

**INDIAN TARIFF BOARD**

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**Oral Evidence**

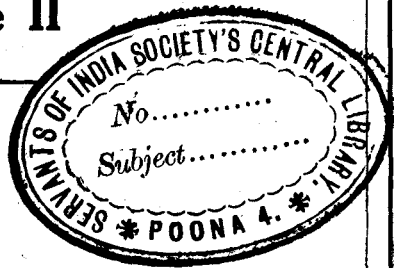
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**HEAVY CHEMICAL INDUSTRY**

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**Volume II**

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CALCUTTA: GOVERNMENT OF INDIA  
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No. 199-T (8).

GOVERNMENT OF INDIA.

DEPARTMENT OF COMMERCE.

*Simla, the 16th July 1923.*

RESOLUTION.

TARIFFS.

The Government of India have received representations from Messrs. The Eastern Chemical Company and The Dharamsi Morarji Chemical Company requesting that protection may be extended to

Sulphuric Acid.  
Hydrochloric Acid.  
Nitric Acid.  
Magnesium Sulphate.  
Ferrous Sulphate.  
Potash Alum.  
Aluminium Sulphate.  
Sodium Sulphide.  
Zinc Chloride.  
Copper Sulphate.  
Glauber's Salt.

the marginally noted chemicals. In pursuance of paragraph 3 of the Resolution of the Government of India, Department of Commerce, No. 3748, dated the 10th July 1923, the Government of India have decided to refer to the Tariff Board for examination these representations along with any others of a similar nature which may be brought to its notice.

2. In making its enquiry, the Tariff Board will be guided by the principles laid down in the Resolution adopted by the Legislative Assembly on February 16th, 1923, and will consider—

- (1) whether the conditions laid down in paragraph 97 of the Report of the Indian Fiscal Commission are satisfied in each case,
- (2) to what extent, if any, and in respect of what articles, or class or description of articles, protection should be afforded, and
- (3) how its recommendations, if any, will affect industries using these articles.

3. The removal of the import duties on materials of industry was recommended by the Fiscal Commission and is in accordance with the principle of the Resolution adopted by the Legislative Assembly on the 16th February 1923. Chemicals are utilised as raw materials in certain Indian industries and the Government of India have decided that, along with the question of extending protection to the manufacture of particular chemicals, the Tariff Board will examine the question of the removal of the import duties on those chemicals which are used as materials in Indian industries.

4. Firms or persons interested, who desire that their views should be considered by the Tariff Board, should address their representations to the Secretary to the Board.

ORDER.—Ordered that a copy of the above Resolution be communicated to all Local Governments and Administrations, all Departments of the Government of India, the Central Board of Revenue, the Director General of Commercial Intelligence and Statistics, the Indian Trade Commissioner, London, the Secretary, Tariff Board, His Majesty's Trade Commissioner in India, all Chambers of Commerce and the Canadian Government Trade Commissioner in India.

Ordered also that it be published in the *Gazette of India*.



**Press Communiqué issued by the Tariff Board on the 24th August, 1928.**

The attention of manufacturers of chemicals and consumers of chemicals which are used as materials in Indian industries is drawn to the Resolution of the Government of India in the Commerce Department No. 199 T(8), dated the 16th July, 1928, under which the question of granting protection to the manufacture of certain chemicals and the removal of duty on others has been referred to the Tariff Board for examination. Eleven acids and heavy chemicals have been expressly mentioned in the Resolution, but the scope of the Board's enquiry is not limited to these, and those interested in the manufacture of similar chemicals are at liberty to submit representations to the Tariff Board for investigation. Manufacturers who propose to apply for protection are requested in the first instance, to obtain from the Secretary, No. 1, Council House Street, Calcutta, a copy of the questionnaire prepared by the Board and to submit their replies with six spare copies to the Secretary not later than the 30th September, 1928. After their replies have been received, they will be notified as to the dates on which their oral examination, if any, will take place.

Consumers of chemicals used as materials in industries are also requested to submit representations stating (a) the kinds of chemicals used by them and the purposes for which they are used and (b) the amount of extra burden thrown upon the industry by reason of the Customs duties now leviable upon chemicals used. These representations (with six spare copies) should reach the Secretary not later than the 30th of September, 1928.

**THE DHARAMSI MORARJI CHEMICAL COMPANY, LIMITED,  
BOMBAY.**

**Oral Evidence of Messrs. RAMSINGH, DONGARSINGH and L.  
GUPTA, recorded at Bombay on Monday, the 5th November 1923.**

*Preliminary.*

*President.*—Before proceeding with the evidence I would like to explain to you a few points with which we have got to deal in this enquiry from a general point of view. The first point is the scope of the enquiry. Under the terms of reference we have been asked to enquire into first of all the heavy chemicals, of which about 11 have been expressly named in the Government of India notification and though the notification is not quite clear on the point, it does seem to us that the enquiry is not necessarily confined to those 11 chemicals mentioned therein but may extend to heavy chemicals of a similar kind. But I see from the replies that have been received that there is some misconception on the point and the replies are more or less confined to those specially mentioned chemicals. Those who are interested in other chemicals of a like nature would be at liberty to apply to the Board provided of course they do not take too long over it.

The second part of the reference requires us to go into the question of the removal of the duty on chemicals. Of course, if protection is granted to any chemicals it is obvious that we cannot entertain any proposals as regards the removal of the duty on those chemicals, but it may happen that there are a number of chemicals used by various industries as raw materials upon which no duty is required. We have not received many representations from industries using those chemicals or from persons interested in the manufacture of such chemicals. If we should decide that the duty on all chemicals other than those for which protection may be recommended should be removed, those who are interested in the manufacture of those chemicals might find themselves a little too late and I give this warning to those who may be interested in the manufacture of other chemicals to come forward if they so desire because it is obvious that neither the Government of India nor this Board can, after coming to certain definite conclusions, again reopen the enquiry for the benefit of those persons who have not been alive to their own interests whilst this enquiry is proceeding.

There are other points also which are of some importance. In the two important representations which we have received, a reference is made to the existence of certain trusts. One is a German Trust and the other a British Trust. I do not know if those Trusts are represented in this country but if they are, perhaps it would be of advantage from their own point of view if they came and gave evidence before this Board because serious statements have been made as regards their operations in this country and it might be to their advantage to meet them before the proceedings have been completed. We shall endeavour to write to them if we are given information as to whether they have any office in India. As regards Messrs. Brunner, Mond and Company, we understand they have an office in Calcutta. But as regards the German Trust, we are not aware of their having any office in India. Have they got any office in Bombay?

*Mr. Gupta.*—Yes, they have. Messrs. Haverø Trading Company, Limited, are their agents. Messrs. Brunner, Mond and Company have also got an office here. As regards some products, one company is represented by the other. I think there is some understanding between the two companies as regards their sales organisation.

*President.*—We do not know about that. They will have to come and explain that. It is important that they should know that allegations are

made against them and it would be to their interest to come and meet us if possible.

Then, there is the question of railway freight which has been raised. I want to explain to the applicants that this question of railway freight, so far as this Board is concerned, will be dealt with in a somewhat different manner from that in which it is dealt with by the other Committee, *i.e.*, the Railway Rates Advisory Committee. We are not concerned in this enquiry with particular cases in which hardship is caused by reason of some preference being shown or any other such cause. What we are concerned with is this. If we come to the conclusion that an industry is to be protected, the reduction of railway freight might be one way of affording that protection. Of course, it would be open to the railway administrations to say afterwards to the Government that it would not pay them to make these reductions and it would then be a question entirely between the Government and the railway administrations as to how the difference is to be adjusted. So far as we are concerned it is open to us say that protection may be given by the reduction of freights in such and such a manner. But it is for you, Gentlemen, to explain to us what reductions you want. It is no use telling us that the freights are very heavy and that reductions ought to be made. We want to know precisely the amount of reduction in freights which would give you the kind of assistance that you require. For instance, you can say that the general rate of freights on an average works out at Rs. 15 per ton and that if it is reduced to, say, Rs. 5 on an average, it would give you the assistance you require. I am at present dealing both with the freights on the raw materials and those on the finished products. What I want to impress upon you is the necessity of showing in rupees, annas and pies what reduction is required.

*Mr. Ramsingh.*—If I understand you correctly, you want a definite scheme from us that such and such reduction on such and such chemicals from such and such place to such and such place is required.

*President.*—That is as regards the freights on the raw materials as well as those on the finished products.

*Mr. Ramsingh.*—Yes.

*President.*—There is another question as regards the finished products. If freight is to be reduced indiscriminately, you will be no better off than you are now because the foreign importer may also have the same advantage. Therefore it may be necessary to consider whether the reduction in freight should be confined only to a protected industry and to the articles produced in the country. I am not expressing any opinion whatsoever on this point. But that is a point to be considered because if there is a general reduction in freights, then it may happen that you may be worse off than you are now.

*Mr. Ramsingh.*—I quite agree.

*President.*—There is the further point that the reduction of freights both on the raw materials and on the finished products should not be allowed as an encouragement for the growth of very small industrial units. It would not be, in the present day conditions of business in the world, to the advantage of the country that the reduction of freights on the raw materials and on the finished products should lead to the growth of small uneconomic units. That would be, as I say, not to the interest of the country. Therefore some limitation may also have to be placed as regards the units which ought to get the benefit of the lower freights. It may be based upon the production of so many tons of sulphuric acid or any other chemical which enters largely into the manufacture of other chemicals or it may take some other form.

Then, there is the further question whether the benefit should extend to all the companies whether domiciled in India or incorporated outside India or whether it should be confined to rupee companies established in India. As you know the benefit derived by the reduction of freight is not very different from the payment of a bounty. The Legislature has now insisted for some time that a bounty shall not be paid unless the company is a rupee

company registered in India and has a fair representation of Indians both as shareholders and upon the directorate. That is also a point which would require consideration, and I would like those who are interested in this question to assist us with their views. This brings me to the proposal for the payment of bounty on production. That requires very careful consideration. As far as we can judge at present, sulphuric acid plays a very large part in the manufacture of most of these chemicals and therefore it may be possible for us, if we thought that bounty was the best form of giving protection, to say that a certain bounty shall be paid merely on the production of sulphuric acid. For that purpose we shall have to calculate how much bounty paid generally on sulphuric acid would give protection to those chemicals the production of which requires sulphuric acid. We have to get much more accurate information as regards quantities of sulphuric acid required in the manufacture of particular chemicals than we have so far got. The point arises in connection with sulphuric acid that certain quantities of sulphuric acid are sold as such in the country and it is very doubtful whether any bounty may be required in respect of those quantities. There is a certain quantity sold as acid for which the industry would get a reasonable price without protection. The question would arise as to whether we should exclude a certain quantity first and recommend a bounty on the rest or whether we should recommend a bounty on the whole quantity produced. But here also as I said earlier we cannot really in the present day conditions recommend the payment of a bounty to a person who manufactures, say, 50 tons of sulphuric acid. That, I don't think, would help the industries of the country. We have to decide what is an economic unit and what quantity of sulphuric acid must be produced in a year before a bounty can be given. For that purpose we may say, for instance, that the man who manufactures sulphuric acid above a certain figure say 1,000 tons or 500 tons a year, shall be entitled to get that bounty and not otherwise. The idea underlying the payment of a bounty is simply this. It simplifies the administration of the payment of bounty because if sulphuric acid is really the predominant factor in the manufacture of most of these chemicals, it is much easier for Government to say "we will pay the bounty on the sulphuric acid and you can use it for any purpose you like." It is, very difficult to recommend a separate bounty on each product. In the first instance, it would be very difficult to check it and in the next place it would require an amount of interference and supervision by the Government which I don't think any manufacturer would like. But as regards sulphuric acid, the position is very much simpler.

*Mr. Ramsingh.*—If a bounty is given on sulphuric acid, does it mean there would be no protective duty on any salts or acids coming from foreign countries? As you have raised this question, I am simply making this enquiry.

*President.*—I warn you that I am not expressing any opinion here I am simply placing before you the points which we are anxious to consider. You must not run away with the impression that this Board is going to recommend a bounty and no duty or anything of the sort. What the Board does is this. If it recommends protection, it follows the principle that the protection should be adequate. It may be by means of a duty or bounty or reduction in freight or of the three combined. The main idea is to provide a method of protection which should both protect both the industry and safeguard the consumer as far as possible. As we have explained many times, protection is really based on the difference between the fair selling price of the indigenous manufacturer and the import price. That is one of the principles which we generally follow. But whether the protection is granted by means of a duty or a bounty or reduction in freight or a combination of the three, the proposal must amount to this, that it must bridge the difference between the two prices. If after you have put forward a concrete scheme we are satisfied that it will not take you far enough, it will be open to you to make additional proposals.

I would like it to be publicly known that though the second part of the reference requires us to go into the question of removal of duty on chemicals, really speaking so far we have received no application. Some firms have

opposed the imposition of higher duties but there is no proposal of any importance that we can recollect in which they want the removal of the duty. That leads us to think that the reduction of these duties causes no real hardship to any manufacturer. It is not the business of the Government or the Board to go out of its way to find out whether a particular duty is a hardship to any manufacturer, and in the absence of any representation, Government is entitled to think that it does not really matter whether duties are removed so that our answer to the second part of the reference may be brief, namely that there is no opposition to these duties and they may be retained for revenue purposes.

There is one other point of considerable importance and that is as regards the publication of the figures. Every year we have got to explain to the firms the desirability of furnishing the fullest information to the Board and allowing them to publish these figures. Those of you, gentlemen, who have followed our proceedings know that it was only in the case of the Oil industry where certain people did not ask for direct protection that we allowed them to give evidence in camera, but you have seen what the result was. As regards all other industries, I may say there is not a case that I can remember in which an applicant has insisted upon the costs being kept confidential, because if you do that, you weaken your case very much. Applicants have always realized that it is to their interest that the costs should be published. Really speaking we have found that the publication of costs has not done any harm to the applicant. It is true that others know your costs, but the costs vary from day to day: the prices vary from day to day, and if you are afraid of your opponents you may take it for granted that they have a long enough purse to be pretty well informed of your costs! Really I think it would be to your advantage to come to the Board and give all the facts and allow them to be published.

*Mr. Ramsingh.*—We have no objection to our costs being published.

*Mr. Smith-Wright.*—We too have no objection.

*President.*—We are thankful to you. We cannot really substantiate any proposals without the costs. We may also tell you that if there are any points on which our questionnaire is not clear, you are at perfect liberty to see us and we will explain to you what we really require.

*Mr. Ramsingh.*—Thank you, Sir.

*President.*—Mr. Ramsingh, you are the agent of the Dharamsji Morarji Chemical Works?

*Mr. Ramsingh.*—I represent the agents.

*President.*—Mr. Gupta, you are the Works Manager?

*Mr. Gupta.*—Yes, Sir.

*President.*—You say the Company was started in September 1919, but I think you did not start manufacture till 1922?

*Mr. Gupta.*—Quite so.

*President.*—How is that?

*Mr. Ramsingh.*—The Company was floated in 1919, then we went to England for the purchase of plant. We had to make enquiries about the purchase of the plant and it took some time. After we returned here we had to hunt for suitable land. Government would not allow us to establish our factory in Bombay because at that time the development mania was in the head of everybody and they wanted to make Bombay a garden city and throw out all industries out of Bombay. So we had to try and find out land elsewhere and we got it at Ambernath, which however is not an ideal spot. We had to postpone establishment of our factory because we were in search of a site where railway connection was near, and water was near. Government had promised to supply us with water and they supplied it four years after when they had promised it!

*President.*—Delay in obtaining a suitable site was one of the reasons for delay in starting to manufacture?

*Mr. Gupta.*—Then again there was the question of electric supply.

*President.*—1919 was rather an unfortunate time for starting a new industry, was it not?

*Mr. Gupta.*—But many of the limited companies came into existence then!

*President.*—How many remain now?

*Mr. Gupta.*—Very few. It was the top of the boom then.

*Dr. Matthai.*—By the time you started operations the boom had begun to decline?

*Mr. Gupta.*—Yes, we can even say it had gone.

*President.*—You say the superior management has been in the hands of Indians since 1925. Did you have any Europeans on the Board of Directors?

*Mr. Ramsingh.*—No. We had European Works manager, (European Chemist), European foremen, European overseers and assistant managers.

*President.*—Up to 1925?

*Mr. Ramsingh.*—Yes, after 1925 our works was entirely Indianized.

*President.*—Did you find them more expensive?

*Mr. Ramsingh.*—Yes.

*Dr. Matthai.*—How long have you been in the works Mr. Gupta?

*Mr. Gupta.*—Since 1922.

*President.*—What has been your training?

*Mr. Gupta.*—After taking my M.Sc. degree I was two years in the Research Department of the Calcutta University, two years or so as a professor and after that I had some practical experience on some plant I worked under Sir P. C. Roy for about 4 years, who is also connected with the Bengal Chemical and Pharmaceutical Works. Then I joined this Company as Chief Chemist in 1922 and by and by as the management was completely Indianized I was put in charge and last year I went out to foreign countries—to the United States of America, to France, Germany and England.

*President.*—Did you have access to the works there?

*Mr. Gupta.*—In the States I had full access to most of the big works. In France I had the same experience. But I was not long in Germany as I had to return to India hurriedly to present our case before the Tariff Board.

*Dr. Matthai.*—You were in foreign countries the whole of 1927?

*Mr. Gupta.*—Yes, practically.

*President.*—Did you see any works of the Imperial Chemical Industries?

*Mr. Gupta.*—I had access to one of their Tar distillation plant, sulphate of ammonia plant and sulphuric acid plant.

*Mr. Ramsingh.*—I may add, Sir, that before Mr. Gupta was sent to Europe we had sent another gentleman from our staff for training in England for one year and he was allowed to see and work in various chemical works. He is now Secretary to this Company.

*Dr. Matthai.*—You had the same facilities in Germany?

*Mr. Gupta.*—Yes, but I could not stay there long and I could not visit any of the works of the I. G. F. because I had to return to India hurriedly. In the United States of America I had enough facilities. In England also I could visit two or three works very easily.

#### *Alkalis.*

*President.*—Amongst the products that you mention in the list I don't see any alkalis?

*Mr. Gupta.*—No, we don't manufacture them.

*President.*—Is there any special reason why you don't?

*Mr. Ramsingh.*—When we first started we had a very big scheme in mind during the boom period. First we wanted to start the acid industry and

make acids, salts . . . and fertilizers and after that we wanted to go into the alkali business, but we were caught in the whirlpool and had to postpone starting an alkali works.

*President.*—What I wish to know is this. There is a considerable market for alkalis in the country but I don't see anybody manufacturing them. What is the reason?

*Dr. Matthai.*—I think the Eastern Chemicals had a small plant?

*Mr. Smith-Wright.*—That was a very small plant.

*Dr. Matthai.*—What was your plan?

*Mr. Smith-Wright.*—Our idea was to manufacture by the electrolytic process caustic soda and bleaching powder.

*President.*—Are there any insuperable difficulties in the manufacture of these in this country?

*Mr. Gupta.*—I don't think so.

*President.*—Then why are you confining your attention to the production of acids chiefly?

*Mr. Gupta.*—The chief problem in the manufacture of alkalis is the supply of cheap power and plentiful supply of water and raw materials on the spot.

*President.*—You talk of cheap power and you quote in support countries in which either coal doesn't exist or coal is very dear. Take Norway for instance.

*Mr. Ramsingh.*—They have hydroelectric power there.

*President.*—Quite true. But there is no country in the world where coal is cheaper than in India at least at the pitsmouth and therefore the question of having cheap power has really not been investigated. Bombay, for instance, has got no coal and it may find it cheaper to use hydroelectric power. But take Bengal where you can get coal at the pitsmouth, first class coal at Rs. 5-8-0 a ton and inferior coal at Rs. 3 a ton. Has anybody worked out whether cheap electricity could be had if it was produced at the pitsmouth on a large scale? I do not know of anybody who has done it. There may be other questions. I am merely dealing with cheap power. The coalfields of Bengal are within 150 miles of Calcutta, so that it doesn't seem to me to be impossible that cheap power could be produced with very cheap coal.

*Mr. Ramsingh.*—Then the raw material may have to be imported there.

*Dr. Matthai.*—On the question of electric power, supposing you had power at 6 pies, would it be possible for you to produce caustic soda?

*Mr. Ramsingh.*—No.

*Dr. Matthai.*—What kind of rate do you think would be competitive?

*Mr. Gupta.*—2 to 3 pies per unit.

*President.*—That question, as I said, has not really been investigated in this country . . . .

*Mr. Gupta.*—No, it has not been.

*President.*—As to what would be the cost of electricity if it was produced in the coalfields.

*Mr. Gupta.*—It may be lowered down.

*Mr. Ramsingh.*—I manage Gokuldas Morarji Mills and in that connection I have gone very recently into the cost of power. From Tatas at present we get at the rate of '55 per unit.

*President.*—That is hydroelectric.

*Mr. Gupta.*—Yes, and if we reckon the coal at Rs. 18 per ton which is the lowest in Bombay, we get our power at '6 annas per unit.

*President.*—But if it was Rs. 3 or Rs. 4 per ton . . . .

*Mr. Gupta.*—It would be lowered down.

*President.*—So that you cannot say that cheap power has proved to be a decisive factor.

*Mr. Gupta.*—All the things are not near about the power supply. Salt is the principal raw material required. If we go to Bengal, it will be necessary to bring the raw materials there.

*Dr. Matthai.*—As regards salt you are favourably situated.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—If you are adopting the electrolytic method, you have common salt here.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—You would not be in any position of disadvantage when compared to Bengal.

*Mr. Gupta.*—No. Only the question of power supply comes in.

*President.*—Caustic soda, as a matter of fact, is being produced in Calcutta just now by the paper mills. One of the paper mills has got a plant.

*Mr. Ramsingh.*—Yes. I proposed to have a smaller plant.

*President.*—I think the Titagur Paper Mills have a plant.

*Mr. Gupta.*—Yes.

*President.*—So that it doesn't seem to me to be an impossible proposition.

*Mr. Gupta.*—No, it is not.

*Dr. Matthai.*—Most of our caustic soda comes from the United Kingdom.

*Mr. Gupta.*—Yes, about 75 per cent.

*Dr. Matthai.*—A certain amount comes from East Africa.

