munroe.—That concludes all that I want to ask Sir George Buchanan. Before the Committee terminates this Inquiry, so far as the hearing of the evidence is concerned, Sir George Buchanan wishes me, on his behalf, to thank you for the full and patient hearing that you have accorded to him. He wants me also to remind the Committee of the terrible strain and anxiety imposed upon him by this Inquiry, which is unique in his experience, should he have, in the course of the Inquiry, appeared to resent some of the questions that duty has compelled the Committee to put to him.

Chairman.—No, it is quite the contrary. I am sure that we are all agreed that no one could have been in the witness-box for such a length of time as Sir George Buchanan has been, and have comported himself more charmingly and exactly in every possible way.

Witness.—I thank you.

Chairman.—It is only fair to say that.

Sir Frederick Hopkinson.—I entirely agree.

Chairman.—We are all agreed about that.

Sir M. Visvesvaraya.—We are all agreed about that.

Chairman.—We are very much obliged to you, Sir George. We realise that it has made a tremendous demand upon your time, and we do appreciate very much the manner in which you have dealt with every matter that we have put before you.

Witness.—I am very glad indeed if I have been of any assistance, and I say again what my Counsel has said, that I very much appreciate the courtesy shown to me by you, Mr. Chairman, and by your colleagues.

Chairman.—We are much obliged to you also, Sir Harry.

(*The Witness withdrew.*)

APPENDICES TO THE EVIDENCE RECORDED IN ENGLAND.

(I.)

Questions formulated by Committee and publicly announced at first sitting in Bombay on 3rd August, 1926, and referred to by witnesses in India and England.

The following are the subsidiary questions in so far as we have at present been able to formulate them :—

1. Before the decision to undertake the scheme was arrived at, was it fully explained by the Government of Bombay to the Government of India and the Secretary of State in Council, and was it embarked upon with their approval and sanction?

2. Before deciding to undertake the scheme did the Government of Bombay have any, and what, correspondence or consultations with the Port Trust and/or the Royal Indian Marine and any or what other public body, syndicate or persons in relation to :—(*a*) the feasibility of the scheme, (*b*) their experience of dredging operations in the harbour, (*c*) the nature of the sea bed, (*d*) the proposal of Sir George Buchanan to dredge in the area subject to their jurisdiction?

3. Did the Government of Bombay communicate to the Port Trust and/or the Royal Indian Marine (i) the report of Mr. Kidd, "Project of 1912," (ii) Sir George Buchanan's Report of September 1919, (iii) any other and what documents, and seek advice, opinion or information from them or either of them?

4. If so, did they or either of them raise any and what objection to the site of the proposed dredging operations?

5. At what date did the Government of Bombay and/or the Development Directorate learn that the Port Trust and/or the Royal Indian Marine objected to dredging in the harbour? Were the said objections verbal or in writing? To whom were they made and what were the reasons alleged?

6. Did the Government of Bombay and/or the Development Directorate accept the objections as well founded? Were the undertakers of the scheme thus deprived of a dredging area calculated to yield 15½ million cubic yards, or some other and what estimated amount? Was this part of the area over which Mr. Kidd had made some and what number of the 1,314 borings? Was this area stated to contain material eminently suitable for dredging?

7. Did the Government of Bombay and/or the Development Directorate and/or Sir George Buchanan decide to dredge material from some other and what area? On what date and by whom was this decision made?

8. Before commencing dredging upon the new area were the Development Directorate and/or Sir George Buchanan satisfied by any and what surveys, borings or tests that as to quality and extent of material the new area was suitable for dredging?

9. Was it in fact suitable for dredging? What were the results obtained in the dredging operations in this new area, season by season? What (if any) was the additional cost? To what extent (if at all) was the work thereby delayed?

10. What were the functions of the Development Directorate in relation to the Reclamation Scheme?

11. Had any, and which members thereof, previous practical experience of reclamation upon an open sea front, or any practical experience analogous thereto?

12. Did the personnel of the Development Directorate carry out their duties efficiently?

13. In the circumstances of unsettled financial, trade and labour conditions as they existed in 1919 and 1920, would it have been practicable to carry out the work through independent contractors, or was it a wise decision on the part of the Government of Bombay to carry it out departmentally?

14. Was the urgency of the scheme so great that, notwithstanding the aforesaid unsettled conditions, it was prudent and reasonable to undertake it in 1920?

15. Was Sir George Buchanan's estimate of time and cost based upon a dredger working 15 hours a day and delivering each hour 2,000 cubic yards of dredged filling to the site to be reclaimed?

16. Was it practicable to work a dredger for such a length of time each day? If so was it, in fact, done, and throughout what period? If the dredger did not work for 15 hours a day why did it not do so?

17. Were the specifications and designs of Sir George Buchanan for the dredger *Sir George Lloyd* (hereinafter called the dredger) and the *Colaba* fit and proper for the intended work?

18. Did the makers guarantee that the dredger would discharge 2,000 cubic yards of soft clay per hour through a floating pipe line to a distance of 5,000 feet?

19. Did the dredger before delivery under proper test conditions in fact give the guaranteed output?

20. Was the dredger and the *Colaba* when delivered, in all respects in accordance with the contract? If not, in what respect or respects did one or other or both fail to conform thereto?

21. For how many days did the dredger work, and for how many hours of each day in the seasons of :—(I) 1923-24, (II) 1924-25, (III) 1925-26?

22. What was the amount of material dredged from the sea bed and the amount deposited and retained throughout each of the periods respectively? How does it compare with the estimate of Sir George Buchanan of 30,000 cubic yards per working day delivered on the reclamation site?

23. As regards the dredger *Kalu*, when did she commence work? What was her guaranteed output? Did she give the said output? What was her actual output for each and every day she worked?

24. Did any and what estimated amount of dredged filling escape through the rubble wall?

25. If any did so escape, was that in consequence of any defect in the original design of the said wall, or because of some and what departure from the original specification, or some other and what cause?

26. Were the operations carried out by those in charge of the dredgers and pumping station with all reasonable skill and diligence?

27. If the amount of dredged filling is found to have fallen below the estimate of deposit, to what is this deficiency due?

28. If we decide to recommend that the work should be continued wholly or in part, should it be carried out by (i) the Development Directorate, (ii) the Public Works Department, (iii) independent contractors, (iv) or some other and what agency?

29. Should any future reclamation be effected by (*a*) dredged filling, (*b*) dry filling, (*c*) or a combination of the two?

30. What could be the probable cost occasioned and length of time required to complete Block 8? Is its completion in the circumstances a reasonable business proposition?

31. What would be the probable cost occasioned and length of time required to complete Blocks 1 and 2? Is the completion of these in the circumstances a reasonable business proposition?

32. If we decide to recommend that the work should proceed on one or more of the said blocks, should a recommendation be also made (i) to continue the filling in of Blocks 3, 4, 5, 6, 7, or some and which of them? (ii) Or should the scheme be abandoned as far as they are concerned? (iii) Should the question of continuing the reclamation of some or all of the blocks 3, 4, 5, 6 and 7 be suspended until the financial results of any reclaimed blocks are known or can be estimated with fair certainty?

33. When and under what circumstances was the original estimate of 367·61 lakhs increased to 702·43 lakhs; and the eventual cost now estimated at 1,101 lakhs? What are the figures which make up the two latter amounts?

34. Who decided upon the system of building the reclamation wall and the quantity required for it?

35. Was this a proper and economical system or could a better one have been devised?

36. Why were the 20-tons blocks shown on the 1919 scheme abandoned and when and by whom was it decided to abandon their use?

37. Generally, if the work has not been carried out in accordance with Sir George Buchanan's estimate, can it be said how and in what manner the failure has arisen, and to whom it is attributable?

(II.)

Letter from Sir J. Biles of 8th October, 1926.

SIR,

With reference to the request made by Sir Fredrick Hopkinson as to the changes in costs of production in ships during the periods ranging from 1920 to the present time, I have to state that as far as I am able to determine :—

The maximum cost of ship materials occurred in the third quarter of 1920. By the beginning of 1923 these materials had fallen to about what they were during the last two years of the War, which latter were about 55 per cent. above pre-War prices.

As regards labour, the cost did not fall in 1921, as there was a good deal of work being completed which had been begun in the periods before 1920.

In August, 1923, the total prices of ships were about 55 per cent. of those for ships building between 1919 and 1921.

We may take it that ships cost in 1920 three times pre-War prices and in 1921, $3\frac{3}{4}$ times, while in 1923 they were costing about twice as much.

Vessels are being placed now for about 60 per cent. above pre-War.

With reference to the cutter of the "Sir George Lloyd" and the possibility of increasing its revolutions above those obtained with 150 horse-power, I have to suggest that the following should be considered :—

(*a*) The engine should be run at as high a mean pressure as the steam will carry, thereby obtaining as many revolutions as is practicable in cutting the particular clay that is being cut.

(*b*) If it is found that the rate of cutting is not thereby increased, it would be practicable by altering the train of wheels in the cutter to lower the revolutions and get a more powerful cut on the clay. These reduced revolutions with the more powerful cut might increase the total output.

(*c*) If neither (*a*) nor (*b*) produces the desired improvements, a smaller cutter could be made.

Any result produced in this direction must depend on the hardness of the clay, which can only be determined by cutting it with the existing or modified cutter under the suggested conditions.

It is to be remarked that as already stated in my evidence while making the cutter more suitable for cutting hard clay it may be made less suitable for cutting the soft clay (and mud) for which it was originally intended, and while the output in hard clay may be improved, the total output in all materials might not be.

With reference to the point that Sir Fredrick Hopkinson tried to make, viz., that if the actual velocity of the water in the pipes was only 12 ft. per second instead of 14·1 to 14·8 as demonstrated from the actual pressures in the pump, it would be interesting to know under what conditions this velocity of 12 ft. was measured and what was the actual pressure in the pump at the time, and the lengths of the pipe line.

Yours faithfully,

(Sgd.) J. H. BILES.

(III.)

Letter, dated 25th July, 1919, from Sir George C. Buchanan to Messrs. William Simons & Co.

DEAR SIRS,

I have been asked by the Government of Bombay to report on the proposed Back Bay Reclamation scheme and I shall be much obliged if you will give me an estimate accompanied by a plan for the dredging plant required.

2. I have already had the advantage of discussing the matter with Mr. McMurray and I think we are in general agreement as to the type of plant necessary.

3. The enclosed plans show broadly what is required. It is proposed to build a wall enclosing an area of some 1,200 acres in Back Bay and to reclaim the land by dredging in Bombay Harbour and pumping the dredged material through pipe lines across the Colaba Peninsula.

4. The main points for consideration are :—

(*a*) The number and size of pipe lines necessary.

(*b*) The position of the relay pumping station or stations.

(*c*) The capacity and type of the dredger employed.

5. The following are my views on the subject :—

(1) A project prepared by a firm of Contractors in 1912 proposed seven pipe lines across the peninsula but I am disposed to think such a large number are unnecessary and will add considerably to the difficulties and cost of the work as the pipe lines have to be laid underneath existing streets. I therefore propose three pipe lines, Nos. 6, 4, and 2 on the plan, with auxiliary lines laterally and outward as necessary.

(2) The length of the pipe line from dredger to relay pumping station should be the greatest that a dredger with one pump can work successfully and must not in any case be less than 5,000 feet; the sections accompanying this letter give the levels throughout the three pipe lines.

It is matter for consideration whether the relay pumping station should be established afloat on a barge or on the land but in either case it would probably be cheaper to drive the pump by electricity.

(3) The dredger must work to a depth of 70 feet and have a *minimum capacity of* 2,000 *cubic yards* of clay per hour discharged at the extreme end of the whole pipe line.

I consider the type of dredger most suitable would be that of the " Jinga " or " Kalu " with all recent improvements and modifications. Arrangements must be made to raise steam in the boiler by either oil or coal fuel and I shall be obliged by your opinion on the use of the Diesel or similar type of internal-combustion engine or alternatively driving the pump by electricity supplied from Bombay Central Station.

These were proposals of the contractors already alluded to but do not commend themselves to my judgment.

6. An estimate is required of the cost of the plant complete, delivered and erected at Bombay, and as in the case of the dredger " Pelican " you built to my order I shall be satisfied with a test in this country and your guarantee that the plant will do the work required. Time is of importance and I should like to know the earliest date delivery could be given from the placing of the order.

7. The Contractors offered to procure for Government the plant at " the special prices at which manufacturers supply plant and materials to contractors." I was not aware that a Government dealing direct were not in as good a position as contractors and shall be glad of your observation on this point.

8. The proposals I have outlined above are subject to modification if your experience can suggest improvement and I should like to meet you at Renfrew and discuss details personally at a later date when you are ready for me to do so.

I am,

Yours faithfully,

(Sgd.) GEO. C. BUCHANAN.

(IV.)

83, Victoria Street,
Westminster,
London, S.W.
9th October, 1926.

R. B. EWBANK, Esq., C.I.E.,
6, Richmond Terrace,
Whitehall, S.W.1.

DEAR SIR,

I have to acknowledge the receipt of your letter of the 6th inst., and in reply would say I have had a careful search made and cannot find any written record that Sir George Buchanan asked Messrs. Simons to agree to a test of the dredger in Bombay.

With regard to the question of the capacity of the pumps on the "Sir George Lloyd" when delivering water, the capacity is approximately sixty thousand gallons per minute and will vary according to the condition of the pipe line, etc.

Yours faithfully,
(Sgd.) THOS. McMURRAY.

(V.)

Extract from letter of 23rd April, 1925, to the Chief Engineer, Reclamations Branch, Development Directorate.

Through the Director of Development.

* * * * * *

As it is not important that the finished bottom of the dredging should be level, the bottom 2 or 3 ft. of stiff clay with murum and boulders should, if possible, be avoided wherever met with as it is apparently unsuitable and uneconomical for the dredger to deal with.

* * * * * *

23rd July, 1925.

SIR LAWLESS HEPPER, KT.
Director of Development,
Reclamations Branch,
Old Custom House Yard, Fort,
Bombay.

DEAR SIR,

Back Bay Reclamation.