*Mr. Gupta.*—It used to come, but it is now stopped.

*Dr. Matthai.*—Last year I find that there was quite a considerable quantity from Kenya.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Do you make zinc sulphate at all?

*Mr. Gupta.*—We can make when there is a demand.

*Dr. Matthai.*—What is it used for?

*Mr. Gupta.*—For sizing and dyeing.

*President.*—May I take it in all these products that you manufacture sulphuric acid has a fairly important place?

*Mr. Gupta.*—Yes.

#### *Fertilisers.*

*President.*—Does that apply to these fertilisers that you make?

*Mr. Gupta.*—Yes, to superphosphate.

*President.*—It applies only to superphosphate.

*Mr. Gupta.*—Yes.

*President.*—It does not apply to bone meal and oil cake.

*Mr. Gupta.*—No.

*Dr. Matthai.*—What do you mean by bone meal? Is it simply bone crushed and ground?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Oil cake is just the residue after the oil is extracted.

*President.*—You make bone superphosphate.

*Mr. Gupta.*—Yes.

*President.*—You don't make any (rock chemical) superphosphate.

*Mr. Gupta.*—No. We went in for the bone superphosphate, because bone was very cheap and competed with rock phosphate. Bone had one advantage, i.e., it contained 3/4 per cent. nitrogen. Bone phosphate is almost a compound fertiliser. It has 3 per cent. available nitrogen, and it is a soluble phosphate.

*Dr. Matthai.*—That is the difference between the rock phosphate and the other.



*Mr. Gupta.*—Yes. In the rock phosphate you get only the phosphate available, but not nitrogen. In the bone phosphate you get ammonia besides the phosphate.

*Dr. Matthai.*—Is there a good demand for bone superphosphate?

*Mr. Gupta.*—It has just been started. We started from 10 to 20 tons. We went up to 200 tons last year and we hope to increase it.

*Dr. Matthai.*—Will there be sufficient quantity of bone available?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Is bone superphosphate used by itself or with ammonia sulphate? I have heard it suggested that bone superphosphate mixed with ammonia sulphate is much more effective.

*Mr. Gupta.*—That is what we call mixed fertiliser. When we make a mixed fertiliser, we do that.

*Dr. Matthai.*—The point I am trying to raise is this. I find that quite a large quantity of sulphate of ammonia is imported into India. That means a corresponding increase in the quantity of bone superphosphate.

*Mr. Gupta.*—Quite so.

*Dr. Matthai.*—Therefore to that extent the market for bone superphosphate is bound to increase.

*Mr. Gupta.*—Yes, that is our contention.

*President.*—Supposing no bones were exported?

*Mr. Gupta.*—Then we will be much more favourably situated.

*President.*—Even so would you be able to produce sufficient quantities to supply the whole of the country?

*Mr. Gupta.*—100,000 tons of bones go away from the country. 100,000 tons will make about 200,000 tons of superphosphates and it will take 20 to 30 years to absorb that quantity. After that there are rock phosphates available. If it is not available in India, it is available in various other parts of the world. Africa is close to us and we are more favourably situated than European countries even taking it for granted in the near future that the consumption in India exceeds 200,000 tons.

*President.*—Don't you see the Agricultural Commission was against the stopping of the export of bones on the ground that India will not be able to absorb all the bones at economic prices and the man who supplies bones will suffer.

*Mr. Gupta.*—In the next ten years when the demand for sulphate of ammonia has increased to 200,000 or 300,000 tons, a corresponding amount of superphosphate must go up.

*Dr. Matthai.*—This question of an export duty on bone is an old question.

*Mr. Gupta.*—Yes, it is an old question. As chemical manufacturers, we want to lay stress that our raw materials unnecessarily cost us more. In other countries it is not so. Even in the United States bone is brought from South America. In the United States it is cheaper than what we pay here.

*Mr. Ramsingh.*—In the year 1922 the price was Rs. 38 and now it is Rs. 80.

*Dr. Matthai.*—Do you come in competition with imports of bone superphosphates?

*Mr. Gupta.*—As such we don't come into competition.

*Dr. Matthai.*—So that whether the bone goes up in price is not likely to affect you.

*Mr. Gupta.*—If we go in more and more for this bone superphosphate trade, the rock phosphate might come in.

*Dr. Matthai.*—It is a problem that you anticipate in the future.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—As things stand, so far as bone superphosphate is concerned, you don't find any competition.

*Mr. Gupta.*—The primary factor in the fertiliser problem is nitrogen phosphate is next. If the cultivator finds that one ton of ammonium sulphate costs Rs. 200, he will not go in for any phosphate, whether it is bone superphosphate or any other phosphate, if it is more than Rs. 200. Therefore we have to consider the unit value of the fertiliser.

*President.*—What would determine the market price of the sulphate of ammonia?

*Mr. Gupta.*—Practically all fertilisers are based on the unit of nitrogen available and the unit of phosphoric acid ( $P_2O_5$ ) available; in the case of potash on the unit of potash ( $K_2O$ ) available.

*Dr. Matthai.*—That determines the price.

*Mr. Gupta.*—Yes, at least in every other country.

*President.*—That is to say you must sell at a price comparable to the price of sulphate of ammonia.

*Mr. Gupta.*—Yes.

*President.*—Practically that is what it comes to.

*Mr. Gupta.*—When we make compound fertiliser, we must be able to supply it at a price reasonably compared to the sulphate of ammonia price.

*President.*—Sulphate of ammonia is now being manufactured by the synthetic process.

*Mr. Gupta.*—It is a bye-product. The bulk of the world's supply is bye-product.

*Dr. Matthai.*—Do you mean from coke ovens?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—I take it the sulphate of ammonia that comes into India is imported by the Imperial Chemicals.

*Mr. Gupta.*—I.e., Brunner Mond.

*Dr. Matthai.*—Therefore a large quantity of sulphate of ammonia comes from the United Kingdom and the bulk of it would be really recovered from coke ovens.

*Mr. Gupta.*—Yes, till now. After sometime England will be in a position to adopt the synthetic process. Sulphate of ammonia is made in India too.

*President.*—At present it is not much.

*Mr. Gupta.*—Yes. But the present demand is not more than that.

*President.*—Really speaking it may be in an agricultural country cheaper for the agriculturist to get the sulphate of ammonia.

*Mr. Gupta.*—Sulphate of ammonia alone cannot meet all the country's requirements for crop production. We must have nitrogen, phosphate and potash. We want to specialise in phosphates. That is why we say we must be favourably placed to compete with the nitrogen products.

*President.*—As my colleague has been asking you just now, the main competition that you have is from sulphate of ammonia as regards price, is it not?

*Mr. Gupta.*—Yes.

*President.*—Therefore it will be simpler from the agriculturists' point of view to have as much sulphate of ammonia in the country as possible.

*Mr. Gupta.*—But that won't give his crop enough nutrition. After sometime he will realise that.

*President.*—True. He will have to pay a little more for the other fertiliser.

*Mr. Gupta.*—Then the rock phosphate will come in.

*President.*—How do you mean?

*Mr. Gupta.*—The superphosphate made from the rock phosphate will come in. Such a state arises when people are in favour of superphosphate.

*Dr. Matthai.*—As things stand at present, your price with regard to the bone superphosphate is determined mainly by the ammonia sulphate prices?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Hereafter supposing the price of ammonia sulphate is brought down, then you anticipate that rock phosphate might take the place Bone Superphosphate.

*Mr. Gupta.*—No, it will go on until such time as we can also go in for it. (Rock Phosphate.)

*President.*—The three ingredients are nitrogen, potash and phosphate.

*Mr. Gupta.*—Yes.

*President.*—May I take it that this bone meal contains a reasonable proportion of all the three?

*Mr. Gupta.*—It contains only phosphate and nitrogen.

*President.*—Then they would use sulphate of ammonia.

*Mr. Gupta.*—It is only nitrogenous material.

*President.*—When they want the other two?

*Mr. Gupta.*—They will have to use potash, and phosphates.

*President.*—In what form?

*Mr. Gupta.*—Potash as Chloride or sulphate. Phosphate as bone meal or superphosphates.

*President.*—That will give them all the three.

*Mr. Gupta.*—Yes.

*President.*—Is there any fertiliser which contains all the three ingredients?

*Mr. Gupta.*—Compound fertiliser.

*President.*—That is to say mixed.

*Mr. Gupta.*—That is made from the synthetic process with potash and sulphate of ammonia, and phosphate.

*President.*—In certain percentages?

*Mr. Gupta.*—Yes.

*President.*—I take it that they can vary them according to the needs of the consumer.

*Mr. Gupta.*—Yes.

*President.*—Some people may require more nitrogen, some may require more potash and some people more phosphorous. The advantage of the synthetic process is that these ingredients can be varied.

*Mr. Gupta.*—We can do the same thing while mixing. If the ingredients are cheap, it is immaterial whether it is put in a combined form when it is made or mixed after each is finished.

*Dr. Matthai.*—What is the advantage of the combined fertiliser?

*Mr. Gupta.*—The only advantage is that it is brought in a concentrated form.

*Dr. Matthai.*—It is simply a question of transport.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—If the demand for superphosphates is 100,000 tons, for every ton of superphosphate, you use half a ton of sulphuric acid.

*Mr. Gupta.*—Yes. About 60 per cent. of sulphuric acid.

*Dr. Matthai.*—That is about 60,000 tons of sulphuric acid.

*President.*—Nobody is able to tell at present what demand there is for superphosphates.

*Mr. Gupta.*—There is a demand to the extent of 700 or 800 tons in the form of superphosphates only.

*President.*—700 or 800 tons for the whole of India.

*Mr. Ramsingh.*—Only Bombay.

*Mr. Gupta.*—If you take all the area in India, it may be 6,000 or 7,000 tons of phosphates.

*President.*—You do not know. Some of these people may be using bone meal.

*Mr. Gupta.*—They must have the phosphate available in a soluble form.

*President.*—Do you mean to say the whole of the demand in India is 7,000 to 8,000 tons?

*Mr. Gupta.*—Yes, at the present moment.

*President.*—That is hardly anything compared to the potential demand.

*Mr. Gupta.*—Quite so. The potential demand is much more.

*Dr. Matthai.*—I take it that one way of inducing the raiyat to use this fertiliser in larger quantities is to make it cheaper.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Sulphuric Acid is a very large item in the cost of this material and if we make Sulphuric Acid cheap, it would have the effect of making superphosphate cheaper also.

*Mr. Gupta.*—Yes. The cheaper sulphuric acid will enable the manufacturers to make more phosphate at a lower cost and also do more propaganda, for creating increased demand.

*Dr. Matthai.*—The only thing that now prevents the agriculturist from using it is the cost?

*Mr. Gupta.*—Yes.

*Mr. Ramsingh.*—And also knowledge.

*Mr. Gupta.*—Of course, they have to be educated and trained.

*Dr. Matthai.*—Don't you sell any commercial sulphuric acid?

*Mr. Gupta.*—We do.

*Dr. Matthai.*—Is there a considerable demand for commercial sulphuric acid?

*Mr. Gupta.*—Yes, and also for battery acid there is.

*Dr. Matthai.*—Do you call battery acid commercial acid?

*Mr. Gupta.*—No. Commercial acid is used for soda water in mills, etc.

*Dr. Matthai.*—Can you give me some rough idea, of say 2,000 tons of sulphuric acid, how much of it is sold as commercial acid?

*Mr. Gupta.*—Seventy per cent. of it is sold as commercial acid and the rest as battery acid.

*President.*—What percentage of acid is there in the commercial acid?

*Mr. Gupta.*—96 per cent.

*President.*—What is the specific gravity of the purest sulphuric acid?

*Mr. Gupta.*—The question of purity has nothing much to do with the specific gravity. We sell it in the most concentrated form—95 or 96 per cent.—because we save freight. We can also sell at 30 per cent. as dilute acid.

*President.*—From the point of view of the bounty, what acid are we to take? Should we take the chamber acid or what?

*Mr. Gupta.*—Is it for the manufacture of chemicals?

*President.*—Not for the manufacture but for the purpose of calculation?

*Mr. Gupta.*—On 100 per cent. basis. You can calculate on the tonnage basis—say, per ton of sulphur, 3 tons of 100 per cent. sulphuric acid.

*President.*—Supposing I asked you 'what is the total production' you would give me your output of chamber acid, or would you not?

*Mr. Gupta.*—We calculate always on cent. per cent. basis the quantity produced in the chambers as so many tons of 100 per cent. acid.

*Dr. Matthai.*—If you give the quantity of chamber acid as 10,000 tons, it is really on the cent. per cent. basis.

*Mr. Gupta.*—Yes.

*President.*—The Chamber product is about 60 per cent.

*Mr. Gupta.*—60 to 64 per cent.

*President.*—So that for the purpose of calculation we must go on the cent. per cent. production basis.

*Mr. Gupta.*—Yes. It is easier for us and for everybody to calculate in that way.

*Dr. Matthai.*—You give epsom salt among your commercial salts. I understand from some of the representations we have received that you have some arrangement with the Eastern Chemicals whereby epsom salt is produced and sold largely by them. You produce a few salts and they produce other salts.

*Mr. Ramsingh.*—Not exactly so. At present, nobody is making epsom salt.

*Dr. Matthai.*—You produce about 15 and they produce about 35.

*Mr. Ramsingh.*—There is no arrangement about salts but there is some arrangement as regards acids.

*Dr. Matthai.*—Do you put any battery acid on the market?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Is your battery acid considered good in the market?

*Mr. Gupta.*—Yes.

*President.*—Everybody claims that his battery acid is the best.

*Mr. Ramsingh.*—We have got certificates.

*President.*—Other people have also certificates.

*Mr. Ramsingh.*—So that everybody's is the best.

*Mr. Gupta.*—When compared with the foreign acid, there is absolutely no difference.

*President.*—You have given the capacity of your plant in answer to question 5. I take it that these quantities may be variable.

*Mr. Gupta.*—This is the maximum capacity of our plant as it stands but we can increase it by some adjustment or addition.

*President.*—This is your maximum capacity.

*Mr. Gupta.*—Yes, as we are situated at present. For instance, in the case of alum we can make within few months five times the quantity we are making now.

*Dr. Matthai.*—The machinery is so simple that you can add to it.

*Mr. Gupta.*—Yes, in the case of salts.

*Dr. Matthai.*—Your Epsom plant can be used more or less for Glaubers salts.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—If the demand for Epsom salt falls off, you can use it for the production of Glaubers salt.

*Mr. Gupta.*—Yes.

#### *Capacity and demand.*

*President.*—You have not really reached 25 per cent. of your total capacity. Is that right?

*Mr. Gupta.*—We have not, in the case of acids.

*President.*—You have reached only about 10 per cent.

*Mr. Gupta.*—About 12 per cent.

*Dr. Matthai.*—Your capacity for sulphuric acid is 8,000 tons on a cent. per cent. basis. Last year you produced about 1,000 tons. Really taking

the whole capacity of your plant you have produced to the extent of one eighth of your capacity.

*Mr. Gupta.*—Yes, at the present moment.

*Dr. Matthai.*—You can take sulphuric acid as the test.

*Mr. Gupta.*—Yes. But if we are in a position to make all these salts, we can consume practically all.

*President.*—It is difficult for me to say whether if every one of you is working to his full capacity, there is really any market for all.

*Mr. Gupta.*—As regards acids, everybody has the capacity.

*President.*—The Eastern Chemicals can supply the whole of India with Epsom salt. Messrs. Parry and Company are able to do the same. You are also in the same position. I am not satisfied that the units of production are properly balanced. After all, if some of you are over-equipped as regards some products and all of you are not equipped as regards the rest, there is something wrong there. In other industries also we have found the same thing.

*Mr. Gupta.*—If one company were to supply the whole requirements of the country in respect of Epsom salt, it would not be able to make either alum coppers or copper sulphate.

*President.*—That is precisely what I wish to understand.

*Mr. Gupta.*—If Eastern Chemicals were to supply the whole quantity of Epsom, they would not be able to supply for instance either copper sulphate or alum. If we were to supply the whole requirements of the country in respect of alum, we would not be able to supply full requirements for Epsoms, other salts and fertilizers.

*President.*—The quantities are very much smaller. So one manufacturer may, just by increasing the capacity of or making additions to the plant, be able to supply the whole needs of the country.

*Mr. Gupta.*—Leaving aside others, we are self-contained. If we manufacture 4,000 tons of alum and use sulphuric acid, for nitric acid and hydrochloric acid, etc., we almost balance.

*Dr. Matthai.*—Take the point which the President has been raising: you make coppers. Your capacity is 300 tons.

*Mr. Gupta.*—Yes, at present.

*Dr. Matthai.*—The Eastern Chemical Company, Limited, give 1,500 tons as their capacity. There are heaps of other companies which make coppers. The total capacity of the Indian companies is much in excess of the country's requirements.

*Mr. Gupta.*—Yes, as regards coppers. But we need not confine ourselves to the manufacture of coppers only. We can make alum and other things.

*President.*—What I wish to know is this. First of all, take the whole productive capacity of the country. Suppose you two manufacturers are working together. What I want to know is, having found the productive capacity of the plants working together, you have got to ascertain what the demand is, what markets you can reach. I have not been able to discover what the market is. I have not been able to find out how much of that market can be served by manufacturers in this part of India. It is no use saying that there is a market. If the market is in Calcutta, that is not your market.

*Mr. Gupta.*—I agree.

*President.*—What I want to know is the equipment of the industry and what may be called its real geographical and commercial market.

*Mr. Gupta.*—Take the case of alum. Bombay consumes about 80 per cent. Take soda sulphide. Bombay consumes nearly 85 per cent. Take again zinc chloride. There too, the Bombay market consumes 85 per cent. In other words, the salts we make are consumed mainly by the mill industry. From that point of view we are much better situated in respect of these

chemicals. If the Eastern Chemicals make these, they are also better situated. As regards Glaubers salt and Epsom salt, the same thing applies.

*President.*—Supposing both the works worked to their maximum capacity?

*Mr. Gupta.*—We can easily adjust.

*President.*—It is not a question of your adjusting. Supposing both of you worked to your maximum capacity, what I want to know is whether your production can be absorbed in your legitimate market without trying to go too far.

*Mr. Gupta.*—As far as we are concerned, we will be content with supplying the demand of the Bombay market.

*President.*—You take the two units together because they are in this part of India. Leave alone others which are in the other parts of India. You must satisfy us that if you both work to your full capacity, the market here will absorb the combined production of the two. That is what I wish to know.

*Mr. Gupta.*—In that case what we should do is to divide the productions of different articles.

*President.*—It is not a case of what you should do. I want to know what the position is. We had a peculiar case in the Match industry. People said that they had their market, but some of them had their market in Kashmir.

*Mr. Ramsingh.*—We will supply the figures to you to-morrow. If we divide half and half, 16,000 tons of sulphuric acid will be consumed between two of us.

*President.*—I am not suggesting that. What I want to know is that taking the two units together the maximum capacity does not exceed the demand of the market in Bombay and in other markets which you can reasonably reach. If you could give us some figures, it would be useful. If your trouble arises from over-production or over-equipment and if you are trying to penetrate into markets to which you are not entitled, Government would find it difficult to help you.

*Dr. Matthai.*—If you could show that in Bombay and other markets which are accessible to Bombay, there is a sufficient demand for your capacity either in the form of acids or in the form of secondary products, it would be helpful.

*Mr. Gupta.*—We shall send you these figures later.

*Dr. Matthai.*—I take it that your capacity is larger than the capacity of any other chemical works.

*Mr. Gupta.*—Yes, in respect of acids.

*Dr. Matthai.*—Looking at the table given on page 2, the point that strikes me is that your capacity, taking salts, is largest in Epsom and Aluminum Sulphate.

*Mr. Gupta.*—These are the actual productions.

*Dr. Matthai.*—Your capacity for Epsom and Aluminum Sulphate is largest among the salts you make.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—But your actual production of these two salts is the smallest although your capacity is the biggest. That is the position at present.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—That indicates the seriousness of the position.

*Mr. Gupta.*—We are unable to compete in respect of these.

*President.*—I can understand the position in regard to Epsom salt because the prices are much too low, but I don't understand the position as regards aluminic ferric?

*Mr. Gupta.*—That also has gone down. The aluminic ferric is used for the manufacture of alum. Each ton of bauxite makes so much of aluminium sulphate or alumina ferric which treated with potash sulphate gives alum of potash.

*President.*—In answer to question 8 you say “As regards the acids, except phosphoric acid which is somewhat inferior in quality, they are equal in quality and appearance to those imported”. What is the trouble with phosphoric acid?

*Mr. Gupta.*—We are new in this manufacture and that is why it contains a bit more of sulphuric acid than it ought to.

*President.*—This phosphoric acid is used chiefly by the Match industry?

*Mr. Gupta.*—Yes.

*President.*—Is there some difference in the process of manufacture or is it because they get better bones?

*Mr. Gupta.*—They don't manufacture it from bones. They make it from rock phosphates. Really speaking we can get as good a product from bones as from rock phosphates, but we are new in the business and we want some more time to perfect it.

*President.*—You don't manufacture phosphoric acid in large quantities?

*Mr. Gupta.*—No, because we cannot compete.

*Dr. Matthai.*—Is phosphoric acid a by-product in the process of making fertilisers?

*Mr. Gupta.*—It is a main product.

*President.*—As regards zinc chloride, alum potash, alumina ferric and copper sulphate you say they are somewhat inferior in appearance.

*Mr. Gupta.*—Yes, in colour.

*President.*—What about their quality?

*Mr. Gupta.*—They are quite as good as those imported.

*Dr. Matthai.*—Why are they inferior?

*Mr. Gupta.*—There also I should think we are new. We can perfect it shortly if we are able to produce to our full capacity.

*President.*—Does the manufacturer object to the colour.

*Mr. Gupta.*—They are users of a particular kind of product and they naturally like to have the same quality.

*President.*—There is no serious prejudice, is there? Do you make any allowance in price?

*Mr. Gupta.*—Yes, about 5 per cent. If the foreign price is Rs. 140 we have to sell it say three or four rupees cheaper.

*President.*—That happens in the case of most articles manufactured in India!

*Mr. Gupta.*—That is so.