Further to our letter of 25th May last, we have had several conversations with the Deputy Chief Engineer Dredging (Mr. C. R. Brims) since his return to this country.

We gather that there is nothing wrong with the dredging plant and, therefore, no complaint can be made against the builders.

The opinion we have formed as a result of the conversations is that, as previously suggested by us, an incentive should be given to the men working the dredgers in the form of bonus on output and, further, that every effort should be made not to lose time working in hard material if softer is available in ample quantities as we consider increased speed of working more important than quality of material.

Yours faithfully,
C. S. MEIK & BUCHANAN.

15th October, 1925.

THE SECRETARY TO THE GOVERNMENT OF BOMBAY,

Development Department,
Bombay Castle,
Bombay.

SIR,

Bombay Back Bay Reclamation Scheme.

In continuation of our letter, dated 24th September, acknowledging receipt of your letter S.B. 1291, of 28th August, on the subject of dredging operations, Sir George Buchanan has returned to London and we have discussed the matter fully with him and Mr. MacMurray, the London representative of Messrs. Wm. Simons and Company, Limited, who were the builders of the dredging plant.

2. The following are some of the conclusions arrived at :—

(I) The dredger " Sir George Lloyd " was designed to dredge 2,000 cubic yards of soft clay and silt per hour and pump this quantity on shore through a pipe line 5,000 feet in length and there seems to be no reason for assuming that this work cannot be performed. All her tests on the Clyde were carried out to the complete satisfaction of the consulting naval architects, Messrs. Sir John H. Biles and Company, and, from the time that the vessel was taken over by the Government of Bombay, the builder's responsibility ceased.

(II) The builders are naturally for their own sakes anxious that the plant should prove a success, but they are not specialists in the handling and working of dredging plant and in the absence of any specific complaint about the machinery or any portion of same, it is not clear what good interest could be served by their representative going to Bombay. Nevertheless if it can be shown that a visit would be advantageous they are only too anxious to do what is possible in the matter.

(III) The lowness of the output of the " Sir George Lloyd " is in our considered opinion due to one of two causes, or probably a combination of the two :—

(*a*) Unsuitable material, and
(*b*) inefficient handling of the plant.

It is obvious that if the dredger is put to work in such hard material that the cutter blades are damaged, as we understand was the case last season, or if the dredger with booster is asked to deliver continuously through a length of pipe line largely in excess of 10,000 feet, the output must be greatly reduced. We are therefore of opinion (and so informed Mr. Brims when he was here) that when the dredger is found to be working in this hard material, the suction pipe should be lifted and operations continued in the softer clay overlying the rock.

Regarding the handling of the plant, we suggested in our letter, dated 25th May, 1925, that on work of this description it is of vital importance to give an incentive to the men employed; we can only repeat and emphasise this statement and would observe that no contractor would for one moment have handled the job in the way in which it is being carried out in Bombay. In this connection we would invite a reference to paragraph 29 of Sir George Buchanan's report dated 11th February, 1922, which reads as follows :—

> " In carrying out a large public work departmentally success both economic and technical depends to a large extent upon the adequacy, efficiency and loyalty of the engineering staff, technically because apart from actual design much depends upon workmanship and economics because the spending of money and the employment to the best advantage of workmen is entirely in their hands.
>
> " Government is in regard to its staff at a disadvantage compared with a contractor or a private firm. The loyalty and enthusiasm of a staff is often taken for granted but it is rarely spontaneous and in the case of a contractor or private firm bonuses are given for particularly good work and in other ways officers are encouraged to do a great deal more than is strictly required of them, also on the converse side if an engineer is inefficient a contractor will cut his losses and get rid of a man by paying whatever is legally due in lieu of notice. Government rules precludes either bonuses or pay in lieu of notice and I merely mention this matter because it is one of the chief advantages gained in employing a contractor for the execution of public works."

(IV) If the difficulties in connection with (*a*) and (*b*) supra can be overcome we are absolutely confident that there will be an enormous increase in the output this season and in that case a final judgment on the ultimate cost of reclamation by dredging might we suggest be deferred.

3. According to the figures given in your letter under reply, 1,261,986 cubic yards of material was dredged from the harbour during the last season but only 680,438 cubic yards was deposited in Back Bay. The smallness of this latter figure obviously points to a great leakage from the area under reclamation and the advisability is indicated of tipping a watertight moorum bank along the inside face of the sea wall and otherwise arranging for the detention within the area under reclamation, of as much as possible of the silt-laden water discharged through the pipe line until the silt has precipitated. Under these circumstances, we disagree with the view taken that the quantity of filling as measured in the area to be reclaimed should be taken as the basis of calculating the output of the dredger. In all normal cases the quantity of filling is slightly greater than the quantity of material dredged as measured by soundings and, assuming that the chief engineer's figures given in your letter are correct, we consider that the loss of material in the reclaimed area is quite as serious a matter as the low rate of output of the dredger.

4. Respecting the quality of the material being dredged in the harbour, this is a question which, as you are aware, has been the subject of investigation, discussion and report by Sir George Buchanan ever since the inception of the work, because, as he has repeatedly stated in his reports, the crux of the whole undertaking is the successful reclamation of the area enclosed by the wall by pumping through pipe lines the material dredged from the sea bed, and in his last annual report, dated 15th December, 1924, he reviewed exhaustively the position in respect to dredging plant and dredging operations. It follows, therefore, that if as a result of this season's work it is found beyond doubt that there is not sufficient suitable material in the harbour for the economic reclamation of Back Bay by dredging it will be necessary to reconsider and modify the programme of operations although we sincerely hope that such will not be necessary.

5. In your letter you observe that Government undertook the reclamation on the recommendation of Sir George Buchanan contained in his report of September, 1919, the essential feature of the proposals being the capacity of the dredger to reclaim the area at the rate of 2,000 cubic yards per hour. In this connection we beg to repeat that we have no doubt at all as to the capacity of the dredger to perform the work given suitable material, and we would point out that in recommending the work Sir George Buchanan relied entirely on the detailed survey and report of Mr. Kidd, who said it had been completely established that there was available more than three times the quantity required of suitable material. On this data Sir George Buchanan remarked, *vide* paragraph 34 of his report, " on the assumption that Mr. Kidd's surveys and borings are correct, and I see no reason to doubt their accuracy as a great many borings were taken, I accept his conclusion both in respect to quality and quantity of material." Sir George Buchanan did not himself take any borings, nor in view of the urgency with which his report was required would there have been time to do so. We understand from Sir George Buchanan that Mr. Kidd's borings and estimate of quantities were also accepted as sufficiently accurate by the officials in the Public Works Department of the Government of India, when Sir George, at the request of His Excellency the Governor of Bombay, went to Delhi especially to discuss the project with the Government of India and obtain their sanction and approval to the technical details of the scheme.

6. With reference to the various letters and cables which have been exchanged between us with regard to the date of Sir George Buchanan's next visit to Bombay, we very much regret to inform you that he is at present in such a bad state of health that his doctor has stated emphatically that in his opinion it is extremely unlikely he will be able to travel to India without the most serious prejudice to his health before the autumn of 1926. We need hardly say that this is a matter of very serious concern to Sir George, who was relying on being able to fulfil his engagement, but ill-health is a matter which unfortunately cannot be guaranteed against.

7. In order to assist as much as possible your construction staff in solving the problems before them, we are sending the senior member of our staff, Mr. J. Risley Settle. M.Inst.C.E., to Bombay to enquire into matters and advise on the spot; he leaves London this week. We also hope to be able to arrange that Mr. Halcrow pays a short visit to Bombay early in January and we shall be glad to hear from you if the Government will accept these arrangements which are the best we can make, in lieu of the visit of Sir George Buchanan required by our agreement. Should Sir George's recovery be more rapid than expected he will, of course, go to Bombay instead of Mr. Halcrow.

Yours faithfully,

(Sgd.) C. S. MEIK & BUCHANAN.

(VI.)

Extract from letter, dated 24th July, 1924, from Chief Engineer to Messrs. Meik & Buchanan.

(Through the Director of Development.)

DEAR SIRS,

I have to acknowledge the receipt of your telegram, dated 23rd July, which translated reads as follows:—

"Anxious about dredging have you made arrangements regarding engagement of complete staff for working double shift on all dredgers."

In reply I confirm having wired you as per copy enclosed herewith.

I now enclose for your information copies of my letters to Government asking for arrangements to be made for the engagement of staff required to complete the establishment to work dredgers double shift, together with a copy of the reminder sent on receipt of your telegram referred to above.

* * * * * *

Yours faithfully,

(Sgd.) H. A. ELGEE,

Chief Engineer.

Enclosure.

Extract from telegram, dated 24th July, from the Chief Engineer, Reclamation to Messrs. C. S. Meik & Buchanan.

Reference your telegram 23rd July have asked Government engage necessary staff, stop.

* * * * * *

Copy of letter, No. 2710, dated 24th July, 1924, from the Chief Engineer, Back Bay Reclamation Scheme, to the Secretary to Government, Development Department.

I forward herewith a copy of telegram received from Messrs. Meik & Buchanan for information.

"Anxious about dredging have you made arrangements regarding engagement of complete staff for working double shift on all dredgers."

I would refer to my Nos. 2432 of 30th June, 1924, 2672 of 22nd July, 1924, and 2673 of 22nd July, 1924, asking for arrangements to be made for the engagement of officers to complete the staff required and would again point out the urgency of immediate action being taken if the services of these men are to be obtained in time for the commencement of the dredging season.

Copy of letter, No. 2432, dated 30th June, 1924, from the Chief Engineer, Back Bay Reclamation Scheme, to the Secretary to Government, Development Department.

The undermentioned additional staff will be required for the dredging operations next season.

Grade.	*No. required.*	*Rate of pay.*
2nd Engineer	4	640-30-700
3rd Engineer	4	540-30-600
Assistant Dredging Masters ...	2	600-50-800

These appointments bring the numbers in the respective grades up to the establishment sanctioned in G.R. No. S.C. 1735, dated 26th November, 1923.

I should be glad if Messrs. Meik & Buchanan could be asked to recommend suitable men for these appointments. The High Commissioner should be asked to engage the men recommended if found fit for service on a four years' agreement on the usual terms.

It would be convenient if it could be arranged for one 2nd Engineer and one 3rd Engineer to arrive in Bombay by the 19th September and the remainder of the men by the 26th September.

(VII.)

Wash Borings made in Back Bay.

Statement produced by Sir G. Buchanan.

AREA "A"—February to April, 1922.

Point Number.	Total depth reached.	Depth at which nature of sea bed changes.	Details of strata.
	Ft. ins.	Ft. ins. Ft. ins.	
1	9 6	0 — 9 6	Sand and clay.
2	11 4	0 — 9 0	Sand and clay.
		9 0 — 11 4	Hard clay.
3	9 0	0 — 9 0	Soft clay.
4	16 6	0 — 8 0	Soft clay.
		8 0 — 16 6	Hard clay.
5	10 11	0 — 8 0	Sand and soft clay.
		8 0 — 9 6	Hard clay.
		9 6 — 10 11	Hard clay and small stone.
6	10 11	0 — 8 0	Sand and soft clay.
		8 0 — 10 0	Hard clay and stones.
7	10 10	0 — 8 10	Sand and soft clay.
		8 10 — 9 6	Hard clay.
		9 6 — 10 10	Hard clay and stones.
8	11 3	0 — 8 0	Sand and soft clay.
		8 0 — 11 3	Hard clay.
9	21 6	0 — 16 1	Sand and soft clay.
		16 1 — 21 6	Hard clay.
10	21 8	0 — 15 6	Sand and soft clay.
		15 6 — 21 8	Hard clay.
11	15 10	0 — 9 3	Sand and soft clay.
		9 3 — 15 10	Hard clay.
12	12 8	0 — 10 11	Sand and soft clay.
		10 11 — 12 8	Hard clay.
13	11 6	0 — 6 0	Soft clay.
		6 0 — 11 6	Hard clay and stones.
14	8 4	0 — 4 9	Sand and soft clay.
		4 9 — 8 4	Hard clay and stones.
15	19 1	0 — 15 3	Sand and soft clay.
		15 3 — 19 1	Hard clay.
16	16 1	0 — 11 0	Sand and soft clay.
		11 0 — 16 1	Hard clay.
17	13 4	0 — 8 4	Soft clay and stones.
		8 4 — 13 4	Hard clay and stones.
18	9 6	0 — 7 6	Sand and soft clay.
		7 6 — 9 6	Hard clay.
19	9 8	0 — 5 6	Sand and soft clay.
		5 6 — 9 8	Hard clay and stones.
21	7 9	0 — 5 0	Sand and soft clay.
		5 0 — 7 9	Hard clay.
23	9 1	0 — 6 0	Sand and soft clay.
		6 0 — 9 1	Hard clay and stones.
25	10 3	0 — 5 9	Sand and soft clay.
		5 9 — 10 3	Hard clay.
27	6 7	0 — 4 3	Sand and soft clay.
		4 3 — 6 7	Hard clay.
29	4 10	0 — 3 0	Sand and soft clay.
		3 0 — 4 10	Hard clay and stones.
31	4 11	0 — 3 6	Soft clay.
		3 6 — 4 11	Hard clay and stones.
33	6 11	0 — 3 0	Soft clay.
		3 0 — 6 11	Hard clay and stones.
37	4 3	0 — 1 9	Sand and soft clay.
		1 9 — 4 3	Hard clay and stones.
39	6 7	0 — 3 0	Sand and soft clay.
		3 0 — 6 7	Hard clay and stones.
41	4 11	0 — 2 10	Sand and soft clay.
		2 10 — 4 11	Hard clay and stones.
43	16 1	0 — 10 0	Sand and soft clay.
		10 0 — 16 1	Hard clay and stones.
45	2 0	0 — 2 0	Hard clay and stones.
47	3 6	0 — 1 0	Soft clay.
		1 0 — 3 6	Hard clay and stones.
49	9 7	0 — 5 0	Sand and soft clay.
		5 0 — 9 7	Hard clay and stones.
51	6 6	0 — 2 0	Soft clay.
		2 0 — 6 6	Hard clay and stones.
53	Nil	Rocky	—
55	Nil	Rocky	—
57	2 8	0 — 1 0	Soft clay.
		1 0 — 2 8	Hard clay and stones.
59	Nil	Rocky	—
61	Nil	Rocky	—
63	7 3	0 — 4 0	Soft clay.
		4 0 — 7 3	Hard clay and stones.

NOTE:—The strata referred to as sand and soft clay varies from a mixture of sand and silt on the surface to a blue clay with sand which hardens on exposure.

The hard clay varies from brown to red in colour and is washed up in lumps with small edged stones (not pebbles) embedded and appears to resemble what in the dry state forms the murram in the hills around Bombay.

Beneath this there appears to be a similar soil but with larger stones not removable by wash boring.

Borings carried out during week ending Wednesday, 7th February, 1923.

AREA " A "—Point 41.

Total depth of bore 14 feet 6 inches.

0 in.— 6 in.—hard yellow clay and small stones.
6 in.— 2 ft. 6 in.—black sand.
2 ft. 6 in.—11 ft. 0 in.—sand and clay.
11 ft. 0 in.—14 ft. 6 in.—rock.

AREA " B "—Record of borings with Calyx drill.

Point Number.	Total depth reached.	——	Remarks as to nature of material found.
	Ft. ins.	Ft. ins. Ft. ins.	
34	18 6	0 — 5 0	Sand stone.
		5 0 — 7 0	Hard yellow clay with stones.
		7 0 — 17 6	Soft red clay.
		17 6 — 18 6	Hard rock.
5	17 0	0 — 2 0	Sand stone.
		2 0 — 14 0	Soft clay.
		14 0 — 17 0	Rock.

(VIII.)

Design and Alleged Porous Nature of Rubble Mound.—Note by Sir George Buchanan.

The wall was properly designed, with small material, *i.e.*, the run of the quarry in the middle, and large stones outside, and properly constructed, the wall should have blinded itself, because the silt-laden water would have filled up the small interstices and made the wall watertight.

Naturally above the filling, tidal water will flow through the wall.

If the wall was not built to plan and specification it was the fault of the engineers on the job, and particularly Mr. Elgee, who was in charge of the Marine Lines section, and Mr. Billington, at Colaba.

On my inspection I frequently pointed out that we did not want all big stones in the middle, and that what was required was the run of the quarry.

When dredging started the material was particularly good, and so far as I could see very little was being lost through the wall, and on the occasion when I was asked if certain blinding was required I pointed out I would rather have the material elsewhere, but I distinctly remember on several occasions pointing out to Mr. Billington and Mr. Lewis and, I think, to Mr. Brims; but of that I cannot be certain, that if material was escaping anywhere it was down the large storm-water drain and that this should be closed. When at a later date it was apparent to the engineers on the spot who were looking at the work all day that large quantities of material were escaping through the wall, it was their obvious duty to take action. I understand Mr. Brims, the superintendent of dredging, asked repeatedly that this should be done, but Mr. Elgee refused, and our engineer, Mr. Settle, when in Bombay in December, 1924, reported to us that even at that date no proper action had been taken.

Letter dated 24th January, 1924, from Chief Engineer to Sir G. Buchanan.
(Through the Director of Development.)

DEAR SIR,

IN a discussion in Sir Lawless Hepper's room a few days ago it was suggested that the rubble mound should be lined on the inside with a layer of quarry spoil to prevent any leakage of dredged material. Would you agree to have this spoil placed in position from the present time onwards? If this can be done the disorganisation of the quarries due to the curtailment of programme will be mitigated and use can be made of a by-product which otherwise has to be found room for with some difficulty and at some expense.

I propose a thickness of 3 feet of spoil.

Yours faithfully,

(Sgd.) LL. W. LEWIS,
Chief Engineer.

Letter dated the 28th January, 1924, from Sir George Buchanan, K.C.I.E., to the Chief Engineer, Reclamation Branch.

(Through the Director of Development.)

DEAR SIR,

No. 371.

Reference your letter dated 24th January, 1924.

I AM not in favour of beginning at present the lining of the rubble mound on the inside with quarry spoil. I believe that later on when the reclamation towards the wall is more advanced, it may be desirable to put a lining on the inside up to H.W. Neap Tides only, but any small stuff deposited now would I am afraid be dispersed and washed away. In the matter of making immediate use of your quarry spoil, I consider a great deal could be utilised in the reclamation of the area between the old foreshore line and the railway embankment (*vide* my letter dated 21st January).

Cross Bunds.—With reference to my decision to delete the cross bunds from the programme, it seems to me that as the dredger "Kalu" will not work in Back Bay this season, work might very well be suspended on the cross bund now in course of erection at Marine Lines. The only object to my knowledge in making this bund was to facilitate dredging operations in the absence of the storm-water drain, but by next season when dredging begins the storm-water drain will be finished. There is, I believe, some 5,000 tons of stone still to be deposited to finish the work, so that a saving could be effected by stopping the work of, say, 30,000 rupees.

Yours faithfully,

GEO. C. BUCHANAN.

(IX.)

Alleged Inadequacy of Dredging Plant.—Statement by Sir George Buchanan, K.C.I.E., Dated 18th November, 1926.

With reference to Sir Frederick Hopkinson's question asking me how, with the plant available, I proposed to reach with the pipe lines the extreme points in the reclamation area, my explanation is as follows:—

Plans Numbers 3067 and 3068 (copies appended hereto*) were sent to the builders with full particulars of the work to be done, and they were asked, on these plans and particulars, to submit an estimate for dredging plant suitable for the work.

In the first instance, as explained to the Committee, and in accordance with the usual practice of Consulting Engineers, an estimate was obtained from Messrs. Wm. Simons & Co., Ltd. They had designed the "Jinga" and "Kalu" for work in Bombay Harbour in material similar to that for which the Back Bay dredger was required; they had also designed the dredgers for the Burma Government, used in the Twante Canal, which had worked most successfully under my supervision in Mesopotamia—and I approached them feeling that I should get a practical proposition.

Messrs. Simons & Co., submitted a tender for a dredger capable of discharging at the rate of 2,000 cubic yards of soft clay per hour through a floating pipe line to a distance of 5,000 feet; an intermediate stage pumping station capable also of delivering to a distance of 5,000 feet; 5,000 feet of floating discharge pipe, and 8,500 feet of shore piping, this latter being sufficient to cover the whole area. It was realised by me that the total distance that the material would have to be conveyed exceeded, in some cases, 10,000 feet. This aspect of the case was discussed by me with Messrs. Simons & Co., and it was agreed that an auxiliary shore booster, estimated by the firm to cost three lakhs of rupees, might be necessary, but that consideration as to its purchase might be deferred until work had actually been put in hand. It will be noted that on p. 30 of my project report of 1919, the three lakhs provision is indicated clearly in the difference in cost between the dredger and one shore delivery, and the same dredger and two shore deliveries.

It must be borne in mind that it is unnecessary for the pipe line to extend to the extreme points of the areas to be reclaimed as the water-borne material spreads for a considerable distance in front of the pipes.

It was expected to complete the Colaba area without the additional land booster, by extending the pipe line for a few hundred feet. Such extension would not have affected the output appreciably; any falling off in deliveries would have been compensated for by increased outputs through lengths of less than 5,000 feet.

* Not reproduced.

The Marine Lines area contains 2½ million cubic yards beyond the actual 5,000 foot radius, and whether the reclaiming of this area justified the purchase of an additional shore booster was, as I have already stated, a matter that might be well left over for future consideration, and in my report I had pointed out that by increasing the number of intermediate pumping stations there would be no difficulty in discharging any distance.

The estimate for the dredger, one booster and 13,500 feet of pipe line, plus working expenses, came to 5.90 annas per cubic yard, whilst in the general estimate 8 annas was allowed to provide for contingencies of this nature.

Tenders from other firms for dredging plant were taken in February 1920, by my partner the late Mr. C. S. Meik during my absence in India.

Messrs. Simons & Co's. tender, including 10 per cent. for extension of time to March 1920, amounted to £496,650 against the tender submitted by Messrs. Lobnitz & Co. for £840,000. It is correct that Messrs. Lobnitz & Co's. tender included 19,000 feet of pipes as against Messrs. Simons & Co's. 13,500 feet and two dredgers as against Messrs. Simons & Co's. one dredger and an intermediate pumping station on a pontoon, but Mr. Meik probably weighed the extras contained in Messrs. Lobnitz' tender against the cost, and formed the opinion that the proposals of Messrs. Simons & Co., were sufficient for carrying out the work. Hence his cablegram to me in Bombay.

(X.)

Dates of Sir G. Buchanan's visits to Bombay. Put in by himself.

1919 :
Arrived Bombay, 19th May.
Left Bombay, 31st May.
Arrived Bombay, 15th November.

1920 :
Arrived Bombay, 15th November.
Left Bombay for Burma, 18th December.

1921 :
Arrived Bombay, 9th January, from Burma.
Left Bombay for London, 19th February.
Left London for Bombay, 17th November.
Arrived Bombay, 3rd December.
Left for Baroda, 9th December (evening).
Arrived Bombay, 11th December (morning).

1922 :
Left for Kutch, 9th January.
Arrived Bombay from Kutch, 20th January.
Sailed for London, 25th February.
Arrived Bombay, 4th December.
Went to Calcutta for Christmas holiday, 22nd December.

1923 :
Arrived Bombay, 1st January.
Left Bombay for London, 20th January.
Arrived Bombay, 13th July.
At Mussoni, 15th to 21st July.
Went to Baroda, 28th July (evening).
Arrived Bombay, 30th July.
Left Bombay for London, 11th August.
Arrived Bombay, 28th December.

1924 :
Left for Baroda, 5th January (night).
Arrived Bombay, 8th January.
Left for Dwarka, 12th January.
At Bombay, 17th January.
Left Bombay for London, 16th February.
Arrived Bombay, 24th October.
Went to Dwarka, 15th November.
Arrived Bombay, 20th November.
Left for Nagpur for Christmas holidays, 23rd December.

1925 :
Left Bombay for Australia, 7th January.

(XI.)

Letter dated 14th February, 1921, from Sir G. Buchanan to the Director of Development.

MY DEAR HEPPER,

I send herewith the draft programme of operations which completes the various items I said I would dispose of before leaving for England.

Yours sincerely,
(Sgd.) GEORGE BUCHANAN.

Enclosure.

BACK BAY RECLAMATION SCHEME, BOMBAY.

Programme of Operations.

We are now in a position to summarise what has been done in the preliminary stages and to formulate a programme for the immediate future.

Tenders have been received from contractors for the building of a concrete block wall 8,000 feet long at Colaba, but as no tender was satisfactory from either the economic or technical point of view and the best source of supply of stone is undoubtedly the Government quarries now being opened out at Kandivlee, it has been decided to revert to the original design, for a rubble wall with the exception of the first 2,000 feet, and to carry out the work departmentally. The first 2,000 feet will be of concrete in mass as originally intended.

On the assumption that actual wall construction at both ends will begin early in October, the following works will have to be executed before that date.

Quarries.

The greater part of the machinery has been ordered and will be coming forward within the next few months. Work to be put in hand comprises erection of machinery, workshops and power house, construction of quarters for staff and workmen, laying of railway sidings and connection with the B.B. & C.I. main line, opening out working face at quarries and general organisation of operations to ensure an output of 800 tons per diem. The latter figure constitutes a large quarry and entails a highly efficient organisation.

Chowpatti and Marine Lines.

Between these two points will be situated the main depot and works construction yard. The first and most urgent work is the connection with the B.B. & C.I. Railway at Chowpatti and the laying out of the yard sidings which will require to be sufficient to deal with stone trains for Marine Lines and for Colaba respectively and also general traffic in connection with the works.

There will be considerable work in connection with erection of machinery, store sheds, cement sheds, staff and workmen's quarters, etc., and general preparations for construction.

Colaba.

It is intended to utilise the stone from the reef for the 2,000 feet of mass concrete wall and it will be necessary to erect stone crushers, concrete mixers, cranes, collect sand and cement, make arrangements for shuttering and provide accommodation for staff and workmen. A light railway will also be required from the mixers to and along the wall. It is hoped to build the 2,000 feet of wall in one working season and meanwhile the through railway line along the foreshore and foreshore road to connect with the line from Chowpatti will be put in hand and must be ready for the working season 1922-23.

Permanent Works.

It is confidently hoped to begin work at both ends on the 1st October, 1921, on the following lines:—

Marine Lines.—The sequence of operations will be as follows:

(1) Drive gantry piles and construct gantry.

(1A) Lay apron of large stones on 2 feet of small 20 feet wide, at the toe of the wall on the sea side.

(2) Tip rubble stone from wagons on gantry.

(3) Build on rubble mound, mass concrete superstructure.

Once the work is in full swing, we shall aim at advancing at the rate of 30 feet per diem and to complete 3,000 lineal feet in the season, but that entails driving 8 to 10 gantry piles a day and handling and fixing 375 cubic feet of timber, depositing 16,000 cubic feet of stone rubble and placing 142 cubic yards of concrete in the wall.

These figures are given to show that the task is by no means a light one.

Colaba.—We shall be well satisfied if the 2,000 feet of mass concrete wall is finished in the season of 1921-1922 and arrangements will be made to proceed in 1922-23 exactly as specified above for Marine Lines.

Dredger and Pipe Lines.—The dredger under present arrangements will probably arrive about October, 1922, but meanwhile there is an immense amount of work to do in laying the three pipe lines across the peninsula. The longest and most difficult line is that which runs from the Harbour down Ormiston Street through the Y.M.C.A. Grounds under the B.B. & C.I. Railway to the north of the Baths and thence along the ride to a point between Church Gate Street and Marine Lines Station. This work can probably be let by contract for a portion of its length. The other two pipe lines present no difficulty.

The dredger will probably begin operations at Colaba Point, discharging through pipe line No. 1, and I hope that some 200,000 square yards will be reclaimed in the working season 1922-23.