*Dr. Matthai.*—A suggestion has been made to us by one of the paper companies about alumina ferric that the Indian alumina ferric is not white enough for sizing purposes because there is too much iron in it, though they admit that it is good enough for water purification purposes. If that is so, it may substantially affect the demand for the Indian product:

*Mr. Gupta.*—We can perfect it to that stage quite easily.

*Dr. Matthai.*—I wonder if there is any trouble with the Indian bauxite?

*Mr. Gupta.*—Some bauxite obtained in India contain more iron, but there is bauxite available in India which is quite as good as any in other parts of the world.

*Dr. Matthai.*—The bulk of the demand at present is for sizing?

*Mr. Gupta.*—And also for water purification.

*Dr. Matthai.*—But the more important one is sizing?

*Mr. Gupta.*—Yes. But we find that water purification is increasing every year.

*President.*—The principal industry that uses these chemicals is the textile industry?



*Mr. Gupta.*—As far as we are concerned, about 80 per cent. of our manufacture goes to the textile industry.

*President.*—One of the points that we have got to consider is, if we recommend protection by means of an increased tariff, how the industries using these chemicals might be affected. For that purpose it would perhaps be sufficient for us if we examined the Millowners Association, would it not?

*Mr. Gupta.*—Yes.

*President.*—We have received no representation from either the Millowners Association or from any Chamber of Commerce and it appears to me that they are not affected by any proposals that this Board may make.

*Mr. Gupta.*—I think the Board can safely assume that.

*Dr. Matthai.*—A duty of 30 per cent. on some of these chemicals can easily be borne by the textile industry?

*Mr. Ramsingh.*—That is my view. I am myself manager of one of the mills here and have some experience of their use.

*President.*—If the millowners don't come forward and place their case before us, we may assume that there is no opposition from them to your proposal. In any case we have taken the precaution of writing to these people asking them if they are prepared to come forward and it is for them to consider. But there is one consumer that never appears but whose case has always to be considered and that is the agriculturist. What I wish to know is, so far as these heavy chemicals are concerned, to what extent is he interested at present?

*Mr. Gupta.*—Except in the case of fertilisers it does not affect him at all as far as we are concerned.

*President.*—It is a point which has to be considered. Supposing we recommended an increase in the duties, to what extent would that affect the agriculturists? Can you give us any idea? We have no evidence at present as to the quantity of fertilisers manufactured in this country in which these heavy chemicals are used.

*Dr. Matthai.*—As far as these heavy chemicals, which are included in this list are concerned, none of them are used in the manufacture of fertilisers except sulphuric acid. Is that correct?

*Mr. Gupta.*—Yes. We are not asking for any duty on fertilisers which are already imported free. We want to cheapen the price of fertilisers.

*Dr. Matthai.*—You cannot cheapen fertilisers by putting a duty on sulphuric acid.

*Mr. Gupta.*—We might be able to make super-phosphates cheaper.

*Dr. Matthai.*—Don't you ask for a duty on sulphuric acid?

*Mr. Gupta.*—We have not definitely put forward any proposal.

*Dr. Matthai.*—You have suggested in one of your numerous representations that a duty might be levied on sulphuric acid.

*Mr. Gupta.*—Yes, on imported sulphuric acid.

*Dr. Matthai.*—We cannot differentiate between the two.

*Mr. Gupta.*—Sulphuric acid as such is not used by the cultivator. Our aim is to supply them cheaper superphosphates. We are not able to cheapen bone superphosphates because our price of sulphuric acid is higher.

*Dr. Matthai.*—Supposing we put a duty on sulphuric acid and gave you protection against the imported acid, as far as bone super-phosphates are concerned, in spite of an increase in the cost of sulphuric acid your interest would be better served by selling bone super-phosphates at lower prices: it is only in that way that you can get a market for it. Is that what you mean?

*Mr. Gupta.*—Yes.

*President.*—In answer to question 10 you say "Glauber's salt cannot be produced all the year round because in summer the temperatures are higher and prejudicial to efficient production". Is crystallization slower?

*Mr. Gupta.*—Crystallisation does not take place when the temperature is over 30°C that is 86°F.

*President.*—Is that a serious drawback?

*Mr. Gupta.*—It affects the cost of production. If we could maintain the production throughout the year we could make it a bit cheaper.

*President.*—Can you store it?

*Mr. Gupta.*—We lose if we store. It gets dehydrated and concentrated. Glauber's salt has almost half its weight of water in it. The consumer is benefited because he gets the concentrated stuff. We lose because of loss in weight he gets the better article at the same price.

*President.*—Does it not get dehydrated during the period of transport from abroad.

*Mr. Gupta.*—It takes only 3 weeks to come. 3 weeks' transportation in bags does not affect it very much.

*Dr. Matthai.*—The high temperature would affect condensation, would it not?

*Mr. Gupta.*—In some cases it would. But in this case it is crystallisation, which is affected.

*Dr. Matthai.*—Does it affect other crystals?

*Mr. Gupta.*—No. At least not in the production of copperas which we make throughout the year.

*Dr. Matthai.*—Some others told us that the high temperature affects condensation equally with crystallisation.

*Mr. Gupta.*—We have no case of condensation here. It is all a question of crystallisation. In the case of Glauber's salt it affects us because crystallisation doesn't take place beyond 30°C.

*Dr. Matthai.*—In other chemicals there is no question of condensation?

*Mr. Gupta.*—In the case of these chemicals it is a matter of slow crystallisation and it doesn't affect us the least. Copperas, copper sulphate, and epsom salt, we get throughout the year.

*President.*—You have given in answer to question 11 the processes by which you manufacture these various articles. I ask you generally, as you have been recently abroad, whether you would suggest that your processes are as up to date as in other parts of the world.

*Mr. Gupta.*—Chemical processes change every few months. Some small changes have taken place in these processes.

*President.*—I am not speaking of small changes.

*Mr. Gupta.*—Materially we are not much affected.

*President.*—Take your sulphuric acid plant.

*Mr. Gupta.*—Most of the acid is yet made by the Chamber process everywhere for the manufacture.

*President.*—What other processes do they use?

*Mr. Gupta.*—In cases where stronger acid is wanted, they use contact process and they get 100 per cent. sulphuric acid or more but as we are not yet concerned with the dye manufacture or explosives we are not to think of such processes at present.

*President.*—But for ordinary manufacture this process is used.

*Mr. Gupta.*—In fact for the manufacture of salts we are making and for fertilisers, the Chamber process is the only process used, because if we make a stronger acid and dilute it for use, it costs much more than to manufacture it in a dilute form.

*Dr. Matthai.*—It is not merely a stronger acid, but you get a pure acid.

*Mr. Gupta.*—We get a pure acid from the cascade process, also.

*Dr. Matthai.*—There is no prejudice against your battery acid.

*Mr. Gupta.*—No.

*Dr. Matthai.*—Your plant was installed in 1922.

*Mr. Gupta.*—Yes. We started erection in 1920-21.

*Dr. Matthai.*—You got all your plant in 1919.

*Mr. Gupta.*—We bought the plant in 1920.

*Dr. Matthai.*—All these enormous reorganisations of the Chemical Industry in England and Germany took place after 1920, so that it is quite likely that there would have been rather substantial changes in the processes.

*Mr. Gupta.*—Not much in the Chamber process.

*Dr. Matthai.*—They are making acids other than sulphuric acid by synthetic process.

*Mr. Gupta.*—Nitric acid. I am not competent to express any opinion whether they could make it much cheaper or not. I have seen one or two plants only. It may be that it is cheaper to make by the synthetic process.

*Dr. Matthai.*—It must be a large scale plant.

*Mr. Gupta.*—Yes, and the capital expenditure is tremendous.

*Dr. Matthai.*—What is the smallest unit?

*Mr. Gupta.*—7 tons of nitrogen a day. That means sulphate of ammonia 35 tons a day at least.

*Dr. Matthai.*—The Eastern Chemical Company, Limited, in their representation say that there has been a considerable import of nitric acid at very cheap rates. That might have something to do with the synthetic process.

*Mr. Gupta.*—Also because the war time plants are now making peace time nitric acid at a cheaper rate. That is affecting us surely. Since last year quite a considerable quantity of nitric acid is coming and we have to lower our prices also. It may seriously affect us later on.

*President.*—Which are the industries that chiefly use nitric acid?

*Mr. Gupta.*—Metal refiners, Bombay mint and the explosive department of the Government.

*President.*—At present you are not interested in explosives.

*Mr. Gupta.*—We supplied a lot of our nitric acid to Kirkee, Aruvankadu and Calcutta.

*President.*—We saw the Cordite Factory at Aruvankadu and they make their own nitric acid.

*Mr. Gupta.*—Yes.

*President.*—Really speaking it is a small manufacture.

*Mr. Gupta.*—Gold refiners mostly use our acid.

*President.*—You suggest that a lot of nitric acid is being imported now.

*Mr. Gupta.*—Yes. Lithographers also use quite a lot of nitric acid.

*President.*—In 1927-28 the quantity of imported nitric acid is only 455 cwts. all over India.

*Mr. Gupta.*—It is only recently that imports of nitric acid have become larger.

*Dr. Matthai.*—Synthetic process cannot affect the production of sulphuric acid.

*Mr. Gupta.*—Inasmuch as we shall not be able to make more nitric acid.

*Dr. Matthai.*—What I mean is synthetic process will not help the European producer to produce sulphuric acid cheaper. It affects nitric acid, but it does not affect sulphuric acid.

*Mr. Gupta.*—No.

*Dr. Matthai.*—There is no reason then that synthetic process are making sulphuric acid cheaper in Europe.

*Mr. Gupta.*—No.

*Dr. Matthai.*—Recently there has also been a considerable increase in the import of sulphuric acid especially into this side of India.

*Mr. Gupta.*—The war time plants are making more than is required in the country of production and the surplus is exported out here.

*Dr. Matthai.*—May I take it that except in rare cases most of the acids imported into India are for laboratories and things of that kind?

*Mr. Gupta.*—Those are acids of pure quality.

*Dr. Matthai.*—The quantity imported is very small.

*Mr. Gupta.*—Total is about 455 cwts.

*Dr. Matthai.*—That is for commercial use.

*Mr. Gupta.*—Pure acid comes to about 50 tons.

*Dr. Matthai.*—Those imports do not raise the question of acid as such.

*Mr. Gupta.*—In the case of nitric acid as such we are much affected.

*Dr. Matthai.*—That must be since the date of these imports.

*Mr. Gupta.*—Especially this year.

*Dr. Matthai.*—It must be quite recently.

*Mr. Gupta.*—So far practically it was a test whether they can supply at a lower price than we can, and now they find they can.

#### *Raw Materials.*

*President.*—We wanted really the principal raw materials, but you go on giving us what may be called the natural raw material. You say sulphuric acid and nitric acid and you use that as a raw material. What we really want to know is the principal raw materials. For the manufacture of sulphuric acid you require sulphur and nitrate and that sulphur has to be imported in any case.

*Mr. Gupta.*—Yes, at present.

*President.*—I take it the principal raw materials are sulphur, nitre, salt, magnesite, bauxite and bones.

*Mr. Gupta.*—Yes.

*President.*—The only one that you have not got in any form is sulphur

*Mr. Gupta.*—Yes.

*President.*—But as regards nitre, you use nitrate of soda. You have got nitrate of potash in the country.

*Mr. Gupta.*—Yes.

*President.*—Is there any substitute for sulphur?

*Mr. Ramsingh.*—No.

*Mr. Gupta.*—Burma has an enormous quantity of zinc blende.

*President.*—We do not know.

*Mr. Gupta.*—The Munitions Department has given a report on that

*President.*—Munitions Department has served its purpose and other things have happened since then.

*Dr. Matthai.*—Potash sulphate is an important material.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Does potash sulphate occur as a mineral deposit?

*Mr. Gupta.*—Yes, as a natural deposit.

*Dr. Matthai.*—It really comes out of Strassfurt deposits. It does not occur as a mineral deposit.

*Mr. Gupta.*—It has to be recrystallised.

*Dr. Matthai.*—Out of what?

*Mr. Gupta.*—Out of the mineral containing it.

*Dr. Matthai.*—The point I was trying to suggest is supposing you use potassium nitrate, instead of sodium nitrate, then you can get potash sulphate out of it.

*Mr. Gupta.*—Yes, as a byproduct in manufacturing nitric acid.

*Dr. Matthai.*—At present the trouble is potassium nitrate is very much more expensive.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—What happens to the Indian potassium nitrate? Is it exported?

*Mr. Gupta.*—The bulk of it is exported.

*Dr. Matthai.*—In one of your representations you say the excise policy has something to do with it. What bearing has the excise policy on that?

*Mr. Gupta.*—These potassium nitrate manufacturers are small people. They collect the potash bearing earth round two or three villages. According to the excise policy of the Government all salts recovered have to be kept a watch on. For this purpose an Inspector is appointed. These poor people said "We are too poor to bear this charge and as such we can't refine it."

*Dr. Matthai.*—What I cannot understand is how is it that there is an export market for potassium nitrate when you can get sodium nitrate for the same purpose at about 40 per cent. cheaper.

*Mr. Gupta.*—To England it goes for refining at Greenwich arsenal—and subsequently in the manufacture of explosives like gunpowders. It goes to Mauritius for plantations as fertilisers. Potash nitrate is almost a compound fertiliser. It goes to China for a similar purpose and for fire works.

*President.*—Why don't you use that?

*Mr. Gupta.*—We do use it when we want a substitute.

*President.*—If it pays those people to use potassium nitrate taken from this country, why should it not pay you?

*Mr. Gupta.*—We do use it in the manufacture of mixed fertilisers. The manufacturers have to pay a lot by way of taking out license and so forth. During the war time license fee was reduced to a minimum sum of one rupee or so. As soon as the war requirements were stopped, the license fee was increased, production went down and prices rose up. At these higher prices it does not pay us to use it in any form.

*President.*—During the war how the price of potassium nitrate compared with sodium nitrate?

*Mr. Gupta.*—It went down considerably. Considering the nitrogen and potash it contained, it was fairly cheap. The export price was about £12 to £13 per ton.

*Dr. Matthai.*—At present sodium nitrate is about Rs. 170 here.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Supposing, for example, there was a readjustment of the excise arrangements do you think there is a possibility of potassium nitrate being somewhere about Rs. 170.

*Mr. Gupta.*—I won't be surprised.

*President.*—In answer to question 13, you have mentioned that sulphate of ammonia is one of your raw materials.

*Mr. Gupta.*—Yes.

*President.*—Is it for manufacturing fertilisers?

*Mr. Gupta.*—Yes.

*President.*—Do you use the Indian stuff or imported stuff?

*Mr. Gupta.*—The Indian stuff is concerned by the British Federation which controls the market in India. To buy from them means no margin for us. We have to buy therefore from other parties.

*President.*—Do they leave a margin to others?

*Mr. Gupta.*—They have their own office.

*President.*—How is it that if the Federation controls the market, you are able to purchase it much cheaper?

*Mr. Gupta.*—Because there are people outside the Federation. We have to pick up such manufacturers in different countries.

*President.*—Do you import it direct?

*Mr. Gupta.*—Yes.

*President.*—What difference does it give?

*Mr. Gupta.*—It gives us a little margin which enables us to compete.

*President.*—What is the price you pay?

*Mr. Gupta.*—The Federation's price last year was Rs. 160 to 165, whereas we could get it at Rs. 155. So, there is a difference of Rs. 10 or about.

*President.*—How much do you use of that?

*Mr. Gupta.*—Last year we took about 1,000 to 1,200 tons.

*President.*—In what form do you then sell it?

*Mr. Gupta.*—As Sulphate of Ammonia and also as mixed fertilisers.

*Dr. Matthai.*—What Federation are you speaking of? Are they connected with the Imperial Chemical Industries?

*Mr. Gupta.*—The Federation is a selling body and not a manufacturing body. Brunner Mond's or The I. C. I. are the manufacturers.

*Dr. Matthai.*—These figures that you give represent your actual consumption at present.

*Mr. Gupta.*—Yes, the average for the last 3 years.

*Dr. Matthai.*—The only thing that occurred to me with regard to Epsom salt, comparing it with the figures of consumption given by other people, was that your magnesite and sulphuric acid figures are considerably higher.

*Mr. Gupta.*—We did not make allowance for the mud that is left over. That comes to about 20 per cent. when recovered.

*President.*—This table given in answer to question 14 shows that in every product there is a large percentage of Sulphuric Acid.

*Mr. Gupta.*—Yes.

*President.*—If we were to recommend a bounty, then should we be right in assuming that the quantity of sulphuric acid in the super-phosphate is about '38 per ton.

*Mr. Gupta.*—Yes.

*President.*—That is about two fifths of a ton.

*Mr. Gupta.*—Yes.

*President.*—If we recommended a bounty on sulphuric acid, it would enable you to reduce the price of super-phosphate to that extent.

*Mr. Gupta.*—Yes.

*President.*—Then as regards the two principal raw materials: your sulphur is obtained from Hamburg.

*Mr. Gupta.*—Yes.

*President.*—If it is obtained from Sicily, would not the price be cheaper?

*Mr. Gupta.*—The supply of sulphur, both Sicilian and American, is controlled by a trust: at least it was so till 1927. The American sulphur is stocked at Hamburg, whereas Sicilian sulphur is exported direct from Sicily. The price of sulphur, whether Sicilian or American, is the same, being under the control of a trust.

*President.*—The one thing that puzzles me is this. Every country which has to depend on American or Sicilian sulphur must pay the freight.

*Mr. Gupta.*—Yes.

*President.*—I do not know in what way freights are arranged but I take it that the freight from Sicily to the Indian ports would determine the price of all sulphur in India.

*Mr. Gupta.*—Whether the source of sulphur is Sicily or America, the price is the same.

*President.*—They may fix it in any way they like if they have a monopoly, but I think there are countries which can get sulphur from pyrites. To those countries are different prices quoted or what? If so, is there any evidence of that?

*Mr. Gupta.*—I do not know in the case of sulphur, but I know in the case of rock phosphate different prices are quoted.

*Mr. Smith Wright.*—I think in our first representation to the Government we gave the prices of sulphur to England as well as to India.

*President.*—If you give the c.i.f. prices, the difference might be accounted for by the freight. What I want to know is—is there a difference in the f.o.b. price? The complication in the freight makes it very difficult for any one to judge.

*Mr. Smith Wright.*—I think that the price is so regulated that the c.i.f. price to any country will be the same whether the source of supply is America or Sicily.

*President.*—Sicily is not nearer to England than she is to India.

*Mr. Smith Wright.*—Sicily is nearer India than America.

*President.*—I am taking Sicily because if freight depended on the distance there should not be any difference in the price.

*Mr. Smith Wright.*—There the question of pyrites comes in.

*President.*—Of course, freights are not regulated by distance.

*Mr. Smith Wright.*—I don't think that the question of freight really comes in.

*President.*—We want some evidence.

*Dr. Matthai.*—In this Sulphur Combine, are people who produce sulphur from pyrites included?

*Mr. Gupta.*—They are not.

*Dr. Matthai.*—So that it is really a question of competition.

*Mr. Gupta.*—Yes. If we have pyrites, we could squeeze the price down.

*Dr. Matthai.*—Sulphur from pyrites is mainly made in Spain, is it not?

*Mr. Gupta.*—The main supply is from Spain but there are other countries too. England has some pyrites also.

*Dr. Matthai.*—The bulk of it is found in Spain, is it not?

*Mr. Gupta.*—Yes.

*Mr. Ramsingh.*—In England I have seen factories where they have 3 burners ready. If the price of sulphur goes up, they use pyrites and if the price of the latter goes up, they use sulphur.

*President.*—Pyrites are not burnt like that.

*Mr. Gupta.*—They have to be roasted.

*President.*—Is not pyrite a kind of ore.

*Mr. Gupta.*—It is an ore.

*President.*—It has to be furnaced.

*Mr. Gupta.*—It has to be roasted.

*President.*—It is like a blast furnace to some extent, is it not?

*Mr. Gupta.*—Yes.

*President.*—What I want to know is this. It is quite possible from the furnace they may be using sulphur gases for the manufacture of sulphuric acid, but then iron and other things must go out.

*Mr. Gupta.*—Pyrite is not considered from the point of view of its iron contents.

*President.*—According to some books, pyrites pay best where there is a demand for iron.

*Mr. Smith Wright.*—Yes, if you can get rid of iron.

*President.*—Where they don't make use of the iron, it would not be profitable to use pyrites. Pyrites contain about 45 per cent. of sulphur and there is 55 per cent. of something else. They cannot afford to throw away the 55 per cent. other stuff in it.

*Mr. Gupta.*—The price they have to pay for pyrites is determined on the sulphur content only.

*Synthetic processes.*

*Dr. Matthai.*—Could you give me some idea of the difference between the synthetic process in Norway and the synthetic process as used in Germany? I have a general idea that as it is employed in Norway it means bigger consumption of electric power.

*Mr. Gupta.*—Exactly so.

*President.*—Supposing it was a question of adopting the synthetic process in India, I expect the process that would be used would be the German process. Could you give me some idea of the German process?

*Mr. Gupta.*—German process is generally called the Haber process. The process consists of the oxidation of ammonia in the presence of Platinum as catalyst to nitric acid. For the production of ammonia, the elements required are hydrogen and nitrogen. On some process hydrogen obtained by the electrolysis of water or Brine, whilst the nitrogen is obtained from the liquefaction and distillation of air. In the Haber-Bosch process however water gas is produced from steam and coke and mixed with producer gas made from air, steam and coke, thus giving a gas containing hydrogen, nitrogen, carbon monoxide and dioxide. This is mixed with steam and passed over a catalyst, giving a resulting mixture of  $H_2$ ,  $N_2$ ,  $CO_2$  and some trace of CO. Under compression and washing the  $CO_2$  and CO are removed. The  $H_2$  and  $N_2$  are next passed over to the synthesis plant—when they combine to produce  $NH_3$  in the presence of a catalyst under a specific pressure.

*Dr. Matthai.*—Have you any idea of the cost of electricity in Germany?

*Mr. Gupta.*—The maximum cost is '3 of an anna a unit. The minimum may be '1 of an anna. In Norway it is 1 farthing or so.

*President.*—You require a plant of at least 5,000 tons?

*Mr. Gupta.*—A unit consisting of 7 tons of nitrogen a day will give about 35 tons of sulphate of ammonia or equivalent of nitric acid. A plant to produce 35 to 30 tons a day can only be put up when the country is in a position to absorb all this sulphate of ammonia or its equivalent of soda nitrate. At present the whole nitrogen demand in India in the form of sulphate of ammonia is 13,000 to 15,000 tons per annum, and nitrate of soda about the same quantity. The maximum demand is about 40,000 tons. No doubt in the next ten years it may increase considerably. It is increasing very rapidly.

*President.*—50 tons a day is equal to about 19,000 tons a year.

*Mr. Gupta.*—Yes.

*President.*—You have that demand?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—It is true I suppose that ultimately whether the Indian Chemical industry would be able to establish itself or not would depend on how far it can use this electrolytic method.

*Mr. Gupta.*—It does not come to that. The position is, the world is producing more than the demand. They want to have peace time as well as war time requirements. In fact the synthetic nitrogen industry got its impetus in 1914 when the Germans began its manufacture in right earnest because they were cut out from their nitrate supply from Chili. Since then enormous stride has taken place: France has its own process, Germany has its own process; England has modified the German process. Then there is another process in Italy.



*President.*—So far as all these products where sulphuric acid is the principal chemical, nothing synthetic has been invented, so that ultimately in most cases the whole cost is determined by the price of sulphuric acid?

*Mr. Gupta.*—As regards chemicals under reference, the price is determined by the cost of the sulphuric acid. In the case of sulphates, chlorides and so on . . . .

*President.*—So far as we are concerned, except in the production of fertilisers the synthetic process will not help us.

*Mr. Gupta.*—No. As everybody is well aware, the demand from the agriculturists is the most important and there is a constant demand, so if a big amount of synthetic nitrogen is produced by a plant it necessarily becomes cheap.

*Dr. Matthai.*—I was looking at it this way. As the trade figures stand at present, the biggest demand is for alkalis in India and the next biggest demand in the near future I should say would be for nitrogenous products in one form or another.

*Mr. Gupta.*—Nitrogenous products as regards the agricultural demand, but sulphuric acid too.

*Dr. Matthai.*—The demand for sulphate of ammonia would in the near future be bigger than any chemical product except perhaps alkalis.

*Mr. Gupta.*—That is the case everywhere. Fertiliser demand is more than the chemical demand.

*Dr. Matthai.*—Therefore if the Indian industry is to have a permanent future it must be in a position to make all those products for which there is the biggest demand, namely sodium carbonate, caustic soda and sulphate of ammonia.

*Mr. Gupta.*—Sulphate of ammonia does not meet all the demands of the agriculturists.

*Dr. Matthai.*—But the demand for super-phosphates would arise along with sulphate of ammonia.

*Mr. Gupta.*—Yes, but not until sulphuric acid is made cheaper. In the United States of America 75 per cent. of the sulphuric acid produced is used in the super-phosphates only. As we have mentioned in our first representation, for super-phosphate manufacture alone sulphuric acid used in Great Britain amounts to 850,000 tons, in the United States of America 1,120,000 tons. In the States the bulk about 75 per cent. of it goes into the manufacture of super-phosphates, in England 40 to 45 per cent., in Germany 60 to 65 per cent., so that the bulk of sulphuric acid manufactured in any country goes to the manufacture of fertilisers and super-phosphates, and therefore as I said, it is not only the nitrogenous products which determine the whole thing, the future development of the sulphuric acid manufacture plays even a greater part inasmuch as it is also used for dye manufacture, for explosives and heavy chemicals. In heavy chemicals sulphuric acid is consumed to the extent of 20 per cent.; but the bulk goes to fertilisers.

*Dr. Matthai.*—20 per cent. in heavy chemicals and 40 per cent. in fertilisers?

*Mr. Gupta.*—50 per cent. is the average only in super-phosphates.

*Mr. Ramsingh.*—Incidentally I might mention that by using only nitrogenous matter lands in India are deteriorating and therefore it is necessary that more super-phosphates should be used.

#### *Fertilisers.*

*President.*—Up to now really speaking they have not been able to say what kind of fertiliser is really required for the whole of India generally. We really don't know what form fertilisers may take so far as crops are concerned. The evidence given before the Agricultural Commission was not at all satisfactory. The point is that each kind of soil requires separate study and it may require different kinds of fertiliser for different kinds

of crops. We have not got sufficient information to be able to say what sort of fertilisers India requires and that is why the Agricultural Commission got out of the difficulty by suggesting the establishment of agricultural research institutes to carry out experiments with different kinds of soil and different kinds of fertilisers. Until then it is really difficult to say whether you require nitrogenous fertilisers or phosphates or other sorts.

*Mr. Ramsingh.*—It has been proved beyond doubt that it requires nitrogen and phosphates both.

*President.*—The reason why I am putting to you this question is this. If we were to consider the question of bounty we should like to know what the ultimate bill is going to be which the country has to foot.

*Mr. Ramsingh.*—We can ascertain what kinds of fertilisers were being used before. We can go by the past experience.

*President.*—I would refer you to the Agricultural Commission's report to find that out for yourself. The difficulty arises in this way. If you want nitrogenous fertiliser there is the synthetic process. If you want super-phosphates it makes a tremendous difference in the bill which the country has to foot.

*Mr. Gupta.*—Nitrogen may predominate or phosphates may predominate but the ratio between phosphates and nitrogen will always stand as both are required in every country.

*President.*—Our lands have been cultivated for ages without any kind of artificial fertilisers being used.

*Mr. Ramsingh.*—I respectfully differ from you there. They have been using cow dung cakes, fish manure and farm manure.

*President.*—We all know that. What I am trying to suggest is that the experience of France or the United States of America cannot be a guide for India. As regards India we have not got sufficient information as to what is the agricultural necessity.

*Dr. Matthai.*—The practical point that arises for our consideration here is that you cannot in the present state of agricultural research in India state what is likely to be the demand for phosphates for fertilising the soil in the next few years, and if we were to recommend a bounty on sulphuric acid we should have to say that this bounty should be given on a particular output and that would depend on somebody being able to give evidence as to what is going to be the demand for super-phosphates during the next few years in which sulphuric acid plays an important part. That is the point.

#### *Sulphuric acid costs.*

*Mr. Ramsingh.*—With reference to question 15 may I point out that from 1914 to 1918 supply to sulphur was available in India from various countries, e.g., Japan, United States, Sicily and so on. For example, if the supply from Sicily was cut down we could turn to Japan, if the supply from America was cut down we could get our supplies from elsewhere.

*President.*—That is not the point we are considering. The point is, if you have always got to depend on imported sulphur the price of which must be determined by alternative sources such as pyrites, then we are at the mercy of foreign countries as regards price and not as regards quantity. That is the point. Now let us go on to question 16. In answer to that you say the price of sulphur is £7-10-0 c.i.f. What I want to know is what will be the price of sulphur c.i.f. British port?

*Mr. Gupta.*—About £5.

*President.*—How do you explain the difference? Why should there be a difference in the case of Great Britain of nearly £2-10-0?

*Mr. Gupta.*—There is a difference of £2 on an average.

*President.*—Why should there be that difference?

*Mr. Gupta.*—They charter ships and get lower freight. It is also regulated by the price of pyrites in England.

*President.*—What I am suggesting is that as compared to Great Britain you would be in more or less permanent disadvantage of £2 per ton.

*Mr. Gupta.*—Yes, until we have pyrites available in India.

*President.*—Taking 35 per cent. of sulphur per ton of sulphuric acid that gives you a disadvantage of about Rs. 10 per ton on the quantity of sulphur used?

*Mr. Gupta.*—Yes.

*President.*—But even so your sulphuric acid costs a good deal more than apparently it does in Europe. The difference of Rs. 10 in the cost of sulphur per ton of sulphuric acid does not account for it.

*Mr. Gupta.*—Arsenic free acid in England costs £3.

*Dr. Matthai.*—We have got the price of £6 from somebody.

*Mr. Gupta.*—That is the selling price. £3 is the works cost.

*President.*—I am talking of the selling price.

*Mr. Gupta.*—That is £6 to £6-10-0.

*President.*—Then your selling price ought to be that plus Rs. 10.

*Dr. Matthai.*—That is to say about Rs. 90.

*President.*—I want to know how the difference is explained.

*Mr. Gupta.*—It arises out of the fact that our production here is nothing like the large scale production in other countries.

*President.*—I am not going into details just now. I find that there is much difference even allowing for your full production.

*Mr. Gupta.*—No. Allowing for full production there is not much difference. We can make Rs. 20 to Rs. 25 per ton cheaper. Rs. 65 is our present cost.

*President.*—Are you talking of Chamber acid?

*Mr. Gupta.*—Yes. The future cost is about Rs. 44.

*President.*—I take it these costs that you have given here do not include depreciation and the overhead charges.

*Mr. Gupta.*—Works overhead and selling organisation are included.

*President.*—Depreciation?

*Mr. Gupta.*—Depreciation on the plant we have not included.

*President.*—And the profit on the capital you have not included.

*Mr. Gupta.*—No.

*Dr. Matthai.*—The price of £6 in England does that correspond to C. O. V.

*Mr. Gupta.*—96 per cent. acid.

*Dr. Matthai.*—If we took your cost of Chamber acid as Rs. 60 including everything on a cent per cent. basis, would that correspond to £6 in England?

*Mr. Gupta.*—Not that.

*Dr. Matthai.*—What is the corresponding rate?

*Mr. Gupta.*—£6-10-0 to £7. That is the ordinary commercial C. O. V.—95 to 96 per cent.

*Dr. Matthai.*—On the basis of these figures, what would be your corresponding cost for that kind of acid?

*Mr. Gupta.*—Do you mean for the marketable product?

*Dr. Matthai.*—Yes.

*Mr. Gupta.*—We will have to take our full cascade production costs.

*President.*—What are the journals in which these prices are given.

*Mr. Gupta.*—The Chemical Age and the Chemical Trade Journal.

*President.*—Do you get them?

*Mr. Gupta.*—Yes.

*President.*—Will you please let us have some copies of recent issues?

*Mr. Gupta.*—Yes, we will send you.

*President.*—Do they give the British export prices? Are they considered fairly reliable?

*Mr. Gupta.*—They are the English market quotations. That £6 is *ex works* cost which doesn't include packing charges, etc.

*Dr. Matthai.*—Can you give us correct information later?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—You must give us comparable figures in both cases.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—There is just one difficulty that occurred to us with regard to your proposal for a bounty of sulphuric acid. As far as I can understand the position, the sulphur combine charges a particular price for each particular market.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—There is a price fixed according to the market conditions in India. Supposing we decide to give you a bounty of Rs. 20 a ton on sulphuric acid, is there a chance of the price of sulphur raised by the combine to that extent? The bounty that we give might go to the sulphur combine, you might not get it.

*Mr. Gupta.*—Japan has a supply of sulphur too. It is not in this combine.

*Dr. Matthai.*—That is not a supply on which you can depend.

*Mr. Gupta.*—The Calcutta market buys a lot of sulphur from Japan.

*Dr. Matthai.*—Don't you think that there is some danger in that?

*Mr. Gupta.*—I don't think because the Sulphur Syndicate's main object is to foster the sale of their sulphur.

*Dr. Matthai.*—As far as England is concerned, the price of sulphur is determined by the competition in pyrites. That is a definite factor. Here in India they fix any price which the market can bear. There is no other consideration. We give you a bounty of Rs. 20 on sulphuric acid. These people say to themselves "Look here, these people can bear at any rate Rs. 15 more on their sulphur" with the result that the bulk of the bounty might go to them and you might not get it.

*Mr. Ramsingh.*—We can buy Japanese sulphur.

*Dr. Matthai.*—That is a point for you to consider. That is a difficulty which has just occurred to us.

*Mr. Gupta.*—We may go in for pyrites. Our difficulty in regard to getting pyrites now is that we want to get a pure acid.

*Dr. Matthai.*—You may not consider the question of pyrites, because there is the freight and the sulphur content of Indian pyrites is only about 20 per cent.

*Mr. Ramsingh.*—It contains 38 to 40 per cent.

*President.*—There is again the nitrate of soda. The c.i.f. price is £12-9-0 per ton and the Indian nitrate of potash is Rs. 300 a ton. So far as you require nitrogen in the manufacture of sulphuric acid, you cannot afford to use nitrate of potash.

*Mr. Gupta.*—If the price of nitrate of potash stands at Rs. 300, we cannot.

*President.*—Why is the price of nitrate of potash so high?

*Mr. Gupta.*—The small holders who make the nitrate of potash have to pay heavy license fees.

*President.*—You have explained to me that, but that is not the whole explanation.

*Mr. Gupta.*—I believe if they are put together and if they are encouraged, they can give it at a much cheaper rate.

*President.*—If it is a paying proposition, why should not the large manufacturers undertake it.

*Mr. Gupta.*—Because the deposits are small. Long areas have to be taken out.

*President.*—Then you cannot say that it is a very promising substitute.

*Mr. Gupta.*—If it can be made in large quantities, say 30,000 to 40,000 tons a year during the war period when encouragement was given to the industry; it went down to 10,000 tons after the war when facilities were removed.

*President.*—They must have got very good prices then.

*Mr. Gupta.*—It is not exactly prices. At that time the license fee was very nominal and they could manufacture more.

*President.*—We have written to the Geological Survey of India about this and we are awaiting their reply to find out what the possibilities are.

*Mr. Gupta.*—This is the report (shown). He has given a history.

*President.*—That report has to be revised a great deal in the light of later information. We could not act on that report any more.

*Dr. Matthai.*—That is about 1920.

*Mr. Gupta.*—Yes, but the nature of the industry is much the same. It has not changed. It has been in the same hands.

*President.*—In the United Provinces chiefly?

*Mr. Ramsingh.*—Punjab, United Provinces, Bihar and some parts of Deccan also.

*President.*—You have got very large quantities of magnesite and bauxite. The only question is freight and we shall deal with that when we come to freights.

*Dr. Matthai.*—You get your supply of magnesite entirely from Mysore.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Has it any advantage over Salem?

*Mr. Gupta.*—First of all we could not get from Salem, because the Salem Syndicate had contracts with some other Companies and had given them a guarantee not to supply to any other firm in Bombay and so we did not bother when we get comparable rates from Mysore.

*Dr. Matthai.*—Fairly comparable rates.

*Mr. Gupta.*—Yes.

*President.*—As regards pyrites, have you got any reliable information which makes you say that they exist in India.

*Mr. Ramsingh.*—When we started our factory, we made exhaustive enquiries about pyrites and we sent our man to Sirohi in Rajputana. We got the samples and got it analysed. It contained about 40 per cent. We found that sulphur was the easiest thing to start with and so the pyrites question was shelved for the time being.

*President.*—Did you get any survey made as regards the quantity available?

*Mr. Ramsingh.*—Yes.

*President.*—Have you got any papers from which we can find out what your experience had been. If there is pyrites, it might help the industry a lot. Did you get it actually analysed?

*Mr. Ramsingh.*—Yes.

*President.*—Where?

*Mr. Ramsingh.*—In Bombay. We sent one of our Geologist down there for that purpose.

*President.*—What I want to know is, did you have a commercial test made? Laboratory test is not very helpful where you take a handful of pyrites and then say you discovered 40 per cent. When you come to manu-

facture it on a large scale, it may be a very different proposition. Did you get the test made on any reasonable commercial scale?

*Mr. Ramsingh.*—No, not on a very large scale. We only made preliminary enquiries. We sent out our Geologist and Chemist and got the samples.

*President.*—Did you ascertain how much it would cost there?

*Mr. Ramsingh.*—Yes.

*President.*—Have you got any papers?

*Mr. Ramsingh.*—I will just find out.

*President.*—Will you be able to send us those papers?

*Mr. Ramsingh.*—Yes.

*President.*—When was this?

*Mr. Ramsingh.*—In 1921-22.

*Dr. Matthai.*—Your estimate of the sulphur content of Indian pyrites is much higher than any figure that we have had from other chemical manufacturers. The average I was told was somewhere about 20 per cent. Anyway if you could send us any papers on the subject, it would be very helpful.

*Mr. Ramsingh.*—Yes.

*President.*—How far is Sirohi from Bombay? Would it be about 1,000 miles?

*Mr. Gupta.*—700 to 800 miles.

*President.*—Does the Geological Survey of India know about it?

*Mr. Gupta.*—They have mentioned it.

#### *Labour.*

*President.*—You don't require any very skilled labour in the manufacture of chemicals.

*Mr. Gupta.*—No, not in the manufacture of heavy chemicals.

*President.*—Chiefly a sort of cooly labour is required and that too for the purpose of handling the materials.

*Mr. Gupta.*—Yes.

*President.*—In the process of manufacture practically very little labour is required.

*Mr. Gupta.*—It is automatic and once shown they can manage. Only it requires general supervision. Instead of telling us 40°, if they say 20°, we are out.

*President.*—In other industries where a lot of labour is required, India has an advantage, but in this very little labour is required. That is the difference.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—You require a few Chemists and a lot of unskilled labour.

*Mr. Gupta.*—We require Engineers, foremen, fitters, etc. Repairs are very heavy. If we produce the maximum capacity, we require more labour.

*President.*—Sometimes you employ more labour just for the fund of it. You don't get much use out of your labour very often.

*Dr. Matthai.*—If you work to your full capacity you would require about 1,000 men, not more than that.

*Mr. Gupta.*—Yes; at one place. If you compare on the tonnage basis, it may not work out very little.

*President.*—Your labour charges on the whole do not amount to much.

*Mr. Gupta.*—No, because the labour is cheap.

*Power.*

*President.*—I doubt! The next item is power. As regards electric power I take it that one of the reasons why you want to Ambernath was that the Development Department was going to supply you cheap electricity.

*Mr. Gupta.*—Yes.

*President.*—That has not come about.

*Mr. Gupta.*—No.

*President.*—Why, what was the difficulty?

*Mr. Ramsingh.*—The difficulty was this. They first quoted certain rates to us, but subsequently they said that on calculating they found that they were unable to supply at those rates. Then, when we insisted they said that they had made a mistake in their calculation.

*President.*—What do you do now? Do you make your own electricity?

*Mr. Ramsingh.*—Yes.

*President.*—Do you find it cheaper?

*Mr. Ramsingh.*—Yes.

*President.*—They are supplying electricity to the Ambernath Match Works, are they not?

*Mr. Ramsingh.*—Yes, at two annas or one anna nine pies per unit.

*President.*—Taken as a whole, is fuel a big item?

*Mr. Ramsingh.*—Steam charges are always an item in the chemical manufacture.

*President.*—You have given in answer to question (33) the total quantity of fuel whether for power production or for other purposes as 0.33 tons of crude oil and 0.05 ton of coal. Does that mean per ton of output?

*Mr. Gupta.*—Yes, we understood the question like that. We divided the total tonnage of fuel used by the total tonnage of output. Our tonnage of fuel used was more crude oil than coal and therefore it came like that.

*President.*—It comes to about on an average Rs. 35 a ton.

*Mr. Gupta.*—Yes, fuel is a big item in chemical manufacture.

*Dr. Matkhai.*—Steam is more important than electricity, is it not?

*Mr. Gupta.*—Yes, except for crushing purposes.

*President.*—Do you use crude oil for electricity?

*Mr. Gupta.*—For steam we use it.

*President.*—How do you generate your electricity?

*Mr. Gupta.*—We used to get it from the Woollen mill.

*President.*—The mill has closed down.

*Mr. Gupta.*—Yes.

*President.*—Don't you use any electricity now?

*Mr. Gupta.*—No, for the present we don't. We are using steam.

*President.*—From what power did they use to get electricity?

*Mr. Gupta.*—From oil—Diesel engine.

*President.*—Did you find oil to be cheaper than coal?

*Mr. Gupta.*—Yes.

*President.*—Oil would be just cheaper. I think that there is not much to choose between the two.

*Mr. Gupta.*—That is so. But at the present moment we find that coal is cheaper.

*President.*—What is the price of coal now?

*Mr. Gupta.*—Rs. 18 per ton and crude is about Rs. 41.

*President.*—About two tons of coal are equal to a ton of oil.

*Mr. Gupta.*—Yes, about that.

*President.*—Rs. 18 per ton, is it by rail or does it come by sea?

*Mr. Gupta.*—By rail direct from the mine. At the pitmouth it only costs Rs. 6 per ton and it is the freight that puts up the price by about Rs. 12. In some products, fuel plays a very important part like soda sulphide. In the case of all salts, we want steam.

*President.*—As regards market, in the case of sulphuric acid you give as 22,000 tons. How do you arrive at this figure?

*Mr. Gupta.*—Basing partly on the market requirements of each province and partly on the reports submitted by the Munitions Board, we have arrived at this figure.

*Dr. Matthai.*—Not merely as acid but also as raw material for other products: that is the total demand, is it not?

*Mr. Gupta.*—Yes, it is the total demand. Much of this quantity is used at the coke ovens to get sulphate of ammonia.

*President.*—So far we have only been able to trace about 4,000 tons of sulphuric acid apart from the coke ovens. You manufacture about 1,200 tons, and I think Eastern Chemicals manufacture as much. Parry's also manufacture about the same quantity and D. Waldie and Company must be making about the same quantity. The Bengal Chemical Works also will be making about 500 to 600 tons.

*Mr. Gupta.*—Yes.

*President.*—We must really find out what is the production of sulphuric acid in the country.

*Mr. Gupta.*—Tata's make about 10,000 tons. Messrs. Bird & Co. make about three to four thousand tons. Between these two companies they make about 14,000 to 15,000 tons.

*President.*—As regards this question of bounty: the sulphate of ammonia is produced by two different classes of people. In the first place there are those people who manufacture coke alone. We do not know what the quantity is. Of course now coal and coke do not make very profitable business but in so far as sulphate of ammonia is manufactured by big iron manufacturers, it is good business and sulphate of ammonia is merely produced by them as a bye-product. The more profit they make on sulphate of ammonia, the more profit they make out of pig iron and the sulphate of ammonia is now practically handed over to the federation and prices are fixed by them. There is no guarantee that if a bounty is given on sulphuric acid, the price of sulphate of ammonia will come down. It is part of the pig iron business and therefore they may simply take it as a chance or increasing the profit on pig iron. According to your figures about 10,000 tons are used by them. Clearly it is a case in which if a bounty is recommended they must be excluded or the bounty does not go to the man who uses sulphate of ammonia. Is not that so?