Other work.—A work which is not urgent but must be arranged for is the prolonging of the storm water drains from the present sea-front to outside the new wall.

It should be noted that the programme outlined above does not include the East Colaba Reclamation, and if this is to be taken in hand in the near future by the Back Bay staff, and we are to be entrusted with the working arrangements and supervision we should like to receive instructions as soon as convenient in order that we may arrange for the work to proceed without in any way interfering with the progress of the Back Bay Scheme.

(Sgd.) GEO. C. BUCHANAN.
15th February, 1921.

Letter dated 12th May, 1922, from Director of Development to Sir G. Buchanan.

MY DEAR BUCHANAN,

Your letters of 11th and 27th April. Lewis was in hospital for several weeks and has not been at all fit since he came out. In his present condition, he is not up to the job. He will go before a medical board before leaving and will, of course, have to be passed fit by the medical board at the India Office before he returns.

2. I went through the question about rolling stock, etc., with Lewis, and the result was the telegram he sent you. With the exception of the portal crane for Colaba, it seemed to me to be advisable to order the plant. Your remarks regarding the construction of the rubble mound at Colaba raised a question as to whether it would not be safer at Marine Lines to defer building the mass concrete wall until the rubble mound had had one monsoon to test it. Your reply to this is indefinite, but I do not think it wise to order the cement. We can probably get it later at the same price if necessary.

3. I several times suggested to Lewis that in view of the fact that no heavy protection blocks can be placed at Marine Lines before the monsoon, it might be better to defer the mass concrete wall at Marine Lines till next cold weather. My idea was that any weak points in the mound could be made good during the monsoon and no real damage could be done. On the other hand, serious subsidence or distortion of the mass concrete might be disastrous. I use the word from the political more than the engineering point of view. Criticism has died down but the critics and pessimists are there, and I am most anxious that no excuse should be given for a renewal of the agitation. Lewis, however, argued that the cement would go bad if not used, and in any case, both he and Elgee made light of my apprehensions and the work of constructing the mass concrete wall is feverishly proceeding. I hope they are right.

4. The stone tipped between the piles does not form much of a slope as the material seems to be jammed by the wood work. They are now tipping big stones on the outer face, and, although in my view, it still looks far from safe, I am hoping that the monsoon will be late and that it will be possible to make a good slope on the outer face of big stones before the attack begins. I do not like risks being run because as indicated in the preceding paragraph, I do not think we can afford them.

5. I am sorry the matter of reporting the arrival of the " Sir George Lloyd " and " Colaba " was overlooked. A telegram is being sent to-day.

6. The remarks about accounts, and also about additional engineering staff, in your report, were referred to Lewis immediately, and he was asked to consider them and to submit any recommendations he had to make. So far, he has produced nothing but he promises to let me hear before he leaves. In any case, as Mr. Reith wants the same pay as Elgee, I doubt if he can be employed.

7. After endless delays, the railway to Colaba has been begun and I hope that under a different regime it may be possible to get it finished by October. The progress at Colaba is disappointing, but I think Billinton has done wonders considering the few facilities he has, and the cramped nature of the situation. I attach for your information, copy of a note I recently sent to Lewis about the programme for next year.

8. As a result of your recommendation not to build the mass concrete wall at Colaba till year after next, Lewis now talks of beginning pumping in October, 1924! However, we can discuss that next cold weather.

I am not leaving Bombay until 8th July.

Yours sincerely,

(Sgd.) L. HEPPER.

Enclosure.

In view of your approaching departure on leave it is, I think, desirable that definite proposals for the programme of work to be carried out on the reclamation next season should be put on record.

2. So far, our energies have been directed mainly to the Marine Lines part of the work and at the commencement, in the absence of information as to the proposed layout, there was no particular reason for any special preference being given as between Marine Lines and Colaba.

3. Mr. Davidge's preliminary layout plan has, however, now been accepted in the main and it is evident, looking at the reclamation as a commercial proposition, that it is the portion of the reclamation from Colaba northwards as far as Mayo Road that is of the first importance, a view which receives further support from the agreement we have come to, to sell 265 acres at the southern extremity of the reclamation to the Military Department in an undeveloped state.

4. It is in fact now apparent that, in order to begin to realise money by sales to the Military and the public as early as possible, we must concentrate on Colaba and reclaim from the south by sections, the sections being conveniently formed by bunds following the main roads running at right angles to the sea wall.

5. Our progress to date, however, has been greatest at the Marine Lines end of the work, where 2,000 feet of wall has been constructed behind which we are not likely to do any filling for 6 or 8 years. The main question is whether we can continue the wall at Marine Lines next season without limiting the length of wall which we might otherwise construct at Colaba. If, by closing down Marine Lines next year, we can thereby do more at Colaba then there is, I think, a strong argument for adopting that course.

6. It is, I take it, mainly a question of the supply of stone which is definitely limited by our transport facilities, and I am anxious that the Colaba work should be treated as of the first importance, Marine Lines being looked on as secondary only, and that the former should not suffer by any mistaken desire for rapid progress at Marine Lines which to a certain extent amounts to putting our money in the wrong place at the present stage.

7. The reclamation behind the first 6,000 ft. of wall from Marine Lines will bring us no return, and economically speaking should have been left to the last. We cannot help that now, but we can adjust our future programme to enable us to start filling at the earliest possible date, areas which are to be sold. Subject to engineering requirements being met, it is obviously desirable, having regard to interest charges, to restrict expenditure, in the beginning to work which will be directly remunerative.

8. I shall be glad if you will consider the matter in the light of these remarks and let me have before you leave, your recommendations as to the programme for next year.

Deputy Director (to see)

Chief Engineer,
Reclamation Branch,

Letter dated 3rd June 1922, from Messrs. Meik & Buchanan to the Chief Engineer, Reclamation Department.

Reclamation Department,
Directorate of Development.

DEAR SIR,

We desire to address you on the subject of the relationship between yourself as the Resident Engineer, nominated by us for carrying out the Back Bay Reclamation Scheme, and ourselves as the Engineers of the Secretary of State in carrying out the scheme because we feel that we are not being kept in sufficient touch with the work or supplied with the information necessary for the due performance of the duties specified in our agreement with the Secretary of State. This has not always been the case, as last year after Sir George Buchanan's annual visit, we were kept fully informed by Mr. Lewis as to what was going on, and in addition to official letters he wrote a demi-official letter to Sir George Buchanan nearly every mail. This year, however, a veil appears to have dropped between us and since Sir George Buchanan left Bombay on the 25th February, we have practically had no news of any kind as to the progress of the works for which we are the Engineers, responsible to the Government of Bombay and the Secretary of State.

2. We beg to remind you that before leaving Bombay, at the end of February, Sir George Buchanan writing on our behalf as per copy enclosed, requested that we should be furnished with a monthly report and expenditure statement, and on the 12th April, we wrote from this office sending forms of progress report to be filled up. To neither of these letters have we received an acknowledgment.

3. In Sir George Buchanan's report to the Director dated 11th February 1922, and subsequently endorsed by us, a number of questions were raised which the Director in his letter dated 15th March, said would be taken up with you. We are anxious to know what action has been taken on each of the points raised by Sir George Buchanan, and in particular on the proposals contained in para. 41 of his report for concentrating on the following works :—

(1) Railway connection between Colaba and Marine Lines.

(2) Preparation of terminal arrangements at Colaba and purchase of end tipping wagons.

(3) On completion of Numbers 1 and 2, construction of stone mound to a distance of 10,000 feet from Colaba and cross bunds as required.

(4) Erection of dredger's floating pipe line and laying of the land pipe line for the dredger to serve that area.

4. In para. 27 of the report, Sir George Buchanan said it was impossible to fix a date for starting the dredger and that had it not been for the delays in beginning the work last season, he was of opinion that wall construction should have advanced sufficiently to make it worth while beginning dredging operations at the end of this year and that this possibility should still be kept in view, one pipe line being laid across the peninsula in order to be ready for eventualities.

The above proposals have our entire concurrence. We think a great effort should be made to advance the Colaba work sufficiently to do some dredging before the advent of the 1923 monsoon, and we cannot accept the views expressed by Mr. Lewis to the effect that no dredging should be attempted until the sea wall was complete up to the top. We adhere to our opinion that it would be quite practicable and indeed desirable to begin reclamation in the Colaba area so soon as the rubble mound had been deposited up to high water mark and we do not attach any importance to Mr. Lewis's fear that the areas under reclamation would be liable to be flooded by any tide higher than 86·25 because in any case the sea must pass through the porous rubble wall for a long time to come.

5. Other points on which information is desired are as follows :—

(*a*) On the 4th April, we wrote asking for a detailed report showing the points, raised by the Chief Inspector of Boilers, Bombay, for all boilers despatched, in order that we might take the matter up with the manufacturers in this country. We received an acknowledgment to this request in your letter dated 21st April 1922, but up to the present the report asked for has not been received.

(*b*) On the 24th November, we wrote to you with reference to the Ingersoll Rand contract, a portion of which was supplied from America, and we asked to hear whether the whole of the items embraced in the contract had been safely received. We are being pressed by the India Office for a reply to this question in order that they may close their files on the subject.

(*c*) We have not as yet received a copy of the Project Estimate which has presumably been submitted to Government, nor have we received the current Budget Estimate of Expenditure for the year 1922-23. We have not even been informed of the arrival of the dredger " Sir George Lloyd " or of the auxiliary dredger " Colaba "; the condition in which they were delivered or where they have been placed.

(*d*) In Sir George Buchanan's letter dated 22nd January to your address, he asked to be furnished with some information as to the quality of the Portland cement being used and we shall be glad to have a reply to that letter and some records of cement tests.

(*e*) When the works were started it was Mr. Lewis's expressed intention to obtain a complete photographic record of the progress of the works, and to that end three photographic cameras, complete with accessories and chemicals, etc., were purchased by Mr. Lewis at a cost of £234. One of these cameras is in use at the quarry where some valuable records have been taken but we have seen no photographs of the works at Marine Lines or Colaba.

(*f*) We are very anxious about the expenditure on the works and if Sir George Buchanan's recommendations have been carried out, you should by this time have a proper cost accounting staff without which it will be quite impossible to exercise economy and have a check on expenditure.

(*g*) We have heard unofficially, that Mr. Lewis has been a considerable time in hospital, and further that he was expected to take leave some time in May but we have no knowledge officially of any change.

6. Finally, we would say that we fully appreciate the difficulties you are encountering in carrying out departmentally a work of such magnitude and we should be the last people to contemplate adding to those difficulties.

We know that in the matter of details in connection with the execution of the works you are taking the place of the contractor and as far as possible the man on the spot must be allowed to use his unfettered discretion. That need not, however, prevent your keeping us fully informed as to the progress and cost of the works, and asking us to advise on all matters where you think you should be benefited thereby, because it is impossible to ignore that fact that under our agreement with the Secretary of State we are appointed the Engineers in carrying out the scheme and in the construction and execution of all works connected therewith until their final completion, and we are specifically instructed to assist and advise the Government of Bombay in all matters relating to the execution of the works and to perform all works and duties devolving upon Engineers of large works.

We are, dear Sir,

Yours faithfully,

(Signed) C. S. MEIK & BUCHANAN.

Letter dated 8th June 1922, *from Sir G. Buchanan to the Director of Development.*

(Confidential.)

MY DEAR HEPPER,

Since writing to you on the 3rd June, I have received your confidential letter of the 12th May.

With reference to the building of the mass concrete wall on the rubble mound at Marine Lines we have always been adverse to the proposal as we considered the rubble mound should have at least one monsoon to settle down. I argued the point at length with Lewis when I was in Bombay, and when he pointed out that if we adhered to our views it would wreck his programme of work for the season and that he proposed to finish a length of wall complete with the protection blocks on the outside, I rather reluctantly gave way.

On the 2nd March, before my arrival home, Mr. Meik wrote to Lewis as follows :—

" If you adhere to your intention of building the concrete wall or blocks on the rubble within a month or two after the rubble is deposited, you are certain to have a considerable settlement, perhaps a foot or more. In this case, the proposal, as on sketch No. 332, would be the best as the space intervening between the blocks will allow any irregularities in the front face of the wall to be made up better, but the cost would be rather higher than either of the other proposals."

On the 4th May we received a cablegram from Lewis in reply to a letter from us dated 11th April saying, amongst other things, and with reference to paragraph 6 in our letter—

> " . . . mass concrete wall is now under construction Marine Lines as originally arranged for and recognised in your report of 11th February, but heavy protection blocks cannot be placed before monsoon as portal cranes only now arriving full stop. As supplies cement for next year have to be arranged by end of May do you definitely recommend next season work Marine Lines should consist of 3,000 feet gantry and rubble mound only."

Paragraph 6 in our letter was with reference to Colaba only, and Mr. Meik and I were seriously concerned with the statement that heavy protection blocks at Marine Lines could not be placed before monsoon, but as at that date the monsoon was only two or three weeks off we gathered most of the work was finished and that it was, therefore, useless to make a protest. Further, as even in the monsoon there are a number of hours every day when the crane could work, we supposed that the outside protection blocks would be placed before there was any likelihood of much damage and we trust that this has been done.

Your letter amply confirms the fears I have already expressed in my letter of the 3rd June, and there is not the slightest doubt that a drastic change is necessary in administration and execution of the works, and if Lewis, either through illness or other cause, is unable or unwilling to carry out our instructions it will be better for every one if he does not return.

In the matter of dredging, it seems to me that for some reasons of his own, Lewis has made up his mind to delay operations as long as possible and to begin reclamation at Marine Lines instead of at Colaba. I am very disappointed indeed to hear from you that the railway to Colaba is only just begun because so far as I am aware there was nothing to prevent it being by this time very nearly finished.

Yours sincerely,

(Signed) GEO. C. BUCHANAN.

SIR LAWLESS HEPPER,
Directorate of Development,
Old Custom House Yard,
Bombay.

(XII.)

Note by Sir George Buchanan regarding the estimate on page 29 of the Report of 1919.

My estimate dated 1919 contains all the necessary information to enable any responsible person to form an opinion as to its reliability. It contains very much more detail than Mr. Kidd's estimate, although Mr. Kidd's was supposed to be a working estimate whilst mine was in point of fact the usual preliminary engineering estimate which an engineer makes to his client. It was accompanied by no working drawings and was not supposed to contain details.

Mr. Kidd, on the other hand, is supposed to have prepared and submitted a complete detailed working project, which was accompanied by 10 sheets of drawings. It was handed to me as such for examination and report. The Government of Bombay in sending this scheme to the Government of India had observed

> " the drawings might be considered as complete working drawings which would give sufficient information for examination of the design and for the immediate commencement of the work. All doubtful points had been settled and the revised estimate might be accepted as completely trustworthy and ample."

I repeat that Mr. Kidd's estimate was devoid of detail whilst mine was full of detail in comparison with the estimate of Mr. Kidd.

It is not usual for an engineer to explain in any greater detail than I have done how my estimate was prepared.

It contained at page 13 a comparison of Mr. Kidd's estimate of cost with my estimate of cost for 1912, and under Table B my estimate cost in 1919.

It also contained at page 29 the detailed estimate of the cost of the scheme on my lines, *i.e.*, number of cubic yards of concrete, rubble, concrete blocks, moorum filling, etc., etc., with prices affixed against each.

I will now describe how I arrived at my estimate to Mr. Kidd's scheme 1912.

In the first place it was necessary to take out a complete schedule of quantities for Mr. Kidd's scheme and although Mr. Kidd had given no such schedule in his report we were enabled to do so by taking Mr. Kidd's drawings and from them get out *de novo* the whole of the quantities contained therein. This we did and after putting our rates under each item we arrived at a total of 170·94 lakhs. To this we added Mr. Kidd's item of 59·45 lakhs for roads, lights, and drains, and engineers' and contractors' commission 11·51 lakhs.—Total 241·90 lakhs, against Mr. Kidd's 325·23 lakhs, and we came to the conclusion that Mr. Kidd had over-estimated the work to the extent of 83·33 lakhs.

We then went on to our own estimate and dealt with it in a similar way. We took out the whole of the quantities from information in our office and fixed what we considered were the correct rates and we arrived at a total of 367·71 lakhs.

Our estimate was based on an increase of 2½ times over 1912.

The information I obtained from Bombay and brought home with me is as follows :—

List of prices of work done on the Kennedy sea face in 1912-13 and 1919-20, obtained from Mr. Johnson, Executive Engineer Presidency, in charge of the Kennedy sea face works.

Letter from Mr. Messent, the chief engineer of the Port Trust, dated 30th May, 1919, with a list of prices in Bombay, for various classes of work in 1914 and 1919.

Rate for moorum filling, Improvement Trust Scheme, 1919.

Letter from Mr. Trench, Assistant Secretary to Government, P.W.D., Bombay, containing cost of rubble and cost of stone at Port Trust Quarries.

Note of Mr. Trench, Assistant Secretary, P.W.D., concerning cost of Kennedy sea face wall.

Note giving price of timber by Mr. Pearson.

Cross section of the Mazagon Sewri Reclamation wall, supplied by Mr. Messent, with note of the cost of concrete blocks, 1917 and 1919.

The above information, along with the many records in our office of the cost of works of all kinds enabled us to put prices to our schedule of quantities.

Note put in by Sir George Buchanan on 12th November.

Back Bay Reclamation Scheme—Note on Estimated Cost of Dredging.

In estimating dredging costs two factors must be considered, capital cost of plant per unit and working cost per unit. The capital cost naturally varies according to the quantity dredged, the greater the quantity the less being the capital cost.

In two dredging propositions of say 10 million cubic yards and 5 million cubic yards respectively executed by similar dredgers the capital cost per unit of the large scheme would be less than that for the smaller scheme, if the total cost of the plant was debited against each scheme.

Working expenses, however, are fairly uniform and comparisons can be made with different works.

In my 1919 report and estimate I calculated that capital cost of plant would be 3.24 annas per cubic yard and working expenses 2.66 annas—total 5.90 annas, but in my estimate I allowed 8 annas per cubic yard, an increase of 2.1 annas, or on the total the sum of Rs.32,81,250, say £218,000, whilst dividing 2.09 annas equally between capital and working expenses, we have capital cost 4.39 per cubic yard, working expenses 3.61 per cubic yard.

It has been freely stated that my estimate of 8 annas was too low because Mr. Kidd's tender, made in 1912, was 9 annas 3 pies per cubic yard.

I again assert most positively that my estimate was a reasonable one and that Mr. Kidd's was excessive.

Mr. Kidd gave no details in his tender but in the course of his evidence before the Committee said his dredging plant was estimated to cost in 1912 £287,625, which converted to rupees at 15 and divided by 24,162,463 comes to 2.86 annas per cubic yard. I consider his price for plant in 1912 high, but assuming that amount is allowed there is left for working expenses 6.39 annas against my figure in 1919 of 3.61.

The easiest way to see which figure is correct is to take reliable figures of cost of dredging executed elsewhere about that time and I will therefore quote figures in my possession which I used to check my estimate.

Twante Canal, Burma.—This project was the nearest in approach to the Bombay Scheme.

Three suction cutter pipe line dredgers were used, the material was clay and silt, and the total working expenses for the 6 months ending 30th June, 1915, was annas 1.83 per cubic yard and for the previous 6 months 1.88 annas per cubic yard, and from the beginning of the work in 1912 the dredgers had excavated 10,420,000 cubic yards, the total working expenses being 2.01 per cubic yard.

To take some more examples from my records—

Dredger " Pelican."—The suction pump dredger " Pelican " working in Rangoon in 1912 and 1913 in sand and silt, moved two million tons at a total cost for working expenses of 1.90 annas per cubic yard.

The Suction Dredger " Bolari."—This is a large suction hopper dredger working on the Hooghly and an analysis of her work in 1914 gave total working expenses of 8.40 pies per cubic yard.

The Suction Cutter Pipe Line Dredger " Foyers."—Working in Bengal in 1914 moved 3,200,000 cubic yards at a total working cost of 10 pies per cubic yard and working from 1908 to 1915 moved 14,230,000 cubic yards at a total working cost of 1.16 annas per cubic yard.

These examples from actual work done are, I think, sufficient and surely with these figures before me I was justified in thinking Mr. Kidd's estimate of 7.12 annas most excessive and my estimate of 3.71 annas ample—the difference between Mr. Kidd and myself on the whole 25 million cubic yards being Rs.53,22,000 or over £350,000.

I have no information in detail as to the cost of dredging in Bombay on the Back Bay Scheme and am perfectly satisfied that with proper organisation and continual working enormous economies can be effected.

(XIII.)

Letter dated 31st July from Sir George Buchanan to Lord Lloyd.

DEAR SIR GEORGE,

I began a letter to Your Excellency some time ago but decided, as Sir Lawless Hepper was on his way home, to wait until I had seen him as I know you have quite sufficient worries without my adding to them.

At our last meeting in Bombay I told Your Excellency that there seemed to be some misapprehension as to our position, that Mr. Lewis appeared to be regarded as the chief engineer in fact as well as in name and that at the meeting of the Advisory Committee I was not even introduced to the members.

After my return home we were very much concerned at the absolute cessation of all letters and reports from Mr. Lewis, and on the 3rd June, 1922, I wrote a strong letter of remonstrance and sent a copy to Sir Lawless Hepper. Since then, and I think principally because Mr. Lewis has gone on leave, the veil has been lifted and we are getting our reports by nearly every mail.

Sir Lawless Hepper called here on the 26th instant, and I showed him a letter, of which I enclose a copy, the original having been despatched. The letter speaks for itself, the gist of it being that we should like to do our job according to our reading of the agreement, but Mr. Lewis, either through ill-health or a misconception of our position has been keeping us in the dark and treating us as consultants.

Sir Lawless Hepper now takes our view and the matter will have to be cleared up if and when Mr. Lewis returns to duty.

I am leaving for South Africa next week to report on a very large harbour scheme for the Government of the Union of South Africa but it will not interfere with my usual visit to Bombay, and as Your Excellency will see from our letter we wish to send out ahead of me a particularly experienced member of our staff to collect information and be ready to assist me on my arrival.

I have written this letter because I know how very interested Your Excellency is in everything connected with the Back Bay Scheme, and believe you will like to hear of any difficulties direct from me.

Yours sincerely,

(Sgd.) GEO. C. BUCHANAN.

HIS EXCELLENCY SIR GEORGE LLOYD, G.C.I.E., D.S.O.,
Governor of Bombay.

Enclosure.

26th July, 1922.

To, THE DIRECTOR OF DEVELOPMENT.

DEAR SIR,

We have the honour to acknowledge receipt of your letter No. D.B. 164, dated 4th July, 1922, forwarding project estimates for the Back Bay and East Colaba Reclamation Schemes, on which we beg to make the following observations.

Back Bay Scheme.

The estimate accompanying Sir George Buchanan's 1918 report amounted to lakhs 367.61 which was increased by Government to four crores. In June, 1921, Mr. Lewis, the Chief Engineer, Reclamation Branch, prepared a revised estimate amounting to lakhs 703.17 which was only submitted to us demi-officially, and we could therefore only express demi-officially our disagreement with the figures and our surprise that the estimate should have been prepared without our knowledge.

In 1922, Sir George Buchanan, after a very complete investigation, made a report dated 11th February, 1922, accompanied by a revised estimate amounting to a nett cost of lakhs 598.89. This estimate was prepared as far as possible in consultation with the Chief Engineer, Reclamation Branch, and from actual costs of the work at the time, but it was understood that in order to conform to the rules of the Government of India in the Public Works Department, what is known as a detailed project estimate would be required which was to be prepared in the office of the Chief Engineer, Reclamation Branch. The total nett amount of this project estimate is lakhs 697.79, or lakhs 98.90 over and above Sir George Buchanan's estimate and the accompanying sheet shows the comparison under the various heads. The chief difference is under roads, lights, and drains. The original pre-War estimate was 75 lakhs which Sir George Buchanan increased to 135 lakhs. Mr. Lewis has gone into the matter in more detail and estimates, roughly, the cost at 211.91. This figure is an enormous one and cannot be accepted without careful examination and a great deal more information.

Another matter that attracts our attention is the estimate of 18.70 lakhs over and above Sir George Buchanan's estimate for the sea wall on rubble mound, and we notice that the Chief Engineer, Reclamation Branch, has allowed 9,811 hundred cubic feet of concrete more than Sir George Buchanan and 161½ tons of steel reinforcement which was not included in our design.

We most respectfully suggest that having regard to the difference in the project estimate and the revised estimate Sir George Buchanan prepared last February, it would have been reasonable if the Chief Engineer, Reclamation Branch, had furnished us with a copy of his estimate and allowed us to make our comments on the same before its submission to your Government.

We are afraid that there exists a misapprehension as to the relationship between the Chief Engineer and ourselves or it may be that we have misinterpreted our agreement with the Secretary of State in which case we shall gladly conform to your reading of the terms. According to the memorandum of agreement we agreed to act as the engineers to the Secretary of State in carrying out the said scheme and in the construction and execution of all works connected therewith until their final completion. We were at all times to assist and advise the Government of Bombay in all matters relating to the execution of the works and were to supervise the same and undertake all works and duties devolving upon engineers of large works. The agreement further provided that a Resident Engineer and a Deputy Resident Engineer should be nominated by us to carry out the details of the work in accordance with our instructions, subject to the control of the Director of Development or other official appointed by the Government of Bombay.

We understand that the Resident Engineer has had his title changed to Chief Engineer, Reclamation Branch, because there would probably be other works than the Back Bay Scheme to perform, but the change of title does not presumably affect his relationship to ourselves, and on every point connected with the design of the work we expect instructions to be taken from us. The Chief Engineer, Reclamation Branch, has, however, in his project estimate report, called us the Consulting Engineers in which case he, as the Chief Engineer, would only consult us when he felt disposed so to do.

Another point on which we desire guidance is the amount of supervision and control expected from us in connection with the execution of the works as apart from the design. The work being done departmentally, the Chief Engineer takes the part of the contractor and if a contract had been let for a fixed sum we should not have interfered with the contractor's discretion in the matter of plant or details of construction unless we thought the ultimate completion of the work would be affected. On the other hand, if the contract had been let on a time and line basis we should have considered it to be our duty to scrutinise all arrangements and all expenditure.

We interpret our agreement to mean that we are the actual responsible engineers, that we are designing all the works and that whilst in the various details for carrying out the work a fairly wide discretion should be left to the Chief Engineer, we must be kept in continual touch with all that is going on and allowed to express our views, and if necessary criticise the Chief Engineer's actions. If our interpretations meet with the approval of Government we suggest that it should be made clear by you to the Chief Engineer, Reclamation Branch, and an end thus put to a misunderstanding which must give rise to friction and will certainly interfere with the successful and efficient carrying out of the work.

We may add that we have under consideration to send out at the end of the monsoon the Senior Engineer on our staff, a gentleman with great experience in the practical carrying out of work to make a thorough investigation on our behalf and gather together information to be placed before Sir George Buchanan on his arrival at Bombay, but this can only be done if we have the willing co-operation of the Chief Engineer, Reclamation Branch, who, if he wishes to do so, can make not only our assistant's visit but Sir George Buchanan's visit fruitless.

East Colaba Scheme.

We note that Government have not appointed us Engineers for this project and trust that this is not a final decision as we see our way to making considerable saving on the project estimate. We would also point out that the two schemes are so closely allied as to really form one work, especially as construction will be proceeding on both at the same time; the same plant is to be used, the same source of supply, along with the same engineering and supervising staff; questions will constantly arise equally affecting both schemes and it will be almost impossible for the engineers of the one scheme to be unconnected with the other.

We may add that we are quite willing to meet your Government in the question of fees which do not concern us so much as the difficulties we see before us if we do not control, for engineering purposes, the construction of both projects.

We are, dear Sir,
Yours faithfully,
(Sgd.) C. S. MEIK & BUCHANAN.

(XIV.)