*Mr. Gupta.*—Tata's are not chemical manufacturers. Sulphate of ammonia is a bye-product, so far as they are concerned.

*President.*—If we propose a bounty on the production of sulphuric acid, as they manufacture about 10,000 tons of sulphuric acid a year, we have to exclude them by name.

*Mr. Gupta.*—Yes, because they are steel manufacturers.

*President.*—It is quite true but they manufacture fertilisers.

*Mr. Gupta.*—Yes, but only as a bye-product.

*President.*—What do you suggest we should do?

*Mr. Gupta.*—They should be excluded.

*Dr. Matthai.*—You will be rather hard put to it to find a ground for distinguishing between them and you because one of the great arguments for giving a bounty on sulphuric acid is that you make fertilisers cheaper that way. Sulphate of ammonia is an important fertiliser and they are making that.

*Mr. Gupta.*—If they too get the bounty, it does not affect us.



*President.*—What is the point of the bounty? Is it to increase the profit of the steel makers? The idea is to cheapen the fertiliser to the agriculturist. If that result does not follow, why should the Government pay this bounty? Again, it is public money that has to be spent. Before you play with it you have to make out a very good case.

*Mr. Gupta.*—The business in India was handed over to the federation because at that time there was no demand for the sulphate of ammonia. Now that there is going to be a demand, they may not hand over the business to federation. They handed it over because as steel manufacturers they could not do any propaganda whereas the federation people did all the propaganda and created the market. Now that the market is there, they are in a better position, they may not join the federation.

*President.*—We cannot speculate on a thing like that as to what they might do or might not do. I take it that this 20,000 or 22,000 tons include the steel works, the iron works and the coke ovens.

*Mr. Gupta.*—Yes.

*President.*—Is there any official publication to which you can refer us?

*Mr. Gupta.*—The Geological Survey have given some information in their report.

*President.*—We are examining the Tata Iron and Steel Company on this point. We may be able to get all the information from them.

*Dr. Matthai.*—I find outside of acids the only thing that you produce to capacity is copperas.

*Mr. Gupta.*—Yes, and that is made by everybody.

*Dr. Matthai.*—The Indian production is about 1,000 tons.

*President.*—Commercial salt comes to about 20,000 tons a year?

*Mr. Gupta.*—Yes.

*President.*—These chemical fertilisers that you mention are very largely imported?

*Mr. Gupta.*—Yes, sulphate of ammonia, nitrate of soda, potassium chloride and so on.

*President.*—Of which about half would be manufactured in India.

*Mr. Gupta.*—Yes.

*President.*—What it comes to is this. As far as I can see at present if all the works in India work to full capacity they would pretty nearly be able to supply the whole demand of the country. There is no room for further expansion.

*Mr. Gupta.*—That is right.

*President.*—And that would mean that the whole of the Sind area and the whole of Burma must be supplied by Bombay, Calcutta and Madras. That is what it amounts to.

*Mr. Ramsingh.*—It comes to that.

*President.*—As regards Burma the case is rather a difficult one.

*Mr. Ramsingh.*—It has got its own factory.

*President.*—They have not got it; they make only a few hundred tons of sulphuric acid. Do you consider that this market that there is in India is a sufficiently big market for a big trust to operate here?

*Mr. Gupta.*—It may not be very big, but they don't want to lose it because they find in India a potential market.

*President.*—So far as the present market is concerned, it won't affect them very much?

*Mr. Gupta.*—No, but they want to retain it for potential development.

*Dr. Matthai.*—As things stand at present the Imperial Chemical Industries do not deal with any of the other things except copperas, do they?

*Mr. Gupta.*—They make zinc chloride, soda sulphide, alumina sulphate, epsom.

*Dr. Matthai.*—I take it that most of these heavy chemicals, where they are imported, are imported from Germany?

*Mr. Gupta.*—Soda sulphide comes from England; alumina sulphate also comes from England.

*Dr. Matthai.*—But the bulk of it comes from Germany?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Epsom salt comes entirely from Germany?

*Mr. Gupta.*—Mostly.

*President.*—Then there is the question of these alkalies.

*Mr. Ramsingh.*—We have not mentioned them as we are not making any.

*President.*—But in any question of the examination of heavy chemicals should not they be taken into account as regards the possibility of their manufacture?

*Mr. Gupta.*—Yes.

*President.*—But considering that very few people in India manufacture it, it does not seem to have proved very attractive.

*Mr. Gupta.*—One Company is being started in Kathiawad. It is State managed.

*President.*—Are they going to make synthetic ammonia?

*Mr. Gupta.*—No; salt, carbon dioxide and ammonium chloride are their raw materials.

*President.*—Have they got sufficient fuel for the purpose?

*Mr. Gupta.*—They depend on coal.

*Dr. Matthai.*—What is the difficulty about zinc chloride? You are the only people who were making it.

*Mr. Gupta.*—Yes; we are the only manufacturers; we could not make it competitively so we had to stop it. First of all our sulphuric acid costs high so our hydrochloric acid costs is necessarily high. At the present price of hydrochloric acid it does not pay us to manufacture it. There is of course some technical difficulty also in making the purer quality. That we have overcome but we could not make it competitive.

#### *Freights.*

*President.*—Questions 39, 40 and 53 are really connected together as regards freight. As regards freight on raw materials, really speaking there is very little just now that you have to bring from a long distance except bauxite and magnesite.

*Mr. Gupta.*—Bones too.

*Dr. Matthai.*—You get special rates on bones?

*Mr. Gupta.*—No, class rate only.

*President.*—As regards the finished products do you get special rates?

*Mr. Gupta.*—We get lower rate on fertilisers.

*President.*—Is it lower than on any other commodity?

*Mr. Gupta.*—From Bombay to Ambarnath it works out to Rs. 3-14-0 per ton against the first class rate of Rs. 4-2-0. A special rate has been given to nitrate of soda, fertilisers, sulphate of ammonia for wagon loads.

*President.*—Take a distance of 1,000 miles; take Delhi for instance. What difference would it make? How many rupees would it cost you if you were charged the ordinary rate to send 1 ton of fertiliser?

*Mr. Gupta.*—About 40 to 45 rupees (as per ordinary rate).

*President.*—You have not given us any rates for fertilisers.

*Mr. Gupta.*—From Bombay to Ambarnath the rate is Rs. 1-7-0 on fertilisers—nitrate of soda, sulphate of ammonia, etc. This is for quantities not less than a wagon load.

*President.*—What I wish to understand is in what way the freights ought to be reduced. As I explained to you this morning, it depends on two things. The first as regards distance and the second as regards quantity. A wagon load will of course always be cheaper than a smaller load. We must try and calculate the amount of reduction that you ought to get, but what unit are we going to take and what distance.

*Dr. Matthai.*—For practical purposes would it do if you got from Ambar-nath the same freight as from Bombay to the upcountry markets?

*Mr. Gupta.*—That won't be sufficient.

*President.*—Unless we are able to say that this is what this commodity can bear and no more if it is to be protected, the railways will not be in a position to say whether they can or cannot do it. What unit should we take and what distance? If you are really serious about it you must come forward with a concrete proposal. It is no use saying that these freights are very high.

*Mr. Ramsingh.*—Supposing we say from Ambar-nath up to a distance of 500 or 600 miles.

*President.*—What about the unit? They say "We will give you a wagon load". It won't be any good to you. 700 miles would be the mean distance between Calcutta and Bombay, but it is the question of the unit that presents some difficulty.

*Mr. Gupta.*—We shall think over this and give you a concrete proposal to-morrow.

*President.*—It would be better if the two Companies (the Dharamsi Morarji Chemical Company and the Eastern Chemical Company) consulted together and came with a concrete proposal.

*Mr. Ramsingh.*—We will do that.

*Dr. Matthai.*—These rates that you give here in answer to question 54 are per maund rate.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—That is 25 maunds to a ton.

*Mr. Gupta.*—27 maunds to a ton. The railways take 27·2 maunds as being equal to a ton.

*President.*—In answer to question 40 you say: "No; on the contrary the importers are at an advantage inasmuch as they have to pay lower freights to a number of upcountry markets, though the mileage between Bombay and those stations is greater than Ambar-nath and those stations".

*Mr. Ramsingh.*—Please see our answer to question 54.

*President.*—The policy of the railways all along has been this. From the ports you get complete wagon loads as raw materials have to be brought to the ports which always take more wagons. Therefore it pays them to have lower rates from the ports to the interior. That is the case of the railways as far as I remember. It is not so fixed with a view to giving any favourable treatment to anybody.

*Mr. Ramsingh.*—Quite.

*President.*—Our raw materials is exported in bulk which is larger in proportion to the weight and therefore they have to put more wagons at the ports. Instead of sending them empty to other places, they say "we give these people a lower rate". That, as far as I know, is the case for the railways and it does seem to me there is something in it. It is quite a different proposition if they have got to send an empty wagon from the port to Ambar-nath.

*Mr. Gupta.*—They send wagons to Ambar-nath from Karjat or Kalyan.

*President.*—The whole point is this. At the ports more wagons accumulate, because they bring all their raw materials which they actually require for export. It is for that reason freights from the ports to upcountry are lower than to the ports.

*Mr. Gupta.*—Take it from the other point of view. If the goods must be disposed of they will have to go to the port. At that time it is imperatively necessary that people would therefore have to pay whatever rate railways fix.

*President.*—The outgoing traffic, so far as the railways are concerned, requires more wagons, because it is bulkier, whereas the imports are manufactured goods. Therefore there is always more freight available from the ports to the interior than from the interior to the ports. That is the case for railways. It is for that reason that you always find when you want to send anything from the ports to the interior, the freights are lower. That would be the explanation from the Railway Administration's point of view.

*Mr. Gupta.*—Yes.

*President.*—Now you suggest that distinction ought to be abolished, because obviously the foreign manufacturer gets in that way a preference against the Indian manufacturer because of the policy of the railway. That would not make so very much difference as you think, because the figures you have given do not suggest a very big difference.

*Mr. Ramsingh.*—It makes a difference of Rs. 6 to Rs. 7 per ton on an average.

*President.*—Take the factories situated in Bombay and Calcutta where they are benefited compared to you, is that not so?

*Mr. Ramsingh.*—Yes. That is why we say that a uniform treatment should be given.

*President.*—What is your suggestion as regards uniform treatment?

*Mr. Ramsingh.*—The rates available from the ports should be made available from Ambar Nath.

*President.*—What it comes to is this. If the distance is just the same or smaller, you pay the same rates as the people at the ports do.

*Mr. Ramsingh.*—In fact railway wagons from Great Indian Peninsula go from Kalyan and we should be getting better rates.

*President.*—Why should they go from Kalyan?

*Mr. Ramsingh.*—On the Great Indian Peninsula Section all wagons go *via* Kalyan.

*President.*—They must go from Kalyan, because really it is the junction. How do you know which wagon you will get?

*Mr. Ramsingh.*—They distribute us from Kalyan.

*President.*—That is a distribution centre and they have got to bring them to you. If your works were in Bombay, they would give you wagons from Bombay itself. At present they have to take wagons from the port to Kalyan and then distribute.

*Mr. Gupta.*—So far as we know there are always wagons at Kalyan.

#### *Foreign markets.*

*President.*—You talk of the foreign markets in answer to question 41. So far as Afghanistan is concerned and countries like that which are far away from the ports, you may be able to send something, but as regards Persia, Africa and those places which are nearer Europe, do you seriously think that you can export your chemicals to those parts.

*Mr. Gupta.*—From Bombay to South Africa we can export.

*President.*—You say the Mysore Iron Works and Tata Iron Works have already established an export market in foreign countries. Simply because they cannot find a market here, they send the stuff to foreign countries and it is not a profitable proposition.

*Mr. Ramsingh.*—We had enquiries from Afghanistan and from South Africa for superphosphates. We have sent some samples to South Africa.

*President.*—As regards your bone superphosphate, I can understand, but we are dealing here with chemicals. Is there really any field for export?

*Mr. Gupta.*—In fact we have sent some consignments of copper sulphate to Rangoon when our prices were comparatively low.

*President.*—Did you make any money out of it?

*Mr. Gupta.*—We never lost anything.

*President.*—In that way you may be able to do business.

*Mr. Gupta.*—But it brought our costs down.

*President.*—The whole point is, can you profitably export chemicals to countries outside India?

*Mr. Gupta.*—Yes, things like alumina sulphate, alum, etc. We have a reserve of bone phosphate. We can surely supply Burma, Java, and places like that.

*President.*—That is as regards alum.

*Mr. Gupta.*—Take the case of epsom salt. Business will be possible if magnesite is obtained at a comparatively low price, and sulphuric acid made cheaper.

*President.*—Considering that epsom salt is coming as a bye-product, I don't think you can export epsom salt to any country where German epsom salt goes. Epsom salt is sent out here, simply because it is a bye-product. Alum, I do not know, because your bauxite is here. But as regards other chemicals, you could not export. In order to be able to do that, you must have some decisive advantage as regards some of the raw materials or as regards freight. As regards freight you have no very decisive advantage over any other country as far as one can see. As regards raw material, you have got bauxite, but as I said that won't help you. On bauxite you cannot really build a big export industry. The whole point is this. Government have up till now agreed to no export duty on these raw materials, but if you can afford to buy these bones which are exported to foreign countries and then you can convert them into bone superphosphates, then it may be possible for you to export that, but not otherwise. Then you have got an advantage as regards the principal raw material provided you are able to pay at least the export price of the raw material, is not that so?

*Mr. Gupta.*—Yes.

*President.*—It is only in that case you can really say that you may have an export market as regards bone superphosphate.

*Dr. Matthai.*—If you have an export duty on bones, then you will certainly be in a position of advantage so far as your nearer markets are concerned.

*Mr. Gupta.*—Yes.

*President.*—Who collects these bones? Is there a regular market?

*Mr. Gupta.*—There is a regular bone market. Thana is a big market. It is collected in different centres by small poor people who go round the villages. The agents of these Companies pay about As. 2 per basket. The bones are collected at one station and then sent to the market.

*President.*—Are they crushed before they are exported?

*Mr. Gupta.*—Yes; most of them are crushed.

*President.*—Acetate of lime has got to be exported, because there is no market here.

*Mr. Gupta.*—It is not exactly so. The freight on acetate was Rs. 160 and the price of the material was Rs. 130. When it arrived at Ambarnath, it was Rs. 270 per ton of lime acetate. We can make acetic acid, but the problem is of freight from Mysore to Ambarnath.

*President.*—That is why they are exporting.

*Mr. Gupta.*—We can use it ourselves if the freight is made lower.

*President.*—There is very little demand for acetate of lime.

*Mr. Gupta.*—For acetate of lime there is no demand.

*President.*—About 100,000 tons of bones are exported.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—On the magnesite that you get from Mysore they charge you something less than the ordinary rate.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—If they charge you the ordinary rate, what would be the freight?

*Mr. Gupta.*—Rs. 38 or so per ton.

*Dr. Matthai.*—At present what do you pay?

*Mr. Gupta.*—Rs. 26 per ton.

*President.*—What freight on magnesite would enable you to compete?

*Mr. Gupta.*—Not more than Rs. 6 or 7.

*Dr. Matthai.*—At present you pay Rs. 26 freight on magnesite.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Taking half a ton of magnesite per ton of Epsom, you pay Rs. 14. Supposing the whole of that freight is removed and you get it free, at the present price of Epsom you won't be able to compete.

*Mr. Gupta.*—No.

*Dr. Matthai.*—You don't give the freights on Epsom salt from Bombay and Ambarnath. Have you got the figures?

*Mr. Gupta.*—It is the fourth class rate.

*Dr. Matthai.*—What would be the rate?

*Mr. Gupta.*—It will be about Rs. 5 per ton.

*Dr. Matthai.*—What would be the difference between Bombay and Ambar-nath on Epsom in railway freight?

*Mr. Gupta.*—There we find no preference, the rates being the same.

*Dr. Matthai.*—There is no ground on which you can ask for a concession.

*Mr. Gupta.*—No, not on Epsom.

*Dr. Matthai.*—As a matter of fact I don't think anything would help you except a high duty.

*Mr. Gupta.*—It comes to that.

*Dr. Matthai.*—There is no other way out of it.

*Mr. Gupta.*—It will help us if we get something on acid, the amount of acid used being a big item.

*Dr. Matthai.*—Half is sulphuric acid and half magnesite.

*Mr. Gupta.*—Yes. If we can reduce the cost of sulphuric acid it will help us. The magnesite going out of the country is used for other purposes, not for the manufacture of Epsom. There they get an advantage. They get from India the raw material which we cannot use. All the Indian magnesite goes for steel furnace lining and refractories.

*Dr. Matthai.*—Don't you get any bye-product out of the manufacture of Epsom?

*Mr. Gupta.*—No.

*Dr. Matthai.*—Government purchases largely from you?

*Mr. Gupta.*—These are purchases made by Government and other public bodies from us.

*Dr. Matthai.*—I suppose iron sulphate is in a sense a bye-product in European countries. In the pickling process in sheets and wires where they use sulphuric acid for cleaning, the solution left would give them iron sulphate, would it not?

*Mr. Gupta.*—Only if it has enough iron and not otherwise.

*Dr. Matthai.*—Then it has to be treated considerably.

*Mr. Gupta.*—Yes, with iron scraps.

*Dr. Matthai.*—On your figures you are making a considerable margin in copperas.

*Mr. Gupta.*—There is overhead charge on it.

*Dr. Matthai.*—Even if you add your overhead charges, there is a margin.

*Mr. Gupta.*—The current price is Rs. 60.

*Dr. Matthai.*—On page 13 of your replies you give the average realised prices for the past five years. You give the market price as somewhere about Rs. 82.

*Mr. Gupta.*—Yes. Last year we sold it at Rs. 65.

*Dr. Matthai.*—But your actual cost in 1926-27 is Rs. 31 less than that.

*Mr. Gupta.*—We have not added head office and other charges.

*Dr. Matthai.*—Rs. 52 inclusive packing and selling charges. Only it does not include depreciation.

*Mr. Gupta.*—Nor the head office charges.

*Dr. Matthai.*—If you add a reasonable sum for depreciation and head office charges, it is not likely to amount to Rs. 30. At present over the works cost you have a margin of Rs. 30.

*Mr. Gupta.*—You have to add the freight from Ambarnath to Bombay; then you have to add the agents' commission.

*Dr. Matthai.*—Even then, it won't come to Rs. 30. The fact is that the Indian production is very nearly equal to the Indian demand with the result that you are able to make both ends meet.

*Mr. Gupta.*—Yes.

*President.*—You say that competition comes from England, Germany and Japan. What does Japan send?

*Mr. Gupta.*—Soda sulphide.

*President.*—That is very negligible.

*Mr. Gupta.*—Not very negligible.

*President.*—In answer to question 46, you have not given us c.i.f. prices for acids.

*Mr. Gupta.*—For commercial acids if you want prices we can give them to you.

*President.*—We would certainly like to have the prices of all acids.

*Mr. Gupta.*—Eastern Chemicals have given these prices to you in their representation (see page 23).

*President.*—These prices that you have given are only c.i.f. prices. The Eastern Chemicals have also given landing charges. We must I think add the usual trading charges, viz., the importer's commission whatever it is, godown charges, cartage from the wharf to the godown, etc.

*Mr. Smith-Wright.*—The c.i.f. price Bombay includes the agent's commission.

*President.*—Then, that is paid by the exporter.

*Mr. Sinclair.*—These are the prices at which firms indent.

*Dr. Matthai.*—If you add to the c.i.f. the duty and the landing charge, you get the price at which it can be had from the importer.

*Mr. Smith-Wright.*—Yes.

*President.*—That includes the godown charge.

*Mr. Smith-Wright.*—Yes. These prices are lower than bazar prices.

*President.*—You have given us bazar prices, haven't you?

*Mr. Smith-Wright.*—Not the bazar prices, but the indent prices—the prices which the importers themselves buy at.

*President.*—Is the difference due to the fact that these people buy from either the German Trust or the other Trust?

*Mr. Smith-Wright.*—These prices are prices quoted by the German Trust agents in Bombay. What the agents themselves buy at we do not know and they have to carry stocks.

*President.*—It is really a direct sale by the manufacturer.

*Mr. Smith-Wright.*—Yes, to the dealers out here.

*President.*—Who are the agents of the German Trust.

*Mr. Smith-Wright.*—Messrs. Havelo Trading Company.

*President.*—There are Brunner Monds.

*Mr. Smith-Wright.*—Yes.

*President.*—Their head office is in Calcutta I think.

*Mr. Smith-Wright.*—Yes.

*President.*—Does the German Trust deal always direct with the bazar? They have eliminated so to say the local commission agent.

*Mr. Smith-Wright.*—Either they deal direct or import and sell.

*President.*—They have eliminated commission agents.

*Mr. Smith-Wright.*—Yes, they deal direct with the bazar. They have their own organisation—a fairly big organisation. It is the same organisation which handles aniline dyes.

*President.*—Now let us take your realised prices.

*Dr. Matthai.*—Taking the prices which you realised, on each product you got more or less the price of the imported article, did you not?

*Mr. Gupta.*—In some cases, as in the case of alum, it was below the foreign price.

*President.*—But on sulphuric acid you realised a higher price. The price is given as £11.

*Mr. Gupta.*—Ours is the average price including battery acids.

*Mr. Ramsingh.*—Our acid is better than the German acid.

*President.*—Do they come out in steel drums?

*Mr. Gupta.*—Yes.

*President.*—As regards these drums, do you sell these drums to the consumer when you sell your acid?

*Mr. Gupta.*—We don't sell in drums; we sell in jars.

*President.*—Are the containers returned to you?

*Mr. Gupta.*—In many cases they are returned: in some cases they are bought outright.

*Dr. Matthai.*—Generally when you state your costs under packing you assume that the jars will be returned?

*Mr. Gupta.*—Yes. The price of a jar is about Rs. 3-8-0 each.

*President.*—In the case of the foreign manufacturer the empties are not returned so that if we were to compare the two, what allowance should we make?

*Mr. Gupta.*—You must make an allowance for the cost of the drum.