List of Drawings of Works prepared by Messrs. C. S. Meik and Buchanan in London and sent to Bombay.

COLABA SECTION (CONTRACT).

Drawing No.	*Date.*	*Description.*
*	Dec. 1920.	Specification.
3164	18.11.20.	Plan with contours showing position of wall.
3165	18.11.20.	Section on line of sea wall, South Colaba.
3166	18.11.20.	Cross-sections of ground to be reclaimed.
3167	18.11.20.	Three sections of wall—details of parapet, coping, tidal flaps, etc.
3168	18.11.20.	Longitudinal and cross-section of rubble cross bank.
3314	12.1.22.	Plan and sections of proposed arrangement for transferring stone,
3315	12.1.22.	from side to end tip wagons.
3321	2.2.22.	Proposed arrangement for tipping—Colaba wall—showing concrete pier and steel girders.
3322	2.2.22.	Proposed arrangement for tipping—Colaba wall—showing rubble mound.
3323	2.3.22.	Proposed arrangement for tipping—Colaba wall—showing elevations.

NORTH SECTION—MARINE LINES.

*	16.11.20.	Specification.
3169	18.11.20.	Enlarged plan of blockyard.
3170	18.11.20.	Cross-section of cross-wall in moorum.
3180	18.11.20.	General plan with contours showing line of wall.
3181	18.11.20.	Longitudinal section on line of wall.
3182	18.11.20.	Three cross-sections of wall on rubble bank.
3183	18.11.20.	Two sections showing crane road and timber gantry also temporary work.
3184	18.11.20.	Plan and sections of pipe lines (3) through Peninsula. (3 No. drawings.)
3185	18.11.20.	Plan section and elevation of timber moulds for blocks.
3186	18.11.20.	Plan section and elevation of reinforced concrete blocks.
3187	18.11.20.	Borings in harbour, copies from L.K. & Co.'s plan.
3188	18.11.20.	Sections 19, 20 and 21, copies from L.K. & Co.'s plan.
3189	18.11.20.	Plan showing blockyard, works, sidings, etc.
3243	14.4.21.	Plan showing alternative position of pipe line No. 3.

Drawing No.	*Date.*	*Description.*
3244	26.4.21.	400 ft. plan of Bombay showing scheme of operations with dredging and filling quantities thereon.
3257	23.6.21.	Plan of Back Bay showing rock outcrop, soundings and line of wall.
3259	24.6.21.	Section of wall with detail of parapet as amended.
3330	2.3.22.	Construction of sea wall.
3331	2.3.22.	Construction of sea wall—first alternative proposal.
3332	2.3.22.	Construction of sea wall—second alternative proposal.
3409	20.4.23.	Plan showing storm water drains.
3414	20.4.23.	Cross-section of proposed blockwork drain.
3415	20.4.23.	Average cross-section of No. 7 drain.
3411	4.5.23.	Plan of proposed programme for commencement of dredging.
3431	21.6.23.	Cross-section of Marine Drive showing levels.
3411	27.7.23.	Plan of proposed programme for commencement of dredging.
3428	27.7.23.	Borings in Back Bay.
3437	1.8.23.	Plan of Back Bay showing position of levels required.
3463	8.11.23.	Plan showing proposed programme of work to complete wall and dredging.
3466	8.11.23.	Plan showing position of cables in Back Bay.
3470	13.12.23.	Part elevation of parapet wall.
3471	13.12.23.	Details of parapet.
3472	13.12.23.	Proposed pier in Back Bay.
3456	13.12.23.	Proposed steps in sea wall.
3459	13.12.23.	Proposed steps in sea wall and pilaster.
3474	4.1.24.	Plan of Back Bay giving dimensions for lay-out of roads.
3475	4.1.24.	Plan of Back Bay showing position of cables.
3496	8.5.24.	Plan of dredging in Back Bay.
3610	12.2.25.	Reference plan to fix position of dredger in progress reports.

EAST COLABA RECLAMATION.

*	23.10.23.	Specification.
3454	20.9.23.	Plan showing proposed position of New Military Pier.
3460	30.10.23.	Plan showing sea wall and sections of wall.
3461	30.10.23.	Details of drains and coping.
3616	19.3.25.	Cross-section of mound and wall, showing proposed reduction in width.
3435	27.6.23.	Proposed lay-out, plan and section.

GENERAL.

Numerous other drawings in connection with the ordering of plant not included in the above.

(XV.)

Extract from Sir George Buchanan's Diary.

8th February, 1921.

Meeting with Hepper at 11 a.m. to discuss the tenders for the Colaba contract. Lewis present and all agreed it should be departmental.

(XVI.)

The question of the single stage pump on the "Sir George Lloyd."—Statement by Sir George Buchanan.

Sir Frederick Hopkinson asks why a single stage pump was used at Bombay whereas at Rangoon there was a double stage pump.

There was not a double stage pump at Rangoon. There were two pumps.

Why the "Sir George Lloyd" had a single stage pump instead of a double stage pump is a question which should be addressed to the Builders and to Sir John Biles, the Naval Architect.

(XVII.)

Supply of 20-ton crane.—Letter of 16th November, 1920, from Mr. C. S. Meik to Sir G. Buchanan.

DEAR BUCHANAN,

Bombay Back Bay Reclamation Scheme.—Cranes.

As no doubt Lewis has told you, he has now got the orders placed for practically the whole of the machinery, including the cranes.

In the matter of the cranes, I have been into the whole question with Lewis and we have come to the conclusion that it would be better to defer ordering the cranes to deal with the concrete blocks until it is ascertained whether or not we are going to get really sufficiently large stone from the quarry to protect the sea face. I enclose you a memo. that Lewis has handed me in this connection and with which I cordially agree. There is no doubt that if we can get stone of large enough size from the quarry it will mean the saving of a great deal of money.

* * * * * *

* * * * * *

Yours truly,

(Sgd.) C. S. MEIK.

Enclosure.

16, Victoria Street,
Westminster, S.W.1.
15th November, 1920.

Messrs. Ransomes & Rapier, Ltd.,
32, Victoria Street,
Westminster, S.W.1.

DEAR SIRS,

With reference to your letter, No. 11,671, of 12th November, 1920, I am recommending the Director-General of Stores, India Office, the acceptance of your tender for—

		£
Item 1.	5-ton crane at	3,500
Item 2.	Seven No. 7-ton cranes at £2,850 each	19,950
Item 3.	One 20-ton Portal Steam Crane, max. radius 50 ft., 12 ft. 6 in. gauge track	10,450
		£33,900

all packed for shipment overseas and delivered f.o.b. London.

You will receive formal contract from the Director-General of Stores, India Office. Inspection will be arranged for by Messrs. C. S. Meik & Buchanan on hearing from you of the completion of the cranes.

Yours truly,

(Sgd.) LL. W. LEWIS.

(XVIII.)

Correspondence regarding bonus to dredging staff.

26th February, 1925.

(Through the Director of Development.)

THE CHIEF ENGINEER,
Reclamations Branch,
Development Directorate,
Old Custom House Yard,
Bombay, India.

DEAR SIR,

Bombay Back Bay Reclamation Scheme.

Dredging.

We regret to note from your weekly dredging reports that the output of the " Sir George Lloyd " continues so low, the average hourly output to the date of your last

report, 6th February, gives only 43 per cent. of the designed capacity of the dredger. You have no doubt been able to form a definite opinion as to the cause or causes of the low output and we shall be glad therefore if you will let us have all information on the matter so that we can consider it before taking up the matter with the builders.

The builders' specification states "The dredger is to be capable, under ordinary working conditions, of excavating 2,000 cubic yards per hour of soft clay from depths up to 70 feet below water level and delivering the spoil through a floating steel pipe line 5,000 feet long to an intermediate pumping station."

And of the "intermediate pumping station" the specification states "The dredging pump is to be capable, under ordinary working conditions, of discharging 2,000 cubic yards per hour of soft clay through a pipe line 5,000 feet long to a height of 16 feet above water level."

The two main factors therefore to be considered as affecting the question of output are:—

(*a*) The actual working conditions, and whether they are such as may reasonably be considered to be covered by "under ordinary working conditions" of the specification.

(*b*) The working lengths and height of the discharge pipe.

With regard to (*b*) the total length of pipe line has not, since the resumption of dredging operations this season, according to the weekly reports, exceeded 9,768 feet—the total length for week ended 8th January should be 8,943 feet. Except during week ending 1st January, when the output reached 1,133 cubic yards per hour the length of the pipe line between the dredger and "Colaba" has exceeded 5,000 feet.

The maximum output during this season of 1,222 cubic yards was obtained during week ended 18th December, 1924, when the length of pipe line between the crafts was 5,389 feet, or 389 feet longer than the specified length, though the total length of the line was only 9,271 feet.

The minimum output of 613 cubic yards, except week ended 11th December, 1924, occurred during week ended 6th February, 1925, when the lengths of the pipe line were 5,781 feet and 3,987 feet, or a total length of under 10,000 feet.

These facts are better realised by comparing them as follows:—

Week ended.	Length of Pipe.			Average hourly output for week.	Pumping time percentage of total working time.
	Dredger to Intermediate Pumping Station.	Intermediate Pumping Station to end of pipe line.	Total.		
	L. ft.	L. ft.	L. ft.	C. yds.	
December 18th, 1924	5,389	3,882	9,271	1,222	67·71
January 1st, 1925	4,821	3,882	8,703	1,133	57·78
January 29th, 1925	5,701	3,957	9,658	799	65·87
February 6th, 1925	5,781	3,987	9,768	613	71 37

Assuming that the conditions of working, except the lengths of the pipe line, and the weekly methods of measurements, during the period under review were similar, it is difficult to account not only for the low hourly output but also for the wide weekly variations in the output.

We note the actual pumping time is 67 per cent of the total time worked.

As the output of the dredger and auxiliary craft so largely depends upon the dredging staff, you have no doubt arranged to pay bonus on the output and we shall be obliged if you will let us have a copy of the bonus conditions, also particulars of the method of measurements adopted as the basis of payment and for weekly progress.

We should also like to have a weekly progress return for the "Kalu" similar to that for the "Sir George Lloyd."

The areas in which it is proposed to dredge on the harbour side are shown on a plan which accompanied Sir George Buchanan's report of the 15th December, 1924, Areas K and G appear to have been abandoned and we shall be glad to hear from you the reasons for this alteration from the original scheme.

Yours truly,

for C. S. MEIK & BUCHANAN.

(Sgd.) W. T. HALCROW.

No. 854.

Development Directorate,
Back Bay Reclamation Scheme,
Chief Engineer's Office,
Old Custom House Yard, Fort,
Bombay.
20th March, 1925.

MESSRS. C. S. MEIK & BUCHANAN,
16, Victoria Street, Westminster,
London, S.W.1.

DEAR SIRS,

Reference your letter of the 26th February, 1925.

The principal reasons for the low output of the " Sir George Lloyd " are as follows :—

1. Inexperienced Assistant Dredging Masters.
2. Nature of material dredged.
3. Strong ebb tides.
4. Bad holding ground for anchors.

The influence of the above on the output of the dredger is as follows :—

1.—(*a*) The working of a suction cutter dredger is entirely different from the working of a bucket ladder dredger, owing to the fact that with the latter the individual in charge of the dredging operations can see exactly how much material he is getting in each bucket, whereas with a suction cutter dredger it is quite impossible for him to do so and the only means by which it is possible to tell whether the dredger is getting plenty of material or not is by the vacuum in the suction pipe, as recorded on the vacuum indicator, and also the pressure on the pump as indicated on the pressure gauge. These two indications in themselves are by no means definite evidence that the dredger is getting a fair quantity of material. This can only be told after years of experience and in my opinion it takes 10 years at least to train a man to work a suction cutter dredger satisfactorily even if he is intelligent and takes an interest in his work. I am afraid that at least one of the Assistant Dredger Masters on the " Sir George Lloyd " does not come under this category. If the Assistant Dredging Master is not experienced at this class of work he does not keep the dredger up to her face or else he does not work the cuts systematically.

(*b*) The Dredging Master, Mr. Speirs, was working this dredger last season and the output was very much better than it has been this season in spite of the fact that we did not have the same depth of material last season that we have had this season. Owing to Mr. Speirs having to look after the working of the " Kalu " in Back Bay this season, it has been impossible for him to devote his whole time to the training of the men on the " Sir George Lloyd." On various occasions when he has returned on board the " Sir George Lloyd " this season, he has found that the cuts have not been worked systematically, making it necessary to pull the dredger astern and clean up the high ridges left, which were preventing the suction frame from getting down to the full depth.

2.—(*a*) The material dredged this season has been approximately as follows :—

The top layer of material which has varied from 8 to 15 feet in depth has been fine silt. The underlying material which has varied from 7 feet to 20 feet has been clay or consolidated silt of a clay nature, the bottom 2 or 3 feet of which has been very stiff and interspersed with pinnacles of murum in which the boulders are embedded. Owing to the hard nature of this murum in which the boulders are embedded, the cutter engine is brought up all standing, or the cutter rides over the top and lifts the suction frame up. This naturally lowers the output of the dredger as it is impossible to keep the cutter into the material.

(*b*) The Builders' specification states 2,000 cubic yards per hour of soft clay, but I do not consider the material now being dredged could be classed as soft clay, and I am not prepared to say that the dredger is incapable of pumping 2,000 cubic yards per hour of *soft clay* under ordinary working conditions.

3. During spring tides the ebb is exceptionally strong and runs at times well over 4 knots an hour. This current on the long length of line which it is necessary to have, viz., 5,000 feet to 6,000 feet throws a tremendous strain on the moorings of the pipe line causing the anchors to drag and in turn throwing the weight of the pipe line on to the dredger with the result that it is impossible to keep the latter up to the working face. This has been on occasions so bad that it has been necessary to cease pumping operations for one to two hours over the height of the tide. Even when the dredger has not stopped work on account of the strong tide, she has been pumping a greater percentage of water than necessary owing to the impossibility of keeping the cutter into the face.