#### *Ex-works costs for comparison.*

*President.*—In making a comparison between the prices we must either eliminate the container altogether in both cases, but we cannot do that in the case of the imported article, or we must take the cost of the container into account. We must bring the two into line in order to compare the prices. What we could do is this. We will take the price of the foreign importer of the drum in his country and in your case we will take the price of the jar and supposing you are able to use it four times or five times, we will calculate how much you ought to charge in your costs for the containers and add that to the bulk price. That is the only way, I think, in which we can compare.

*Mr. Smith-Wright.*—In our own case we have given naked price, that is without container. A fair comparison would be to take that price.

*President.*—That would not give you a fair comparison. By the time it reaches the consumer you add Rs. 100 and in the case of the German stuff perhaps Rs. 640. It won't be a good comparison. After all it does not matter



at what price you are able to deliver it naked *ex-works*. The point is at what price the consumer is going to get the two articles.

*Dr. Matthai.*—In what kind of cases do you pack salts?

*Mr. Gupta.*—We pack in gunny bags and wooden cases.

*President.*—What do the importers pack them in?

*Mr. Gupta.*—In wooden casks generally.

*President.*—Immediately we are not concerned so much with salts but if we were to take a long view and consider whether the industry would be able to do without protection at some future date, then we must find out how your selling price in containers compares with the imported article in corresponding containers or other containers in which the foreign article is imported. Would you be able to give us some idea as to what the containers cost per ton in your case?

*Mr. Gupta.*—Yes, we can.

*President.*—If your jars are returned to you and you can use them over and over again, what you should do is to calculate the life of the container. Supposing you are able to use it five times, you take the price of the container once and the freight five times and divide the total by five, and that is your cost.

*Mr. Smith-Wright.*—It varies very considerably.

*President.*—You must keep your account in some way which gives you an idea of what the jars cost you. Take the average life of a container and on to that add freight.

*Mr. Sharpe.*—That is variable too, and varies within certain limits. Some travel between Bombay and our works, while some go possibly as far as Cawnpore.

*President.*—You must give us some idea of what that means on an average, that is to say, *ex-works* packed. Then you will do the same as regards individual products.

*Mr. Ramsingh.*—We will do that.

*President.*—The bulk of your goods is sold *ex-works*, aren't they?

*Mr. Gupta.*—For up-country *ex-works*, but for Bombay at customer's godown.

*President.*—I think the best thing to do would be to take the Bombay price *ex-godown* as a fair comparison between your price and the foreign price.

*Mr. Gupta.*—Yes.

*President.*—That would be the fairest comparison I think. You would show your naked price *plus* other charges.

*Mr. Gupta.*—Yes.

THE DHARAMSI MORARJI CHEMICAL COMPANY, LIMITED  
BOMBAY.

Oral Evidence of Messrs. RAMSINGH DONGARSINGH and L. GUPTA recorded at Bombay on Tuesday, the 6th November, 1928.

*Trusts.*

*President.*—We would like a little more detailed information about these trusts that you are talking about in answer to question 48. Can you refer us to any published documents?

*Mr. Gupta.*—We have taken this from the Chemical Age Journals. I have got all the papers.

*Dr. Matthai.*—Do you mean you have extracted it from a number of journals?

*Mr. Gupta.*—Yes.

*President.*—It is very important for us to know what their organisation is, how they operate, what is their share capital and what the reserves are, etc.

*Mr. Gupta.*—These extracts are taken from those journals.

*President.*—Will you kindly let us have them?

*Mr. Gupta.*—We have brought them. I have already told the Secretary to take charge of them.

*President.*—Was there a prospectus issued when this Imperial Chemicals was started?

*Mr. Gupta.*—Yes, they did issue.

*President.*—We should like to get a copy of that.

*Mr. Gupta.*—Yes, we shall try to get one.

*President.*—They have been operating only over a year. Has there been an annual meeting?

*Mr. Gupta.*—Last year there was a meeting.

*President.*—We would like to have a copy of the Chairman's speech and the balance sheet.

*Mr. Gupta.*—Yes, we shall try to get it.

*Dr. Matthai.*—I saw in some papers that they have declared an *interim* dividend of 10 per cent. That might have been recent.

*Mr. Gupta.*—I should think so.

*Mr. Ramsingh.*—We shall send a cable to England and get them.

*President.*—If you ask their office here, they may be able to give you a copy.

*Mr. Ramsingh.*—Yes.

*President.*—Is there free competition between these two trusts or is there an understanding between them also?

*Mr. Ramsingh.*—They are coming to an understanding.

*Mr. Gupta.*—As regards fertiliser there is a sort of understanding.

*President.*—That is the I. G. F. specialise in fertilisers.

*Mr. Gupta.*—The selling agency for some of the I. G. F. fertilisers in India is handed over to the Imperial Chemicals.

*President.*—You must be quite accurate about your statement on these points.—Are you sure about that?

*Mr. Gupta.*—That much I know. Further arrangements I do not know of. I heard it from the General Manager of The Nitram Ltd., one of the subsidiaries of the Imperial Chemicals.

*President.*—Are they willing to sell your fertilisers also?

*Mr. Gupta.*—We have made no such proposal, nor do we intend to enquire into it.

*President.*—They might be able to oblige you also.

*Dr. Matthai.*—The sales Director of the Imperial Chemicals is coming on a visit to India this cold weather.

*Mr. Gupta.*—Generally once a year one of the Directors use to come.

*Dr. Matthai.*—I understand Mr. Nicholson, a Director of the Imperial Chemicals is coming.

*Mr. Gupta.*—We have not heard about it.

*President.*—I think it would be possible for you to get as much information as you can about these two trusts.

*Dr. Matthai.*—Is there any understanding between you and Brunner Mond with regard to any of your products?

*Mr. Ramsingh.*—None at all.

*Dr. Matthai.*—Have there been any negotiations?

*Mr. Ramsingh.*—No.

*Dr. Matthai.*—Have any arrangements ever been proposed?

*Mr. Ramsingh.*—No. I have got some papers here (handed in).

*Dr. Matthai.*—What papers are they?

*Mr. Gupta.*—They are about different trusts in the Chemical industry.

*Dr. Matthai.*—Will you kindly make a few copies and send them to us?

*Mr. Gupta.*—Yes.

*President.*—As regards dumping, first of all you say that it cannot be proved whether they are selling below cost price. Of course, nobody can prove it, but that is not so important. It is very difficult to say in a business which has so many different branches whether a particular commodity is sold below cost or whether it is not. If it is a single commodity, one can easily get an approximate idea. But if you are able to establish that chemicals are exported to India at a lower rate than they are sold in the country of origin, that may be of some assistance.

*Mr. Ramsingh.*—We have tried to prove that in our answer to question 49.

*President.*—These tables that you have given here certainly do seem to suggest that dumping in that sense is taking place.

*Mr. Ramsingh.*—Yes.

*Dr. Matthai.*—As far as these trusts are concerned, it may be said that since the formation of the trust, the tendency has been rather to stiffen prices. Since 1921 on account of overproduction, as a result of the war plants being turned to peace production, there was enormous overproduction and therefore prices came tumbling down. But since 1925-26 in a considerable number of the products the result has been a slight stiffening in prices.

*Mr. Ramsingh.*—They are in a position to control prices.

*Dr. Matthai.*—Obviously the formation of the trust means that they make some kind of arrangement by which they would prevent this tendency to a fall in prices. Take some of these articles like alumina sulphate. In 1925-26 the price was Rs. 75 and in 1926-27 the price went up. Similarly copper sulphate has slightly gone up, so that to that extent the formation of the trust might be a circumstance in your favour.

*Mr. Ramsingh.*—But they can bring it down any moment. I can give you an instance as regards the question of alum. As soon as we started our factory, they brought down the prices. When we stopped our plant their prices went up. When we started manufacturing alum, the price was Rs. 225. Then it came down to Rs. 120 and we tried to sell it at Rs. 120. As soon as we stopped producing alum, the price went up to Rs. 150 or about.

*President.*—You cannot place too much of an argument merely on the reduction of prices for this reason that if the trust is operating as a single

unit, they are able to bring down not only the cost of production, but the cost of distribution which is a very heavy item. You cannot apply entirely the case of dumping on the ground that their prices have come down, is not that so? They say they have organised themselves into a big trust, because it has this advantage that they can produce articles on a large scale. That in itself will bring down prices. They also say that they have a combined sales organisation and they are able to bring down the selling price. These two arguments have to be considered, to the extent to which these trusts operate in those directions, you cannot say that their bringing down prices is evidence of dumping necessarily.

*Mr. Gupta.*—But they are controlling prices in different countries. In England there is one price and in India there is another price.

*President.*—Your next argument is that since there is a reduction of 40 to 50 per cent. in the price of some of the articles, that is evidence of dumping. I am trying to suggest to you that it is not evidence of dumping by itself.

*Dr. Matthai.*—When they reduce their price in that way, they are not doing it with the deliberate object of driving you out of the market, but it is because larger scales will enable them to have a larger output and a more economic sales organisation.

*Mr. Gupta.*—Their reduction of price in India must have some relation to their reduction of price in England.

*Dr. Matthai.*—They have got their own home market. By reducing the prices in the home market, they are not increasing their market. If they want to increase their market, they must reduce their price in the export market.

*Mr. Ramsingh.*—That is called dumping.

*Dr. Matthai.*—All that we suggest is that it is not dumping in the sense of war against you. It is dumping in the sense that they want to ensure the largest possible output and ensure an economical production, though the effect of it as far as you are concerned is the same.

*Mr. Gupta.*—I will read to you the agreement of the Anglo-German glauber's salt producers: "A report from Consul H. C. Claibourne at Frankfurt-on-the-main states that German and British producers of glauber's salt have concluded an agreement for three years, regulating prices and dividing markets. It is stated that important consumers of the glauber's salt produced by a number of large factories on the east coast of England are Swedish pulp manufacturers, whose demand, due to Swedish industrial difficulties, has fallen off heavily. German factories are said to be less affected than others and to have plenty of order on hand. Hence it is alleged that the agreement with the British producers was concluded in order to prevent disturbances in the world market. Unconsumed quantities will be stored at common account thus enabling producers to hold prices at the usual level until the Scandinavian countries again appear as buyers of the normal amounts".

*Dr. Matthai.*—You cite it as proof that there is some agreement between Germany and England.

*Mr. Gupta.*—Yes. Prices are controlled and the market is divided.

*President.*—They make no secret of that fact.

*Mr. Gupta.*—No, but it affects us.

*President.*—There is no idea in forming a trust if they don't control prices and control output at the same time. You have got to show that they are operating to your prejudice in order to destroy you. That is essential. If they are operating in commodities in which you are at present not interested, you cannot say that they are acting to your prejudice, can you? I am just asking for information.

*Dr. Matthai.*—In that connection I want to draw your attention to the statement made to us by the Eastern Chemical Company, Limited. They make a statement that as far as these heavy chemicals are concerned, it is only in respect of copperas that there has been competition from the Imperial

Chemical Industries. The Imperial Chemical Industries apparently deals in the Indian market in sodium carbonate and ammonia sulphate with which you are not concerned. Therefore it comes to this that as far as the main competition to which you are exposed is concerned, it comes really from the German trust, i.e., I. G. F. In copperas although there is competition from England, you are more or less safe. Practically you might say that the competition boils down to German competition.

*Mr. Gupta.*—As I drew your attention, yesterday, the Imperial Chemical Industries manufacture or deal in quite a considerable quantity of alum, zinc chloride, soda sulphide, epsoms, etc.

*Dr. Matthai.*—I should like you to get a little more information about this. I have given you the statement made by the Eastern Chemical Company, because it is rather different from the statement you made yesterday.

*Mr. Gupta.*—Yes.

*President.*—We will have to examine you again on some subsequent date. Before that I hope you will be able to give us all the information we want and come prepared on all these points.

*Mr. Ramsingh.*—Yes.

*President.*—Question 50 was: "Do you manufacture any chemicals which in competing countries are produced as bye-products?" The answer is "No". Is it not true of epsom salts more or less?

*Mr. Gupta.*—Yesterday Dr. Matthai drew my attention, to the fact that the German product has to go under so many processes before the product can be taken out and as such compared to the process we adopt, it seems we are on a safer platform.

*Dr. Matthai.*—Very probably the cost of the process that you have to perform must be very much less than the cost of their process in regard to strassfurt deposits.

*Mr. Gupta.*—Identically it is about the same. They have got to do two or three crystallization. We may also have to do once or twice.

*President.*—As regards epsom salts, you are far away from the principal raw material, magnesite.

*Mr. Gupta.*—That is the only drawback.

*President.*—Supposing there was even a reduction of freight and if sulphuric acid was made cheaper, assuming both these things happened, in that case the industry located on the Madras side would certainly have a great pull over you, wouldn't it?

*Mr. Gupta.*—Yes, it is quite possible.

*Mr. Ramsingh.*—But the principal market is in Bombay.

*President.*—We are assuming that freights are made cheaper. What chance have you against Messrs. Parry and Company? We cannot say that the reduction of freights should be confined to the Bombay side.

*Mr. Gupta.*—While we are paying freight on the raw material, they pay freight on the finished products.

*President.*—We assume that freight on both these things is reduced. Assuming that, do you stand any chance at all against the manufacturer in Madras? It doesn't seem to me to be a very economical proposition to manufacture epsom salts on this side, because we must assume that if any facilities are given, they must be given to all Indian manufacturers. In that case, are you prepared to give up epsom salts market entirely to the manufacturers in Madras? That is what it comes to.

*Mr. Gupta.*—I have not quite understood the point. The Madras Company pay freight on the finished product and we pay freight on the raw material.

*President.*—Yesterday we were suggesting a reduction of freight on both.

*Mr. Ramsingh.*—In epsom salt there is water of crystallisation. They have to pay freight on water as well as the costly packing and the rate of

freight for epsom salt is quite different from the rate of freight on raw material.

*President.*—We are assuming conditions under which the freight on the finished product is also reduced.

*Mr. Gupta.*—In order to get the Bombay market, they have to bring the finished product here and sell it. In order to manufacture it here, we have to bring the raw material. So, both sides balance, as far as freight is concerned.

*President.*—What advantage would you have in that case?

*Mr. Gupta.*—At any rate we will have no disadvantage.

*President.*—We will have to assume that the sulphuric acid is also made cheaper for all, and that the rate of freight both on the raw material and on the finished product is reduced. Though the freight on the finished product may be a little higher than the freight on the raw material, yet an industry which is situated in the neighbourhood of raw materials is better situated than yourselves, other things being equal. Is not that so?

*Mr. Gupta.*—But the main market is Bombay. The supply has to come from the source of raw materials to the market in Bombay. The difference between us will be this. We are bringing the raw material and paying the freight on that, whereas they are bringing the finished material and paying freight on that. But as Mr. Ramsingh Dongarsingh has said in Epsom salt half is water and half is salt and so comparatively they will be paying more freight.

*President.*—On the other hand some of the raw material which you import must be wasted in the process of manufacture.

*Mr. Gupta.*—Four to five per cent. is almost the maximum loss. We get it at the bulk rate. If we get in wagons, we can even bring more quantity in one wagon. Further the freight on the finished product will be more than the freight on the raw material. It is more or less a question of the market. In that case, we are better situated than the Madras people.

*Dr. Matthai.*—What is the main market for Epsom?

*Mr. Gupta.*—The Bombay market for the Textile Industry.

*Dr. Matthai.*—I find in the South they use it for weighing skins.

*Mr. Gupta.*—Not much goes to that.

*Dr. Matthai.*—The most popular use for Epsom is to give false weight.

*Mr. Gupta.*—Epsom is used for medical purposes also.

*Dr. Matthai.*—As regards some of the items which you say should be added to the c.i.f., on page 17, I take it your point is this. You take the c.i.f. price and to that you add Customs duties and landing charges and various other trading charges. It was pointed out yesterday that in the way in which the business in chemicals is done, items (3), (4) and (5) do not enter and you get the market price by adding to the c.i.f. only Customs duties and the landing charges. Therefore you ought to make reductions from your figures of items (3), (4) and (5). That would bring it much nearer the current market price.

*Mr. Gupta.*—These salts are sold by the Bombay merchants who control the market. In the case of acids the middleman's profit is eliminated, but in this case the middleman's profit is there and not eliminated. These people must take it from the docks to godowns. That is why we cannot eliminate these charges in the case of salts.

*Dr. Matthai.*—We tried to work out the market prices from the c.i.f. prices. Market prices are the c.i.f. prices plus duty and landing charges. If you add the three, you get more or less these prices. Here you have taken other items such as (3), (4) and (5). All that I am pointing out is that in order to make the comparison fair you have to deduct from your 1st column figures, the figures under items (3), (4) and (5). You might look into this point again. I don't want an answer straightaway.

*Mr. Gupta.*—We will look into it and let you know.

*President.*—In reply to question 53, you have given freights on chemicals. How do you get these freights?

*Mr. Gupta.*—We got these freights from the steamship companies and from London.

*President.*—Could we assume that these are the freights which these big Trusts pay?

*Mr. Smith-Wright.*—They are Conference freights and may be taken as reasonably correct.

*Dr. Matthai.*—Can you not get the latest freights from the United Kingdom?

*Mr. Gupta.*—I have got them.

*Dr. Matthai.*—Then, you might send them on to us later.

*Mr. Gupta.*—Yes.

*President.*—Is it not a fact that the Imperial Chemical Industries control some works outside Great Britain?

*Mr. Gupta.*—Yes, they do. They control a factory in Canada.

*President.*—Are there any works in Europe which they control?

*Mr. Gupta.*—No.

*Dr. Matthai.*—These freights that you give from Rotterdam are really on tons of 2,240 lbs. approximately?

*Mr. Gupta.*—Yes, per ton of 1,015 kilos.

*Dr. Matthai.*—One kilo is roughly equal to about 2·2 lbs.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—On this question of railway freights again, the difference between Ambar Nath and Bombay is a handicap that only applies to you and not to the Eastern Chemicals. The latter are located in Bombay and so this difference in freight does not affect them. Therefore when you ask for a concession in that respect you are asking for a concession which entirely arises out of the fact that you are located unfavourably.

*Mr. Gupta.*—We don't demand any concession. We only want the same freight to be applied to Bombay as well as to Ambar Nath. In spite of the longer distance, the freights from Bombay are lower than those from Ambar Nath.

*Dr. Matthai.*—My point is simply this. Supposing the railway authorities say that they are put to a great deal of inconvenience and consequently it would be necessary to charge a higher freight from Ambar Nath, since only one unit is concerned in this industry, it would not be quite so easy to make out a case for you.

*President.*—I wish to know what proportion of your various products you sell outside Bombay—and that is on this question of freights. I want to know how much of your production is affected by freights?

*Mr. Gupta.*—We will send you the information later.

*President.*—Will the Eastern Chemicals do the same?

*Mr. Smith-Wright.*—Yes.

*President.*—You have not given us the freights on acids at all in these replies.

*Mr. Gupta.*—We have not. It is only a question of comparison.

*President.*—It is more than that. If the freights are to be reduced on finished products, obviously the acids are to be included.

*Mr. Gupta.*—We are working on those figures and we will let you have them as soon as they are ready.

*President.*—Take the case of sulphuric acid for instance. Your case is that the cost of sulphuric acid can be brought down only if the production is on a large scale. That being so, it must follow that the manufacture of

sulphuric acid should be confined to certain points. But there are other uses of sulphuric acid all over the country. Some may be interested in fertilisers and it would be necessary for them, if they were to get cheap sulphuric acid, to get it from the main works. It is for that reason that I am asking you what the freights are on the acids and how much do you expect to sell in the up-country markets. I take it that so far as Bombay is concerned, at present you have practically got all the market you can get.

*Mr. Gupta.*—Yes, as regards acids.

*President.*—As regards up-country markets we cannot tell.

*Mr. Gupta.*—No.

*President.*—Probably they do without acids or they use very little.

*Mr. Gupta.*—Our experience is that we can go half way between Bombay and Calcutta, the other half being covered by the Calcutta people. We find we cannot go beyond Nagpur on this side and Agra on the other.

*President.*—What about Lahore?

*Mr. Gupta.*—We don't go so far as Lahore. Lahore I think is supplied by Messrs. D. Waldie and Company from Cawnpore because they are better situated so far as Lahore is concerned.

*President.*—Are you able to express any opinion as to whether if sulphuric acid is made cheaper in the country, the bones which are exported now to the extent of 100,000 tons would be used more and more as fertilisers in this country?

*Mr. Gupta.*—That is the case in every other country. They make super-phosphates.

*President.*—Do you expect that there would be the same tendency in India?

*Mr. Gupta.*—We do expect the same tendency, if not now, at least after some years.

*President.*—That is to say, where bonemeal is available.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—That is to say, sulphuric acid will be taken to those centres where bones are available.

*Mr. Gupta.*—Yes, to places where collection takes place.

#### *Market for bonemeal.*

*Dr. Matthai.*—Taking, for example, the Bombay area, which do you consider the market for bonemeal?

*Mr. Gupta.*—Near Raichur.

*President.*—Is there a bone market?

*Mr. Gupta.*—Yes, there is. It is a very big market.

*President.*—Is it the place from which they export bones?

*Mr. Gupta.*—The bones come to Bombay for being crushed and exported. There are certain mills in Bijapore, Akola and other places.

*President.*—Are there bone mills?

*Mr. Gupta.*—Yes.

*President.*—Can the bones be used without treatment?

*Mr. Gupta.*—Yes.

*President.*—Does the raiyat use it at all in that way?

*Mr. Gupta.*—Yes. Sometimes he uses bones in pieces and sometimes also after being crushed. He finds that it gives better results. But we think that if he uses superphosphate he will find it still better.

*President.*—He has to be educated.

*Mr. Gupta.*—Yes.

*President.*—What percentage of sulphuric acid do you require in the bonemeal for making super-phosphates?



*Mr. Gupta.*—About half, say.

*President.*—Which are the main ports of shipment for bonemeal?

*Mr. Gupta.*—Bombay and Calcutta.

*Dr. Matthai.*—Taking your own case, supposing you had a factory for making bone super-phosphates at Raichur, as far as the cost of distribution in your market is concerned, it would be less if you distributed from Raichur than if you distributed super-phosphates from Bombay, because it is more central to your market, is it not?

*Mr. Gupta.*—That is right.