4. The greater portion of the sea bed south of the dredging area outside Oyster Rock is composed of loose shingle and stones or a thin layer of mud overlaying rock. This, as is well known, is extremely bad holding ground for anchors. This difficulty was foreseen last dredging season, and each pontoon was provided with two winches and anchors, although the original arrangement allowed for was for every fourth or fifth pontoon only to be provided with winches and anchors. The additional anchors provided were the same as those supplied with the pontoon, viz., 7 cwts., but owing to the difficulty experienced at the commencement of the dredging season in keeping the pipe line in position, six 30-cwt. anchors were obtained and laid out in addition to the 7-cwt. anchors. Even these have proved to be insufficient, and arrangements are now being made for the purchase of about nine more anchors of about 20 cwts.

I do not consider that the length of discharge line has in any way affected the output of the dredger. The maximum length of discharge line between the dredger and the booster pump this season has been 5,781 ft. The dredger is supposed to be capable of discharging 2,000 cubic yards per hour through 5,000 ft. of pipe line. When it is taken into consideration that the booster pump is introduced into the line 781 ft. beyond this distance and will suck the material out of the pipe, I think it will be agreed that the discharge line has not been too long between these two vessels. The total length of the discharge line from the booster pump has not yet reached the supposed maximum length of 5,000 ft. The total length of this line at the end of the last week was only 4,247 ft., in which length there is a difference in height of about 22 ft. at dead low water ordinary spring tides, or about 6 ft. at H.W.O.S.T. This, in my opinion, has had no material effect on the output of the dredger.

No bonus on the output has been arranged for this season owing to the fact that only one of the Assistant Dredging Masters has had any previous training, and I consider it would be throwing money away to fix a bonus at a low rate of output at this stage of the operations to enable the men to earn any bonus.

With regard to a weekly progress return for the " Kalu," as this vessel is only able to work for an hour or two a day every other week and her output is very small, being only about 225 cubic yards per hour owing to the hard nature of the clay under-lying the sand, it is not worth while giving any detailed report similar to that for the " Sir George Lloyd."

With regard to areas K. and G. referred to in the last paragraph of your letter, these have not necessarily been abandoned. During the visit of Sir George Buchanan and Mr. McMurray of Messrs. Simons & Co. in season 1923-24, it was remarked that the dredger ought not to have been started work dredging the material at the nearest point to discharge it at the nearest point on shore, but should have been started to work at the farthest out point of the dredging area to discharge at the nearest point on shore. But work was commenced in this area in accordance with your plan No. 3411, which was handed to Mr. Brims, and which shows the dredger " Sir George Lloyd " to commence dredging in the S.E. corner of area " K." But on investigation it was found impossible to put the dredger to work in the position shown owing to the presence of rock or boulders projecting up above the surface. Moreover, the depth of material available proved to be only about 4 or 5 ft., the majority of this being silt, and it would not have been economical working to attempt to dredge in this position.

It was impossible to commence work this season at the most distant point of the dredging area owing to insufficient floating pipe. This deficiency will not be made up until the pipe now on order from Messrs. Braithwaite & Co. is delivered.

Yours faithfully,

(Sgd.) H. A. ELGEE,

Chief Engineer.

(Through the Director of Development.)

23rd April, 1925.

(Through the Director of Development.)

THE CHIEF ENGINEER,

Reclamations Branch,
Development Directorate,
Old Custom House Yard,
Fort, Bombay,
India.

DEAR SIR,

We are obliged for your letter, No. 854, dated 20th March, 1925, relative to the low output of Suction Dredger *Sir George Lloyd*, and after carefully considering the

reasons therein given for the low output of the dredger, we desire to offer the following remarks and suggestions in the hope that they may help in overcoming the adverse conditions under which the work is being carried out and so improve the output.

The paragraphs are numbered to correspond with those of your letter.

1.– (*a*) The vacuum and pressure gauges connected with the suction pipe and pump, respectively, are aids specially provided for the guidance of the dredging master during dredging operations, and they are to an experienced dredging master, who has made himself generally acquainted with the material being dredged, an almost infallible guide as to the percentage of solid material being dredged and discharged. Particularly is this the case when dredging is in fairly uniform strata, though of varying depths, after a few simultaneous observations have been taken from time to time of the vacuum and pressure gauge readings and of the velocity of and the percentage of solids in the discharge at the end of the discharge pipe. The velocity is generally obtained by measuring the curve of discharge at the end of the pipe, and where this cannot be done by a pitot tube, which can be made on the works from ½-inch or ¾-inch diameter piping. The percentage of solids is obtained by taking samples of the discharge at the end of the pipe.

The following observations have been found from previous experience to be generally correct.

The percentage of solids transported in a pipe-line decreases as the length of the pipe-line increases.

Material is transported in a pipe-line most efficiently at a velocity of about 12 feet per second.

The pressure is considerably greater when pumping sand and gravel than when pumping clay and loam, and the velocity of discharge is greater in the case of the latter.

The velocity of discharge decreases as the percentage of solids increases, but the increase in the percentage of solids more than compensates for the smaller discharge due to decreased velocity.

The vacuum always gives a higher reading, varying with the percentage of solids, than that obtained when pumping clear water.

When dredging and transporting a mixture of sand, shells, gravel, mud and stiff clay, the velocity of discharge in a pipe 2,000 feet long was found to vary from eight to 17 feet per second; and during these fluctuations the velocity decreased as the percentage of solids and the pressure, as indicated by the pressure gauge, increased.

A wide and continued variation in the vacuum also occurred when pumping solids, due apparently to the variations in the mixture of the materials.

The vacuum head in feet of water varied from 6 to 19.

Men experienced in handling suction dredgers are not easy to find, but we consider an intelligent man, seaman or engineer, with suitable Board of Trade certificates and of reasonably long sea service should very quickly learn to work the dredger efficiently, particularly under the general guidance of an experienced master like Mr. Spiers.

1. (*b*) The remarks clearly indicate that the assistant dredging master referred to was lacking in experience when compared with Mr. Spiers, but we hope his ability has improved and that he gives promise of efficient service.

2. (*a*) The material and the depths, averaging since week ended 18th December last from 20 feet to 30 feet, are considered to be ideal for suction cutter pump dredging and the very low output obtained is consequently very disappointing.

As it is not important that the finished bottom of the dredging should be level, the bottom two or three feet of stiff clay with murum and boulders should, if possible, be avoided wherever met with as it is apparently unsuitable and uneconomical for the dredger to deal with.

3. Where holding ground is bad it is a very common practice in dredging operations to back up an anchor which is gradually being brought " home " with another, usually single fluke anchor, the chain of which is payed out taut after making the end fast to the anchor to be backed up by the mooring lighter or anchor boat being towed by a launch in the direction in which the anchor is to be laid. The chain of the backing anchor should be of sufficient length to serve as a ground chain and to make sure that it will be taut when laid, it should be payed out under control of the lighter or anchor boat's crew.

When the ground is exceptionally bad, two backing anchors are laid out making an angle of about 20 degrees to 30 degrees with each other, at their connection with the anchor to be backed up.

As the output or efficiency of a suction dredger rapidly falls off after the designed length of discharge pipe is exceeded we are of opinion that the extra 781 feet of pipe between the dredger and the " Colaba " seriously affects the output and the better results would be obtained by exceeding the builder's limit of 5,000 feet as little as practicable.

We note that the difference in height of the discharge from the " Colaba " is about 22 feet at dead L.W.O.S.T., but as the builder's specification gives the height 16 feet, it is probable the 22 feet will not exceed the 16 feet limit which is measured from the centre of the pump to the centre (maximum level) of the discharge pipe.

If builder's limits are exceeded it is difficult to discuss question of output with them.

As a bonus on the output has not been arranged, we consider it should be arranged even at this late period of the season so as to give the men concerned the assurance that their better effort and skill in working the craft will be rewarded. We are strongly of opinion that the best output will not be obtained until a bonus is given and we therefore suggest that a start should be made at once with a reasonably substantial bonus to the dredging master (Mr. Spiers) and downwards. It is best to fix the bonus-earning limit low with a correspondingly low rate per unit and in this case might commence at 1,200 cubic yards per hour actual pumping or even a lower figure. The members of the crew concerned should at the same time be given to understand that the dredger and " Colaba " are capable of dredging clay and transporting it to reclamation at the rate of 2,000 cubic yards per hour.

It is an advantage to clear the discharge pipes during the operation of lifting the suction pipe and cutter at the close of the day's operation.

With regard to the " Kalu " there are several points on which we are not clear and we do not propose to write further on this matter until we have had an opportunity of seeing Mr. Brims.

Yours truly,
for C. S. MEIK & BUCHANAN,
(Sgd.) J. RISLEY SETTLE.

23rd July, 1925.

(Through the Director of Development.)

THE CHIEF ENGINEER,
Reclamations Branch,
Development Directorate,
Old Custom House Yard, Fort,
Bombay.

DEAR SIR,

Back Bay Reclamation.

Further to the correspondence *re* output of the *Sir George Lloyd* last season, we have had long conversations with Mr. Brims and have formed the opinion that the main causes of low output are the lack of incentive to the men in the form of a bonus on output, and also that there would appear to have been too much time spent on obtaining hard material at the expense of output, which we consider of greater importance.

We do not agree with the view stated on page 4, para. 2, of your letter 854 of 30th March last, that it is advisable to wait until the output is increased before fixing a bonus scale. We are of opinion that this should be done at the commencement of operations, the scale being based on the designed capacity of the craft, substantial bonus being earned when this is attained.

Yours truly,
(Signed) C. S. MEIK AND BUCHANAN.

No. 2349.

Development Directorate,
Back Bay Reclamation Scheme,
Chief Engineer's Office,
Old Custom House Yard, Fort, Bombay.
8th August, 1925.

MESSRS. C. S. MEIK & BUCHANAN,
16, Victoria Street, Westminster,
London, S.W.1.

DEAR SIRS,

In reply to yours of 23rd July, 1925, we are in agreement that a bonus will probably lead to an increase in the output, but I do not agree that the lack of this incentive is one

of the main causes of the low output, nor, do I agree that too much time has been spent on obtaining hard material by the *Sir George Lloyd* as all the material we can get from the area available will be required unless earth filling is resorted to.

I shall be glad to have your proposals of what bonus you would suggest, the scale being based on the designed capacity as mentioned in the last paragraph of your letter.

My idea is that a monthly bonus should be paid on *actual pumping time* only, exclusive of time spent in pumping water only, provided that measurements show that the quantity pumped is not less than say 900 cubic yards per hour.

The ordinary actual pumping time is reckoned to be 88 hours per week, when working double shifts.

Bonus to be paid, on the actual pumping time in excess of 80 hours per week in the following proportions :—

Sir George Lloyd & Colaba.	*Shares.*
4 Nos. 3rd Engineers at 1 share	4
4 ,, 2nd Engineers at 1¼ shares	5
2 ,, Chief Engineers at 1½ shares	3
2 ,, Assistant Dredging Masters at 1½ shares	3
1 ,, Dredging Master 2 shares	2
Total shares	17

If the bonus is fixed at, say, Rs.102 per hour, then the value of one share, Rs.102/17 = Rs.6, and the amount of bonus payable will be distributed as follows :—

	Bonus per hour.	
	Rs.	Rs.
4 3rd Engineers at	6.0.0	24.0.0
4 2nd ,, at	7.8.0	30.0.0
2 Chief Engineers at	9.0.0	18.0.0
2 Assistant Dredging Masters at	9.0.0	18.0.0
1 Dredging Master at	12.0.0	12.0.0
		Rs.102.0.0

Taking the output at 900 cubic yards per hour the output for 88 hours would be $88 \times 900 = 79{,}200$ cubic yards.

Bonus on 8 hours at Rs.102 per hour = Rs.816.

$$\therefore \frac{816 \times 16 \times 12}{79{,}200} = 1{\cdot}98 \text{ pies per cubic yard additional cost.}$$

Yours faithfully,

H. A. ELGEE.
Chief Engineer.

Through the Director of Development.

16th September, 1925.

(Through the Director of Development.)

THE CHIEF ENGINEER,
Reclamations Branch, Development Directorate,
Old Custom House Yard,
Fort, Bombay, India.

DEAR SIR,

Back Bay Reclamation Scheme.—Dredging.

We duly received your No. 2349 of the 8-10th August, 1925, with regard to the proposed bonus to be paid on the output of the dredgers.

We note your suggestion that bonus should be paid on the *actual pumping time* and have given it our careful consideration. The idea is new to us and while we realise that a bonus on this basis would make for an increase in the number of hours' pumping (with reservations regarding the quantity of material pumped) we are of opinion that better results would be obtained by adopting the more usual system of bonus on the *actual quantity of material dredged per hour.*

We suggest that you should arrange a bonus based on a minimum figure of 800 to 1,000 cubic yards of material dredged per hour, as measured by soundings, for the "Sir George Lloyd," the actual amount depending to some extent on the nature of the material to be dredged. When the dredger is raising 2,000 cubic yards per hour the bonus to amount to 50 per cent. of the wages earned without bonus and between the minimum figure and 2,000 cubic yards a graduated scale to be prepared. All employees from the dredging superintendent downwards who can in any way influence the output to be put on the bonus list.

Assuming that the total wages bill is the same for an output of 1,000 or 2,000 cubic yards per hour, the cost of wages per cubic yard if and when the latter figure is reached would be 25 per cent. less, and fuel, stores and overhead charges would be reduced in greater proportion.

We suggest that you give this proposal your careful consideration.

Yours truly,

(Signed) C. S. MEIK & BUCHANAN.

(XIX.)

Letter dated 13th April, 1922, from Messrs. Meik & Buchanan to Director of Development.

SIR,

We have now had an opportunity of discussing with Sir George Buchanan the progress of the reclamation works at Back Bay, and we have also read his report to you, dated 17th February.

Whilst concurring generally with the report, we particularly desire to endorse and emphasise the paragraphs concerning engineering staff and engineering accounts; it is impossible to carry out efficiently a large public work without adequate engineering staff, and it is equally impossible to exercise economy without a proper system of cost accounting.

We also agree with Sir George Buchanan's programme of future operations and the suggestion for concentration contained in the latter portion of para. 41 of his report.

We had certainly hoped that the dredger would begin operations at the Colaba end during the next fair weather season, and we still think such a possibility should be kept in view.

The end tipping wagons will be despatched at the earliest possible date and if the railway between Marine Lines and Colaba is completed, and the cross wall built, even by hand labour, and the pipe line laid across the peninsula it might be possible, by beginning work at the end of August or early in September, to complete up to high water mark sufficient of the rubble mound, beyond the 2,000 feet of mass concrete wall, to justify the dredger working even for 2 or 3 months.

We received by the mail which arrived here on the 3rd April the Chief Engineer's letter, dated 17th March, enclosing an indent for the additional plant and machinery. Tenders are being taken in for the whole of the indent, but we have in our letter to the Chief Engineer, dated 11th April, 1922, questioned the necessity for some of the plant and have asked him to take your orders on the subject and cable a reply.

We have the honour to be, Sir,
Your obedient Servants,

(Sgd.) C. S. MEIK & BUCHANAN.

(XX.)

Testimonials and experience of Mr. Brims.

(Copy.) 28th March, 1923.

DEAR MR. HALCROW,

Herewith the other copies of my training and experience, which was not ready yesterday afternoon.

Yours sincerely,

(Sgd.) C. R. BRIMS.

(Copy.)

Outline of Training and Work Done by C. R. Brims.

1895-1900.

During this period I served my apprenticeship with Messrs. D. & C. Stevenson, civil engineers to the Northern Lighthouse Commissioners, Edinburgh, Scotland. While with this firm I was engaged in making surveys both land and marine, for lighthouses, river improvements, harbours, piers and new roads, and in the preparation of designs, working drawings, specifications and measurement of quantities for such work, and in the superintendence over the construction of same, also in preparing Parliamentary plans and estimates, &c. During this period I was also studying engineering at the Heriot Watt College.

1900-1902.

I left Messrs. Stevenson in December, 1899, and joined Messrs. S. Pearson & Son, Limited, Contractors, London.

I was engaged by them to take charge of the setting out, measuring up, and to superintend the construction of a storage reservoir, covering an area of about 80 acres, with a puddle wall and embankment, 8,800 feet long, also two overflows, a large aqueduct, and river diversion.

1902-1910.

I left Messrs. Pearson early in 1902, and joined Sir John Jackson, Limited, for their Simons Bay contract, Cape Colony, where I was employed until the end of December, 1910.

I was engaged by them to take charge of the setting out, measuring up, and to superintend the construction of the two breakwaters in connection with the new Admiralty Harbour Works, also certain other work in connection with the dry dock and permanent workshops.

The setting out and construction of the permanent railways and roadways, as well as our temporary railways, and 40- and 35-ton Titan roads, 40-ton Goliath roads, temporary jetty, and temporary stages and gantries for various machines.

1911-1912.

On the completion of the works at Simons Bay, I returned to London, and on calling at the offices of Sir John Jackson, Limited, in December, was asked to proceed at once to Ferrol, Spain, as chief engineering assistant. While there, I was engaged in setting out, measuring up, and superintending the construction of a dry dock, various buildings and roads in connection with same, the erection of ships, fitting out jetties, also the deepening of the tidal basin, by means of three bucket dredgers. I also had charge of all the repairs and maintenance of the various marine craft.

1912-1919.

On the completion of these works, I returned to England, and joined Messrs. Topham, Jones & Railton, Limited, Contractors, London. I was engaged by them as chief engineering assistant on a contract in Wales for three months, when I was sent north to take charge of the engineering side of the contract they had secured for the dredging of the approach channels to H.M. Dockyard, Rosyth, Scotland, acting also as assistant manager. This position I occupied until January, 1918, during which time we carried out several very urgent war works for the Admiralty.

In January, 1918, I was appointed Assistant Manager to take charge of an urgent dredging contract at Inverness. This work I completed by the end of May, 1918, when I was appointed Local Manager, in charge of the construction of two haul-up Slipways and two Piers which Messrs. Topham, Jones & Railton, Ltd., undertook to construct at H.M. Dockyard, Pembroke Dock, on behalf of the Admiralty.

1920-1921.

The above works were completed at the end of 1919, when I was appointed Manager in charge of the constructional work for a large Oil Storage Installation which Messrs. Topham, Jones & Railton undertook on behalf of the British Petroleum Co., Ltd., at Salt End, Hull.

1921-1923.

On completion of our section of the work at Hull, I joined the staff of the British Petroleum Co., Ltd., to take charge of and superintend the constructional work at nine large Oil Storage Installations, and later other work of a similar nature throughout England and Ireland.

(Signed) C. R. BRIMS.

100, Loraine Mansions,
Widdenham Road, N.7.
27th March, 1923.

MESSRS. C. S. MEIK & BUCHANAN,
16, Victoria Street, S.W.1.

DEAR SIRS,

Bombay Reclamation Scheme.

With reference to your conversation with me regarding an Engineer to take charge of and supervise the above work, and in confirmation of my verbal statement that I would be willing to consider same, I now have pleasure in sending you particulars of my general training and experience, together with particulars of the various dredging works supervised by me.

I shall be pleased to receive in due course full particulars of conditions of engagement, and should my application be favourably considered could arrange to sail within three months of notification.

Thanking you for recommending me to the authorities at Bombay.

Yours faithfully,
(Sgd.) C. R. BRIMS.

Outline of Dredging Work Superintended by C. R. Brims.

NOTE.—As all the dredging work I have been engaged upon has been carried out on behalf of the Admiralty it is impossible for me to give details of same. The following brief outline of the various works will I think, however, be sufficient to indicate that I have had extensive experience of this class of work, extending as it does over a period of 18 years.

At Simons Bay, South Africa, 1902-1910.

This consisted of two distinct sections of work, but for both sections a self-propelling hopper suction dredger capable of dredging to a depth of 30 feet was employed.

The first section consisted of dredging wide trenches to a uniform depth for the rubble foundations of a breakwater and two basin walls. The material dredged from these trenches was pumped into the hoppers of the dredger and deposited at sea.

The second section consisted of dredging a tidal basin of 28½ acres to a depth of 30 feet below low water of ordinary spring tides. Part of this material was taken to sea, but a large proportion was pumped ashore for reclamation purposes. The longest length of pipe line used for this was about 1,000 feet. The method adopted was as follows :—

A temporary skeleton jetty for berthing the dredger was constructed against one of the breakwaters, a pipe line was then laid from this jetty across the breakwater to the inside of same. The end of this pipe line, which overhung the inner slope of the breakwater, was supported by means of a simple light timber frame. Owing to the suitability of sand for reclamation by pumping, it was possible after a time to support the end of the line when extended by simply laying old railway sleepers on the sand previously pumped ashore.

All the material dredged was pumped into the hoppers of the dredger. The dredger then went alongside the temporary jetty, and after having the delivery pipe connected to the line on shore, the material in the hoppers was pumped ashore by means of the dredger's own pump.

At Ferrol, Spain, 1910-1911.

This consisted of the deepening of the existing tidal basin to a depth of 8½ metres below low water of ordinary spring tides by means of three bucket dredgers, the dredged material which consisted of silt, hard clay and rock being taken to sea in hopper barges.

Owing to the restrictions imposed by the authorities, blasting of the rock was not possible. The dredging of this was therefore a very slow and arduous task and

necessitated one of the dredgers being a heavy rock dredger. The other two which were much lighter craft were concentrated on the softer material.

The craft used for conveying the dredged material to sea were two steam hoppers, four dumb hoppers and two ocean-going tugboats for towing the latter. The total quantity dredged was about 800,000 cubic metres.

At Rosyth, Scotland, 1913-1918.

The work here comprised several dredging contracts, the two largest being the formation of the approach channel to the Naval Base (this was dredged to a depth of 30 feet below low water of ordinary spring tides) and the removal of a large bank in the middle of the River Forth, which was also dredged to a depth of 30 feet below low water of ordinary spring tides. The total quantity dredged in each case amounted to approximately eight million cubic yards. The material consisted of silt, soft clay, hard-bound gravel and boulder clay in the former case and soft silt and sand in the latter case.

Work was carried on continuously in two shifts of twelve hours each, five and a half days per week.

The craft employed were three bucket dredgers, six steam hoppers, two tugboats and several small craft.

The record output for one dredger on this work amounted to 73,500 barge cubic yards in one week of 11 shift.

All of the various dredging works here were completed within contract time, the approach channel to the Naval Base being completed as much as 12 months under the contract time.

At Inverness, Scotland, June-May, 1918.

The work here consisted of dredging channels through two banks in the fairway in the Inverness Firth. The material in one bank was composed of gravel and in the other all mud and silt. In the former case we had at times to contend with a six or seven knot tide. We therefore employed a heavy rock dredger on this bank. On the other bank, where the material was mud and silt, one self-propelling and one stationary dredger was employed.

All the material dredged was conveyed to sea in steam hoppers.

The craft employed consisted of three bucket dredgers, eight steam hoppers, two tug boats, one self-propelling coaling lighter, one motor-driven water boat, and three small launches.

At Pembroke Dock, Wales, 1918-1920.

The dredging work here consisted of the removal of the mud overlaying the rock on the site of two jetties and two haul-up slipways, and also the lowering of a mud bank opposite the two jetties.

The removal of the mud overlaying the rock was a very difficult operation owing to the impossibility of obtaining a suction dredger at the time. We therefore used a heavy rock dredger.

Owing to the uneven surface of the rock the buckets frequently caught in obstructions, stopping them revolving and throwing great strain on the buckets, links and pins. The conditions were severe and repairs consequently heavy Had it been possible to obtain a suction dredger at the time, the cost would have been considerably less and the time required for completion much shorter than it was.

The craft employed on the dredging work here consisted of one self-propelling rock dredger, fitted with buckets for dredging soft material, three steam hopper barges, one sea-going tugboat, and one small self-propelling steam water boat.

The work was proceeded with day and night in twelve-hour shifts, five and a-half days a week, but owing to the high level at which the rock was found over a large area of the site it was necessary to work tide work during a portion of the time.

During a gale immediately after the completion of the construction of the jetties and slipways, the water boat dragged her moorings, grounded on the side of a bank on the falling tide, and slid off on her side, going down in about 20 feet of water. The work of salving this vessel was carried out under my supervision, and was so successful that the hull was not damaged in any way by the lifting operations.

(XXI.)

16, Victoria Street,
Westminster, S.W.1.
11th April, 1922.

My DEAR HEPPER,

I am much distressed to receive a letter from Lewis by this mail written from St. George's Hospital and I wonder if you are taking any action on the lines I suggested to His Excellency and to yourself. Possibly as his leave is nearly due you are letting him carry on to that date especially as it would be difficult for him to get a steamer passage by an earlier boat. On the other hand if you had Lewis examined by a Medical Board before he leaves India and they reported unfavourably he would not be able to return to India from leave without a clean bill of health. We feel very strongly that in the interests of the work there should be no chance of a repetition of this disastrous year of sickness.

We received by last mail an indent for additional machinery and rolling stock for the Back Bay Scheme aggregating in value over £90,000. We have written by this mail to Lewis challenging several of the items and we have asked him to discuss the matter with you and send us a cablegram with final orders.

We have pointed out that we have no wish to interfere with the discretion of the man on the spot or in any way to delay the work but that in the interests of economy we think his estimate might be cut down.

With kind regards,

Yours sincerely,

(Signed) GEO. C. BUCHANAN.

3rd June, 1922.

My DEAR HEPPER,

I received this mail your letter dated 8th May, saying that you had postponed your "leave" and would not sail from Bombay until 8th July.

On the assumption that you were sailing for home on the 20th May, we were looking forward to a long talk with you on the subject of the Back Bay Reclamation Scheme, because we are seriously concerned about the lack of information we are receiving from the Chief Engineer, or as he is called in our agreement, the Resident Engineer. As you will now be at Bombay for another month we think it well to put the matter in writing and we have this mail written a letter to the Resident Engineer of which we enclose you a copy demi-officially.

Our agreement is very plain and we feel sure that you and the Government of Bombay are as anxious as we are that we should conform to that agreement and carry out conscientiously and thoroughly the duties laid down therein.

At present there appears to be a tendency on the part of Lewis to keep us in the dark and use us merely as agents for the purchase of plant.

If the works were being carried out by contract there would be no question as to the procedure; the Resident Engineer would receive his instructions from us and it would be his business to see that the contractor carried out the work accordingly.

As the work is being done departmentally the case is a little different; the Resident Engineer is taking the part of the Contractor and must so far as the execution of the work is concerned be permitted to exercise his own judgment but that need not hinder our supervision as responsible Engineers, or prevent our being kept fully acquainted with the progress and the cost of the work.

In all works of magnitude such as that in the Back Bay a complete record of progress comprising plans, photographs, and statements ought to be kept and if this is so there should be little difficulty in forwarding us copies periodically.

There can be little doubt that Lewis' health has broken down seriously and in the opinion of Mr. Meik and myself you would do well to have him examined at home by a Medical Board for an expression of opinion as to his fitness to continue hard work in the East.

But this and other points we can discuss on your arrival home towards the end of July.

Yours sincerely,
GEO. C. BUCHANAN.

SIR LAWLESS HEPPER,
Bombay.

(XXII.)

Statement put in by Sir George Buchanan.

Year.	*Amount. Lakhs of rupees.*	*Equivalent in sterling.*
January, 1913	400 ...	2,682,291
June, 1919	400 ...	3,328,125
February, 1922	400 ...	2,656,250
October, 1926	400 ...	2,979,166
January, 1913	700 ...	4,694,010
June, 1919	700 ...	5,824,218
February, 1922	700 ...	4,648,437
October, 1926	700 ...	5,213,541
January, 1913	1,000 ...	6,705,729
June, 1919	1,000 ...	8,320,311
February, 1922	1,000 ...	6,640,625
October, 1926	1,000 ...	7,447,916

It will be noted that the difference in sterling between 400 lakhs in 1919 and 700 lakhs in 1922 was only £1,320,312.

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