*Dr. Matthai.*—There is this difference between rock phosphates and bones that rock phosphates are more bulky than the super-phosphates that you get out of it. Therefore it would have to carry a higher railway freight. Supposing you have got a place which is the main market for rock phosphates it would be more advantageous for you to have your factory located there to make super-phosphates.

*Mr. Gupta.*—Provided these people used rock phosphates. In the East Coast of the United States of America all the super-phosphate is made at Baltimore and the rock comes all the way from Florida—quite a big distance, nearly 600 or 700 miles. They manufacture 75 per cent. of the requirements of the United States eastern section of the north-east at Baltimore. The acid is made there in bulk, sulphur is brought from Texas, super-phosphate is made there and is distributed up to a distance of 600 to 800 miles. There are good waterways and railway facilities.

*President.*—So far as the bones are concerned according to the trade figures Sind is the largest exporter—42,000 tons in 1926-27 out of a total of 100,000 tons, Bengal 40,000, Madras 7,000 and Bombay about 8,000 tons. In Sind they don't manufacture any sulphuric acid at present, do they?

*Mr. Gupta.*—There is a very small works there.

*Dr. Matthai.*—I suppose it means all the bones collected in the United Provinces and the Punjab?

*Mr. Ramsingh.*—From the United Provinces and the Punjab, I suppose, all the bones come to Sind for shipment.

*President.*—They consume the largest quantity of meat!

*Mr. Gupta.*—It is not always slaughter-house bones; most of the bones that are collected in these centres are jungle bones.

*President.*—Supposing bone super-phosphates were manufactured in India it is impossible to say which would be the best centre at present assuming that sulphuric acid was cheap.

*Mr. Gupta.*—We have to look to the central place for production and the centre of supply. It does not look as if we are able to get both facilities at present.

*Dr. Matthai.*—As far as you are concerned the market for bone super-phosphates is an internal market, isn't that so? For an internal market Bombay is a bad centre of distribution. It is much better to have a central place like Raichur.

*Mr. Gupta.*—At present our bone super-phosphate goes to Poona and near about places.

*Dr. Matthai.*—That is because you are producing so little. Assuming you are producing larger quantities your market will have to be found more and more in the interior of the country.

*Mr. Gupta.*—Within two to three hundred miles because the majority of the consumers will be cotton growers, ground nut growers, horticulturists and so forth.

*President.*—We understand in Madras they are using these for rice too.

*Mr. Ramsingh.*—We are also trying to encourage its use for the same purpose.

*Capital costs.*

*President.*—As regards your answer to question 55, one great disadvantage that you have is in respect of the cost of your plant and machineries.

*Mr. Gupta.*—Yes, it invariably costs us more.

*President.*—But I don't see that the investment on plant and machinery is very large, not like the steel industry where it means crores of rupees. Your machinery cost you Rs. 9 lakhs and now you say it would be about Rs. 5 lakhs so that the disadvantage is not so very great.

*Mr. Gupta.*—Compared with the present position of our plant but if we have to increase the capacity the ratio of about 25 to 30 per cent. will always remain.

*President.*—You say most of these disadvantages are permanent except as regards freight.

*Mr. Gupta.*—Yes, as compared to other manufactures.

*President.*—If they are permanent they are arguments against protection, aren't they?

*Mr. Ramsingh.*—We would call it semi-permanent until India makes its own machinery.

*President.*—Is the chemical machinery very intricate?

*Mr. Gupta.*—It is very easy to manufacture. We have tried to get made some of these. We got nitre pot castings made here. Formerly these used to come from England. The trouble is people here do not keep these in stock as there is no demand and when we go to them they quote a very high price as they know that the requirement is urgent.

*Dr. Matthai.*—I suppose more than half the cost of machinery or about 60 per cent. goes to the sulphuric acid plant?

*Mr. Gupta.*—Yes.

*President.*—As regards internal competition you have got an arrangement with the Eastern Chemical Company?

*Mr. Gupta.*—Yes, as regards the sale of commercial acids.

*President.*—They market all your products, don't they?

*Mr. Ramsingh.*—Only acids.

*Dr. Matthai.*—Are not their managing agents your selling agents?

*Mr. Ramsingh.*—Only in respect of acids.

*President.*—Please read their answer to question 58 and say whether you agree to the statement made by them?

*Mr. Ramsingh.*—We are in substantial agreement with their statement.

*President.*—As regards equipment, your plant was purchased in 1919-20, but since then there have been improvement in the processes?

*Mr. Gupta.*—Not much in the heavy chemicals neither in the chamber process of sulphuric acid manufacture.

*President.*—The Tata plant is later than yours?

*Mr. Gupta.*—Yes, it is exactly similar to ours though recent and is of the same make.

*President.*—What is their capacity?

*Mr. Gupta.*—The same as ours, 8,000 tons. As we have explained, small changes have taken place of which we are taking notice and we want to improve. But this does not apply to acids.

*Dr. Matthai.*—Do you use steam or water spray?

*Mr. Gupta.*—Water spray.

*Dr. Matthai.*—You say your total outlay is Rs. 39 lakhs. That includes your debenture loan, I take it?

*Mr. Gupta.*—No. It includes borrowing but not debenture loans. We borrow on deposits.

*President.*—In your answer to question 65 we can only see Rs. 23 lakhs and here you say that the total outlay is Rs. 39 lakhs. The works have cost you Rs. 39 lakhs including losses incurred by you, that is to say, actual losses on the works costs?

*Mr. Gupta.*—That is so.

*President.*—That is to say, you sold below your works cost. Do you include interest on loans?

*Mr. Gupta.*—It includes all expenses.

*President.*—Or, in other words, it includes what may be called out of pocket, is that right?

*Mr. Gupta.*—Yes.

*President.*—That is to say, it includes what may be called your actual out of pocket expenses, is that right?

*Mr. Ramsingh.*—Yes.

*President.*—You are not entitled to a return on that.

*Mr. Ramsingh.*—No.

*President.*—First of all shall we take your present book value given in answer to question 66?

*Mr. Ramsingh.*—Yes.

*President.*—That is really your investment.

*Mr. Ramsingh.*—Yes.

*President.*—Plus whatever working capital you may require.

*Mr. Ramsingh.*—Yes.

*President.*—The replacement value is very much smaller owing to the drop in prices.

*Mr. Ramsingh.*—Yes.

*President.*—You bought these plants at a time when prices were very high.

*Mr. Ramsingh.*—Yes. If we are to construct a similar plant now, we shall have to spend about 60 per cent. of the value we have spent.

*Dr. Matthai.*—If you take the buildings at 60 per cent. and the plant at 50 per cent., the present replacement value on your plant would be about Rs. 14 lakhs.

*Mr. Ramsingh.*—Yes.

*President.*—That would be a fair valuation in calculating your profit, etc.

*Mr. Ramsingh.*—Yes.

*President.*—Have you had your plant revalued at any time or is this merely a guess?

*Mr. Gupta.*—It is not a guess.

*President.*—Have you made any recent enquiries about this plant in Europe?

*Mr. Gupta.*—Yes, I have made enquiries of a similar plant we have.

*President.*—Would it not be better to write it off?

*Mr. Ramsingh.*—We are thinking of doing it.

*President.*—We can calculate the depreciation on the present reduced block value and the return on the capital. That would give you a reasonable return on your investment.

*Mr. Ramsingh.*—Yes.

*President.*—The building practically costs more than the plant which is rather a sort of luxury.

*Mr. Ramsingh.*—The plan was drawn up by an up-to-date English firm.

*President.*—All I wish to suggest is that it does seem to me that you have spent a large sum of money, i.e., 25 per cent. more on the building than on the plant.

*Mr. Ramsingh.*—We engaged the best Engineers available in England.

*President.*—I have no doubt that you took very good advice, but it does seem to me that you do not require a building of that kind to house the plant. That is the impression it created on me at the time I visited your factory. Supposing you were to build a similar plant, would you house it in a similar building like that or would you have a cheaper building?

*Mr. Ramsingh.*—I can't say.

*Dr. Matthai.*—In answer to question 75 you say: "The additional capital required to carry out replacement and extensions would be about Rs. 3 lakhs. If you spend Rs. 3 lakhs more, what increase in output would you expect? Does it mean in order to work up to your capacity of 8,000 tons, you need Rs. 3 lakhs more or by spending Rs. 3 lakhs more, are you going to get an increase over your estimated capacity?"

*Mr. Gupta.*—This is mainly for carrying out the survey which we have already mentioned to you. From the present capital we are unable to meet the working capital.

*Dr. Matthai.*—I am thinking of your answer to question 75. Obviously that is not working capital.

*Mr. Gupta.*—No. That is for the full capacity production.

*Dr. Matthai.*—Therefore by spending Rs. 3 lakhs you would absolutely ensure the total capacity you estimate.

*Mr. Gupta.*—Yes.

*President.*—In answer to question 70, you have given the subscribed capital as Rs. 40,00,000 and the paid-up capital as Rs. 31.7 lakhs. Has somebody not paid yet?

*Mr. Ramsingh.*—No.

*President.*—Have you taken any steps to recover the amount?

*Mr. Ramsingh.*—Yes.

*President.*—Do you expect to recover?

*Mr. Ramsingh.*—We are recovering every day. We cannot expect the whole amount. Many people have become insolvent. It is not possible to recover the whole amount.

*President.*—How much of it do you expect to recover?

*Mr. Ramsingh.*—Rs. 1 lakh.

*President.*—Rs. 1 lakh out of Rs. 9 lakhs.

*Mr. Ramsingh.*—Yes.

*President.*—So that your real capital is only Rs. 31 lakhs.

*Mr. Ramsingh.*—Rs. 33 lakhs.

*President.*—In answer to question 85, you say you have borrowed Rs. 6½ lakhs and out of which you use Rs. 3½ lakhs for working capital.

*Mr. Ramsingh.*—Yes.

*President.*—And the rest on the plant.

*Mr. Ramsingh.*—Yes.

*President.*—Then I take it that your losses have come out of the subscribed capital.

*Mr. Ramsingh.*—Yes.

*President.*—The subscribed capital is Rs. 33 lakhs. Your assets are about Rs. 23 lakhs.

*Mr. Ramsingh.*—Yes.

*President.*—I am asking you generally at the present moment what is the position. Are you making both ends meet or are you still suffering a loss?

*Mr. Gupta.*—We cannot make both ends meet, so we have to stop manufacturing salts.

*President.*—Is there any loss incurred in respect of those articles that you produce, e.g., acids and super-phosphates?

*Mr. Gupta.*—No.

*Mr. Ramsingh.*—On the whole there is some loss.

*President.*—On the whole you don't make any depreciation or you don't get any return on your investment.

*Mr. Ramsingh.*—We are also out of pocket.

*President.*—Are you out of pocket now on the business?

*Mr. Ramsingh.*—Yes.

*Dr. Matihai.*—Practically on all the salts that you are making except copperas you are out of pocket.

*Mr. Gupta.*—Yes.

**THE DHARAMSI MORARJI CHEMICAL COMPANY, LIMITED  
BOMBAY AND THE EASTERN CHEMICAL COMPANY,  
LIMITED.**

**Oral Evidence of Messrs. RAMSINGH DONGARSINGH and L.  
GUPTA, representatives of Messrs. The Dharamsi Morarji  
Chemical Company, Limited and Messrs. SINCLAIR  
SHARPE and SMITH-WRIGHT, representatives  
of the Eastern Chemical Company,  
Limited, recorded at Bombay  
on Tuesday, the 6th  
November,  
1928.**

*Overhead charges.*

*President.*—This is the way in which we divide our overhead charges. First as regards depreciation in all our enquiries we have calculated depreciation on the whole of the replacement value at 6½ per cent. and we have found that a serviceable figure. We don't count so much on land, so much on buildings and so much on some parts of the machinery, but we calculate at the rate of 6¼ per cent. on the replacement value of the whole block.

*Mr. Sinclair.*—In the case of a chemical work, it is rather on the low side.

*President.*—We have always been told that but we have always found that if we calculate at the rate of 6½ per cent. on the whole of the block value including the land, buildings and everything, it is not a lower percentage.

*Mr. Sinclair.*—I agree as far as the general industries are concerned, but not in the case of Chemical Industries when high corrosion takes place.

*President.*—On the other hand on buildings you get 2½ per cent.

*Mr. Sinclair.*—That is true.

*President.*—Instead of that you get 6½ per cent. on buildings and on land also. On that basis we have experimented on all the industries and we have found that 6¼ per cent. is on the liberal side.

*Mr. Smith-Wright.*—We have been on existence for 14 years. What do you mean "replacement value on your block"?

*President.*—We take a sort of imaginary plant which will be constructed to-day of the same capacity and we make an estimate as to what that would cost. Then we calculate depreciation on that. Your plant may cost you Rs. 5 lakhs and if we think that the replacement value of the plant is Rs. 15 lakhs, we calculate on Rs. 15 lakhs.

*Mr. Smith-Wright.*—For the purpose of costing.

*President.*—Take the Steel industry where we allowed 6½ per cent. There was tremendous wear and tear on some of the plants, but on the whole we found that it was rather on the liberal side.

*Dr. Matthai.*—If the general rate of depreciation on machinery were 7½ per cent., what is the rate of depreciation you would suggest for a chemical plant?

*Mr. Sinclair.*—I would suggest about 10 per cent.

*President.*—If you suggest 10 per cent., you will have to take a smaller rate on the building.

*Mr. Sinclair.*—I quite agree.

*President.*—It very much simplifies the thing.

*Mr. Sinclair.*—Yes.

*President.*—Then as regards interest on working capital, we calculate at the rate of  $7\frac{1}{2}$  per cent. That is also, considering the present rate of interest, on a liberal scale.

*Mr. Sinclair.*—Too high in our own case.

*President.*—We generally take a sort of an average. In respect of head office expenses, establishment and other charges, it is always a very difficult matter. We take each industry by itself. Whatever the agents' agreement may be with the Company, we don't take that into account. We generally fix what we considered as reasonable. I want to know generally what you consider a reasonable charge for head office, establishment and agents' commission. We generally take it as so much a month.

*Mr. Smith-Wright.*—That is what we do in our own case.

*President.*—What do you think would be reasonable?

*Mr. Smith-Wright.*—Rs. 3,000 a month.

*President.*—Is your arrangement about the same?

*Mr. Gupta.*—Yes, about Rs. 3,000 a month.

*President.*—That is as regards the head office charges.

*Mr. Gupta.*—Yes.

*President.*—As regards the agents' commission, how does that work out?

*Mr. Ramsingh.*—There is a fixed commission.

*President.*—What do you consider a reasonable charge? We calculate like this. Supposing we allow a 10 per cent. return on the investment as a sort of profit, we add a certain percentage as agents' commission.

*Mr. Ramsingh.*—In our case it is 10 per cent. on the profit.

*President.*—Nett or gross?

*Mr. Ramsingh.*—Nett.

*President.*—After allowing for depreciation and everything.

*Mr. Ramsingh.*—Yes.

*President.*—That you consider would be reasonable.

*Mr. Ramsingh.*—Yes.

*Mr. Smith-Wright.*—This is agents' commission as opposed to the selling commission.

*President.*—The selling commission goes into the cost.

*Mr. Smith-Wright.*—In that case, 10 per cent. on the nett profit would be reasonable.

*President.*—We shall consider that. But that is your proposal, is it not?

*Mr. Smith-Wright.*—Yes.

*President.*—As regards the sales organisation, I take it that in this industry business is done more or less direct by you. You don't employ commission agents and brokers, do you?

*Mr. Smith-Wright.*—We usually employ sub-agents in up-country districts and give them a discount.

*President.*—What is the usual discount given to them?

*Mr. Smith-Wright.*—In the case of up-country, we generally allow them 5 per cent. of the usual price.

*President.*—Is that your practice too?

*Mr. Ramsingh.*—Yes, about that.

*President.*—I am asking for information as to what your up-country sales are, because we will have to spread it over all your sales. Supposing you give 5 per cent. commission on your up-country sales and if your up-country sales are half of your production, it comes to  $2\frac{1}{2}$  per cent. on the whole production.

*Mr. Ramsingh.*—Yes.

*President.*—Will you give us your figures?

*Mr. Ramsingh.*—Yes.

*President.*—As regards the overhead charges that are mentioned none of them naturally go into the cost account.

*Mr. Smith-Wright.*—They do.

*President.*—As regards the method of calculation, I shall come to that later on. We separate the works costs which are costs actually incurred at the works. Ordinarily they include all packing charges and sometimes the brokers' and sub-agents' commission.

*Mr. Smith-Wright.*—We have not included any commission in our works costs.

*President.*—Nor do we as a matter of fact. But you must be quite clear that the charges are included somewhere and we must be told where.

*Mr. Smith-Wright.*—The figures given for acids on page 40 of our representation include all overheads.

*President.*—Do you use the word "overhead" in the sense in which we use it?

*Mr. Smith-Wright.*—Yes, except depreciation and selling commission.

*President.*—Profit on investment you don't include either.

*Mr. Smith-Wright.*—No.

*Dr. Matthai.*—You have included packing.

*Mr. Smith-Wright.*—Yes, and other charges like managing agents' commission, interest on working capital, establishment charges, etc.

*Dr. Matthai.*—In order to get a fair selling price, to this we have to add depreciation, selling commission and the profit on investment.

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—The statement in which you give your works costs does not include packing.

*Mr. Smith-Wright.*—No.

*President.*—As regards the allocation of these charges, of course, there are various ways of allocating them. Would it be fair to allocate these charges in proportion to the works cost?

*Mr. Smith-Wright.*—That is the fairest way. If they are allocated on the time basis, it will not be fair.

*President.*—Some people allocate on the basis of raw materials and labour and some people merely on the basis of labour.

*Mr. Smith-Wright.*—We allocate these charges on the unit cost per ton at the works.

*President.*—Of each product?

*Mr. Smith-Wright.*—Yes.

*President.*—You have got to allocate your general supervision charges, power and fuel.

*Mr. Gupta.*—Power and fuel are a direct charge.

*Dr. Matthai.*—What you actually do with regard to your allocation is that you base it on a proportion which is made up of your monthly output and your realised prices of each product.

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—It is all right as a working formula. But our concern is to find a fair selling price for each product. For that supposing we take an allocation based on the realised price in the market, we are begging the question.

*Mr. Smith-Wright.*—We can only estimate on the works cost what would be a fair profit to make.

*President.*—The works cost, is it free of allocation?

*Mr. Smith-Wright.*—We use so much direct labour, we use so much water and so on. These are directly charged.



*President.*—Is that the same in your case?

*Mr. Gupta.*—Yes.

*President.*—Except general supervision?

*Mr. Smith-Wright.*—Except head office and supervision of the works.

*President.*—Supervision of the works has to be allocated.

*Mr. Smith-Wright.*—That is included in the wages bill.

*President.*—How do you allocate the cost of the chemist?

*Mr. Smith-Wright.*—I have made a mistake in the use of "supervision of the works". The cost of the senior staff, viz., works manager, chemist and full time assistants comes under overhead. The works cost only includes wages of the casual labour employed on the various plants, so that it does not really include supervision.

*Dr. Matthai.*—What you do is this. Take power and fuel and establishment and depreciation. All these three you divide among the various products according to a particular proportion.

*Mr. Gupta.*—We have allocated in this form. The works have consumed, say, 10,000 units and produced so many tons of all products. We divide the amount of power consumed by the amount of production and say that per ton the consumption of power is so much and allot accordingly.

*President.*—That would not be correct.

*Mr. Smith-Wright.*—That would not be accurate.

*President.*—The simplest way is to take the direct expenditure as the basis, that is to say, raw materials and labour. That ought to give you a fairly good allocation.

*Dr. Matthai.*—That you can directly estimate for each product.

*Mr. Smith-Wright.*—What would you do with fuel?

*President.*—You allocate fuel in the same proportion.

*Mr. Sinclair.*—But fuel itself is as much a raw material as sulphur.

*President.*—If we include fuel, water, direct labour and raw materials?

*Mr. Smith-Wright.*—That would be all right.

*President.*—And then divide it by the total tonnage to arrive at the proportion of the overhead?

*Mr. Smith-Wright.*—Yes.

*President.*—Take a concrete case. If we took sulphuric acid, it would be as follows:—

	Rs.
Sulphur . . . . .	100
Labour . . . . .	50
Water . . . . .	10
Fuel . . . . .	10
TOTAL	170

*President.*—We will have to take the whole quantity manufactured. Supposing there are 100 units, one unit comes to 1.7.

*Mr. Gupta.*—We must divide the total cost on a month's production by the tonnage.

*President.*—You do that in each case?

*Mr. Gupta.*—Yes.

*President.*—Then you add these different units together and you get 1.7. Then you have got to allocate the other charges. Then you get the total of the other charges—1.7 for sulphur, epsom salt, say, '3.

*Mr. Smith-Wright.*—We don't allocate the other charges according to the cost. If sulphur costs 1.7 and Epsom half of that, we don't allocate twice as

much to sulphur as we do to Epsom necessarily. We do not do in that ratio, because we do not realize on one product what we realize on the other.

*Dr. Matthai.*—Supposing we fixed a fair selling price for each product by taking into account the price in the market and fixed the duties accordingly. If these Trusts alter the prices in the market next year the duties are completely upset.

*Mr. Smith-Wright.*—If it is a question of arriving at a scale of duties we have one suggestion to make and that is, after taking evidence from all the factories you will find out what the costs are to them on each product and you can then ascertain what the average costs are at present of each product.

*President.*—How are we to find out the costs because we do not know how they are allocated. You may follow one system while the others may follow different systems. They may be all right or they may be all wrong and we can never arrive at accurate results.

*Mr. Smith-Wright.*—If you can find out more or less what is the fair cost you can fix a fair selling price.

*President.*—I think we have got to apply some rule of thumb and the best thing we can do is to take them in the proportion I have just mentioned—sulphur 1·7, Epsom '3, and so on. Somehow we have got to determine what would be the fair selling price. What we usually do is this. Supposing your capacity is 8,000 tons, but your average production is, say, 1,000 tons a year allowing for the shut down period. We say this 8,000 tons is the figure that you can obtain in, say, 10 years. What we generally do is, we take some intermediate figure which we consider as average production for the whole of that period. For instance, if your production is 1,000 tons only it is absurd that 1,000 tons should bear all the total overhead charges, we say let us take 4,000 or 4,000 tons as an average for the period if we are granting protection. Then we say for this period we will calculate such and such production. We have tried to make an estimate of the average production for a particular period. Take the case of the Steel Company for instance. When we were reporting they were producing 3½ lakhs of tons. We estimated that in seven years they would produce 600,000 tons. According to our calculations we came to the conclusion that if we took 500,000 that would give them for that period sufficient profit.

*Mr. Sinclair.*—That was assuming an increase in the market. The chemical market has been more or less stationary.

*President.*—We have got to take some average and we are trying to get as reasonable an average as we can. That allows for shut down and everything else.

*Mr. Sinclair.*—That is fair I think.

*President.*—Under overhead we also include interest on working capital. It is very difficult to ascertain in what the working capital is. We take it on so many months production.

*Dr. Matthai.*—It is works cost on so many months production.

*President.*—In the Steel Industry we took 4½ months I think. In your case what do you suggest the period of turnover?

*Mr. Smith-Wright.*—I think in our statement we have stated three months as the average but in the case of big jobs we have to wait for a longer time.

*Dr. Matthai.*—Taking works cost on your full capacity it is roughly 6 months' turnover?

*Mr. Gupta.*—We have put 8 months.

*President.*—In the case of sulphur you have probably to store it.

*Mr. Gupta.*—Yes.

*President.*—We are going to include jars and other things in the works cost so that if we take 4 to 6 months whichever you think reasonable, that would be a fair way of arriving at the working capital, would it not?

*Mr. Smith-Wright.*—Yes.

*President.*—In these calculations can you suggest any method of arriving at the cost separately of each item. Can you suggest a typical product which we can take?

*Mr. Smith-Wright.*—Sulphuric acid would give you the key practically to the whole thing. It represents the greatest sale.

*Dr. Matthai.*—You are fixing the measure of protection on sulphuric acid. The import price is much above your cost.

*Mr. Smith-Wright.*—Actually it is less.

*Dr. Matthai.*—Supposing in fixing the measure of protection we took your cost of sulphuric acid and the present import price in Bombay and took the difference between the two and said that difference would apply to the other chemical products that you manufacture, would it be proper?

*Mr. Smith-Wright.*—No.

*President.*—On Epsom salts you want a good deal more protection. That is not a typical product.

*Mr. Smith-Wright.*—No.

*President.*—Now let us come to the general issues (question 98). I may tell you that this Board never recommends prohibition of imports at all. If we are satisfied that an industry has made out a case for protection we go on to consider what the protection should be. It is no use suggesting that imports should be prohibited. There are two or three things. First as regards the measure of protection, we do not propose to make any departure from our usual method unless you can show us some unusual grounds. Our method is simply this; if we are satisfied that protection should be granted we recommend an adequate measure of protection. That would depend on the difference between the fair selling price and the import price. Protection may not take the form of a high duty necessarily; it may take other forms. Yesterday I explained to you that there are two other ways. One is the question of freight. On that point we should want more information than you have given us. The second is the question of a bounty. That also requires very careful consideration. But we must be satisfied that if protection is given the industry would develop. Supposing a bounty on sulphuric acid was given, you must show that it would lead to more production and to the expansion of other industries which depend on sulphuric acid. We would like to be advised in what direction the expansion of the use of sulphuric acid is possible.

*Mr. Gupta.*—The textile industry is a big consumer. Both industries are linked together. If the textile industry expands our sulphuric acid industry will expand also.

*Dr. Matthai.*—If you had a bounty on sulphuric acid and to that extent the cost of your sulphuric acid was reduced, then you could make salts out of sulphuric acid cheaply?

*Mr. Smith-Wright.*—The chief way in which cheap sulphuric acid will help us to expand would be the manufacture of Epsom salt.

*Dr. Matthai.*—If the textile industry develops you would get a bigger market. Taking the market as it is now, supposing you are not able to get the whole of it because your costs are higher than the import price, if we gave a bounty on sulphuric acid to that extent you can bring down your costs so that you will be able to get a larger share of the existing market, is that right?

*President.*—We must get an idea of the burden that the bounty would throw upon the general tax-payer. That is to say, you must give us an idea of the quantity of sulphuric acid which would earn the bounty.

*Mr. Smith-Wright.*—As you suggested yesterday, you could fix a minimum. That would be only fair.

*President.*—In any case a certain quantity of sulphuric acid will be sold in the country and as such that will have to be excluded.

*Mr. Smith-Wright.*—Yes.

*President.*—Therefore the bounty will only cover that sulphuric acid which will be required for developing other industries.

*Mr. Smith-Wright.*—For manufacturing all other products. But the difficulty we are faced with is that even a bounty on sulphuric acid is not going to help us unless we can market epsom salt profitably. Because epsom is the most important salt which we make with the exception of fertiliser which we have dealt with already fairly fully. Of all the salts the important one is the epsom for which there is a very large market in India. As I have explained, there is difficulty in regard to getting supplies of magnesite and other things.

*President.*—As I was telling you yesterday, we cannot encourage the growth of mushroom sulphuric acid plants.

*Mr. Smith-Wright.*—No.

*President.*—What do you suggest would be the limit?

*Mr. Gupta.*—I don't think you have anything much to fear on the score of the growth of small plants, because the sulphuric acid plant is very expensive for any one to start it in a small way. There are, of course, small plants—nearly half a dozen in the Punjab.

*Dr. Matthai.*—Because the railway freight on sulphuric acid is so high that you can have a small local plant catering for a small market.

*Mr. Gupta.*—That is true.

*President.*—What do you consider should be the limit?

*Mr. Gupta.*—At least 1,000 tons a year.

*Dr. Matthai.*—1,000 tons would not be considered a reasonable economic unit for sulphuric acid.

*Mr. Gupta.*—Certainly not, but it is the very minimum.

*President.*—On the first 1,000 tons nobody would get a bounty.

*Mr. Gupta.*—The other acids and salts won't get any benefit if you make the margin as high as 1,000 tons and there won't be any improvement on the present situation.

*President.*—It becomes very difficult to work it. You must say the first 500 tons or 1,000 tons in every case are excluded.

*Mr. Smith-Wright.*—If you confine the bounty to sulphuric acid which is only used for the purpose of making other products, you exclude also pure acids sold as such.

*President.*—Each work must sell a certain quantity of sulphuric acid as such and that must be excluded. Another thing is, as I said, the limit must be such that it doesn't encourage the growth of very small plants. These are two things to be kept in view.

*Mr. Smith-Wright.*—If you are going to grant a bounty on the sulphuric acid that is used in other things, there will be no incentive to any man to start a sulphuric acid plant.

*President.*—It requires such a lot of supervision that the scheme is not workable. The best thing is to see that no man is entitled to a bounty unless his production exceeds a certain quantity in a year and in that case the bounty will have to be higher.

*Mr. Smith-Wright.*—In administration you would not actually exclude acid sold as such and you would fix a minimum limit and say that that is the amount which is allowed to be sold outside.

*President.*—On the first 500 or 1,000 tons, he gets nothing. After that he gets a bounty whether it is made to be used in other products or sold as pure acid.

*Mr. Smith-Wright.*—Yes.

*President.*—Remember, I have not made up my mind yet. The whole thing is merely a discussion and I am asking you whether it would not be a way of doing it. Yesterday I was telling you about the coke ovens plant and

pig iron plant where they are manufacturing sulphate of ammonia and selling it through a Syndicate. We may have to exclude them entirely. These are points we have got to consider.

*Mr. Smith-Wright.*—You will have to exclude the iron and steel industry altogether. Excluding them you may fix it at 360 tons per annum or a ton a day, instead of as I said previously at 1,000 tons.

*President.*—Would it prevent the erection of small plants? I think sulphuric acid is also used for batteries which are not really industrial.

*Mr. Gupta.*—300 tons cent. per cent. acid would be fair.

*President.*—That is equal to 500 tons of chamber acid.

*Mr. Gupta.*—About 450 tons.

*President.*—Do you think that it would be sufficient to exclude the small plants?

*Mr. Gupta.*—Yes.

*President.*—We will consider that. It is of very great importance.

*Mr. Gupta.*—Small plants must be excluded, otherwise as Dr. Matthai said, small plants might be started.

*Dr. Matthai.*—Please think it over and let us have your reply.

*Mr. Ramsingh.*—Yes, we will think it over and let you know.

*Mr. Smith-Wright.*—The thing that we want to market is epsom salt.

*President.*—In the case of fertilisers you will have to give us some idea. If we recommend a bounty on fertilisers, we have got to say that the bounty shall be paid on the production of so many thousand tons a year and for so many years. You must give us an idea as to what your opinion is likely to be about the expansion of the market for sulphuric acid and its products.

*Mr. Ramsingh.*—What period do you consider reasonable?

*President.*—It is for you to suggest.

*Dr. Matthai.*—If you suggest a particular period during which the scheme should be in force, we must know what is the maximum burden that may be imposed during that period upon the exchequer as a result of the bounty scheme. You cannot lay an indeterminate charge on the tax-payer.

*Mr. Ramsingh.*—No.

**THE DHARAMSI MORARJI CHEMICAL COMPANY, LIMITED.**

**Oral Evidence of Mr. L. GUPTA and Mr. RAMSINGH DONGARSINGH  
continued on 8th November, 1928.**

*Costs.*

*President.*—We now propose to go into the question of costs. First of all we shall deal with sulphuric acid. You manufacture two classes of sulphuric acid don't you?

*Mr. Gupta.*—One; it is chamber acid and that chamber acid is concentrated for selling.

*President.*—In what form do you sell sulphuric acid as such?

*Mr. Gupta.*—Concentrated sulphuric acid.

*Dr. Matthai.*—You sell also a small quantity of battery acid?

*Mr. Gupta.*—Yes, but it is concentrated also.

*President.*—Is it what is known as concentrated oil of vitriol?

*Mr. Gupta.*—Yes. But in the process of manufacturing this acid and the battery acid there is no difference. In the case of better concentration greater precaution is taken.

*President.*—Is this chamber acid taken on a cent. per cent. basis?

*Mr. Gupta.*—We have costed this on a cent. per cent. basis.

*President.*—There is another class of acid which is called ordinary commercial acid?

*Mr. Gupta.*—That may be in the form of concentrated acid too because generally in order to make some saving in freight everybody sends it in concentrated form which the customer demands. Chamber acid which is 64 per cent. we concentrate and bring it down to 95 per cent.

*Dr. Matthai.*—For the purpose of determining the price of your sulphuric acid we might take the oil of vitriol as the basis?

*Mr. Gupta.*—Yes.

*President.*—When you talk of your capacity as 8,000 tons, what acid are you referring to?

*Mr. Gupta.*—Chamber acid on cent. per cent. basis.

*President.*—I want to know the equivalent of chamber acid in terms of this oil of vitriol.

*Mr. Gupta.*—7,600 tons.

*President.*—In the subsequent processes of manufacture I take it that you use chamber acid but you cost on the basis of 100 per cent. when you use sulphuric acid for other products?

*Mr. Gupta.*—Yes. We take it directly from the chamber and put it on to the other articles.

*President.*—How much do you sell as oil of vitriol and how much do you use up for your other manufactures?

*Mr. Gupta.*—We will give you detailed figures.

*Dr. Matthai.*—There is just one point that I would like to be cleared up. In the statement that you sent to the Government of India in 1925 you gave a statement of costs of these various products. That was in August 1925. I expect, therefore, that the costs you showed there were your costs in 1924-25. Am I right?

*Mr. Gupta.*—No. That was an estimate of what we were going to make in the future.

*Dr. Matthai.*—What you estimated to be your possible output in the near future?

*Mr. Gupta.*—Exactly. Except in the case of raw materials the figures won't tally.

*Dr. Matthai.*—On what kind of basis did you make that estimate? Supposing one asked you what was going to be your probable output in the near future would you take these figures or your full capacity figures?

*Mr. Gupta.*—I can't answer that off-hand. We will give you a fuller statement.

*President.*—As regards the price of sulphur in your answer to question 76 (Form No. II) it has varied very considerably since 1924-25. In 1924-25 your average price was Rs. 158; it came down to Rs. 105 in the following year and it rose again to Rs. 116 in 1926-27. What was the reason?

*Mr. Gupta.*—We bought this sulphur in huge quantities in 1922 and then the price suddenly went down.

*President.*—Is it what is known as rock sulphur?

*Mr. Gupta.*—Yes. This sulphur that we bought at that time bore a duty. Subsequently the duty was removed, so we wrote off an equivalent amount.

*President.*—That duty was removed in 1924-25?

*Mr. Gupta.*—Yes.

*President.*—But there has again been a rise since 1925-26?

*Mr. Gupta.*—This stock was being used up and when we found that the duty had been removed we wrote off the amount and said our cost of sulphur was so much.

*President.*—What was the actual price at the time?

*Mr. Gupta.*—Rs. 158.

*President.*—What is the present price?

*Mr. Gupta.*—\$33 to 35, that is about Rs. 100.

*President.*—To that you have to add how much?

*Mr. Gupta.*—Port charges and freight to Ambarnath—Rs. 7-12-0 altogether.

*President.*—I take it that the drop in the price of sulphur would affect the world price of all chemicals with which we are dealing.

*Mr. Gupta.*—It depends on the demand for the articles also.

*President.*—Quite true, but if the drop in the price of sulphur persists it must affect the price of the products?

*Mr. Gupta.*—It must bear some relation.

*Dr. Matthai.*—Has there been a general fall in all countries or has it affected the Indian market only?

*Mr. Gupta.*—Since 1925 it is almost general but the variation will be very slight, about Rs. 4 to Rs. 5 per cent.

*President.*—According to quotations given in the Chemical Trade Journal the price of sulphur doesn't seem to be any lower in Great Britain than here.

*Mr. Gupta.*—That is for rubber chemicals.

*President.*—I want to know whether I can find the price of sulphur in these journals.

*Mr. Smith Wright.*—I have cabled home for the latest prices. Sicilian sulphur c.i.f. United Kingdom is \$25 loose or in bulk. Packed in a single bag it costs \$23.

*President.*—How do they take it generally?

*Mr. Smith Wright.*—That would depend on whether they want to resell it to some one else or import it for their own works. The price of American sulphur, 99½ per cent. is \$26 to \$28.

*President.*—That is about £6.

*Mr. Smith Wright.*—Yes. The price of sulphuric concentrated acid in England is £5 a ton.

*President.*—Is it in bulk or naked?

*Mr. Sinclair.*—£5 per ton naked.

*Mr. Gupta.*—That is arsenicated acid from pyrites. That won't compare with the pure sulphur acid.

*President.*—Let me understand this term, Sulphur flowers, Sicily. Is that the purest form of sulphur?

*Mr. Gupta.*—Yes.

*President.*—The price of it is given as £12-10-0.

*Mr. Gupta.*—Yes.

*President.*—What is this sulphuric acid 168° T.W.?

*Mr. Gupta.*—That is 1.84 sp. gravity acid which we are selling.

*President.*—What is T. W.?

*Mr. Gupta.*—Twaddle.

*President.*—That is £6-5-0 per ton.

*Mr. Gupta.*—That is fair, because acids made from brimstone always cost a pound more.

*Dr. Matthai.*—The cost that you give here for c.v.o. is comparable with £6-5-0.

*Mr. Gupta.*—Yes, about.

*President.*—There is sulphuric acid 144° T. W. That is also £6-5-0. What is the difference between 168° and 144°?

*Mr. Gupta.*—144° is a lower percentage acid.

*President.*—They sell it at the same price.

*Mr. Gupta.*—Because they have to make up for the freight. In the case of 144° you send about 20 per cent. more water.

*President.*—Can we say that this 168° ought to compare with yours?

*Mr. Gupta.*—Yes.

*President.*—Then there is sulphuric acid free from arsenic which is £4 for 144 T. W.

*Mr. Gupta.*—That is 75 per cent. It will be at least proportionate to that.

*President.*—If you are to convert that, that acid will be sold as such.

*Mr. Gupta.*—Not 144°.

*President.*—But 168°.

*Mr. Gupta.*—Both are sold as such.

*President.*—If we want to reduce it to the chamber acid, what should we do?

*Mr. Gupta.*—There are so many considerations. In the Chamber acid there is no concentration charge.

*President.*—Will this be packed or will this be in bulk?

*Mr. Gupta.*—This may be in tank wagons.

*President.*—I wish to know what it is.

*Mr. Gupta.*—That is ex-works per ton.

*Dr. Matthai.*—That is really naked acid.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Is yours dearsenicated?

*Mr. Gupta.*—Yes. It is not treated for dearsenication.

*President.*—Would it be a pound more than 168° acid?

*Mr. Gupta.*—Yes.

*President.*—For industrial purposes is it necessary to use such pure sulphuric acid?

*Mr. Gupta.*—For magnesium sulphate and things like that which goes to the medical people, pure acid will be necessary.

*President.*—I am not dealing with drugs.



*Mr. Gupta.*—When epsom is made, it is made in the ordinary way and then crystallisation is effected. If arsenic is there, you cannot make epsom free from arsenic in the same process of manufacture.

*President.*—Take your fertilisers or other salts, for instance, glauber's. That is only used for special purposes, but not in glauber's salt which is used for industrial purposes. In that what kind of acid will they use?

*Mr. Gupta.*—Take the case of alum. We cannot use arsenated acid, because it goes for water purification.

*President.*—For fertilisers?

*Mr. Gupta.*—It can be used, but not always.

*President.*—What I wish to know is what sort of acid is used for the manufacture of these?

*Mr. Gupta.*—It depends on the situation and on the position of the works. Many use dearsenicated acid and many use brimstone acid for fertiliser manufacture.

*President.*—If the difference is 20 shilling that is a substantial difference.

*Mr. Gupta.*—It depends on the user and for what purpose he is going to use the acid.

*Mr. Ramsingh.*—For the purpose of pickling iron, this arsenicated acid will do.

*President.*—What I want to know is this: take your products.

*Mr. Ramsingh.*—It won't do for us.

*President.*—For any of them.

*Mr. Ramsingh.*—Not for any of them.

*President.*—Then do you suggest that the foreign manufacturer uses the same class of acid?

*Mr. Ramsingh.*—Yes.

*Dr. Matthai.*—You were telling us the other day that as far as your epsom is concerned, it is supposed to be superior to imported epsom.

*Mr. Gupta.*—Yes, the Commercial quality is.

*Dr. Matthai.*—Part of the reason might be that sulphuric acid that is used in the epsom in these exporting countries is arsenicated pyritic sulphuric acid.

*Mr. Gupta.*—It is made from natural salts. Those salts contain all kinds of chlorides and sulphates besides epsom salt. If you examine the samples from the bazaar, they will contain more chloride than our epsom.

*President.*—The point arises in this way. If they can use this cheaper quality of sulphuric acid for the production of these various chemicals and if you have to use better quality of sulphuric acid, then your cost will be more than theirs.

*Mr. Sinclair.*—In textiles and in soda waters, they do not use arsenic acid. It would not pay for us to buy pyrites and dearsenicate it.

*President.*—What I am suggesting is that if they can use in these various chemicals this sulphuric acid which would cost them a pound less and if you have always got to use superior sulphuric acid, to that extent you are at a disadvantage and you won't get any benefit in the price of the chemicals.

*Mr. Ramsingh.*—They cannot send chemicals with arsenic.

*President.*—I don't see that they do.

*Dr. Matthai.*—You are making a statement definitely that as far as the imported salts are concerned, they are all made out of pure sulphuric acid.

*Mr. Ramsingh.*—Yes.

*Dr. Matthai.*—They would be using pure sulphuric acid for these salts.

*Mr. Ramsingh.*—Yes.

*President.*—You ought to get their stuff, get it analysed and say that this is pure sulphuric acid.

*Mr. Sinclair.*—They can use arsenic acid for making nitric acid, for making hydrochloric acid and many other things.

*Dr. Matthai.*—We are more concerned with salts.

*Mr. Sinclair.*—We need pure acid for salts.

*President.*—Could you use cheaper acid for fertilisers?

*Mr. Gupta.*—Yes, cheaper acid would do.

*President.*—If you use too much arsenic, it may kill the plant.

*Mr. Ramsingh.*—I can make a definite statement that ammonia sulphate is not accepted if it contains arsenic acid.

*President.*—The consumer doesn't take a thing, if he thinks that it contains some very harmful element in it. I am not concerned with it if it is purely prejudice.

*Mr. Ramsingh.*—It is not prejudice, because it is poisonous. I have read somewhere that if fertilisers contain arsenic, they also bring the arsenic in the crops and it is injurious.

*President.*—I have also read about that. The whole point is whether in these fertilisers that compete against you they can use this cheaper sulphuric acid or whether they do not. I am talking of fertilisers which are actually in the market in competition against you.

*Mr. Ramsingh.*—No.

*President.*—Have you got any ground for being so emphatic?

*Mr. Ramsingh.*—That is what I have seen.

*President.*—I have also read that arsenic will kill everything. If it is in fertilisers, it will kill the plant. That is also my theory. In the actual fertilisers which are used in the market, can the inferior sulphuric acid be used or not. That is what I want to know.

*Mr. Gupta.*—In rock phosphates they use any kind. It depends on the position of the works.

*President.*—If you save 10s. a ton on half a ton of sulphuric acid, the man starts with an initial advantage of Rs. 6 or Rs. 7. I really wish to know whether he will do so.

*Mr. Gupta.*—As far as superphosphate is concerned, I have seen quite a number of works in the States—3 or 4 dozens I believe where they use any kind of acid.

*Dr. Matthai.*—That is so far as super phosphate is concerned.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—What about the sulphate of ammonia?

*Mr. Gupta.*—There is a tendency to use brimstone acid.

*Dr. Matthai.*—Are you speaking of the States?

*Mr. Gupta.*—Yes, and even in England it is the same.

*Dr. Matthai.*—We get most of our sulphate of ammonia from England.

*Mr. Gupta.*—Mostly from England and from Germany.

*Dr. Matthai.*—What do they use there?

*Mr. Gupta.*—As far as I have seen, I regret to say that some use even arsenated acid.

*President.*—May I put it the other way? At any rate, as regards certain of these chemicals in which sulphuric acid is used the Indian manufacturer must be relatively at a disadvantage compared to the foreign manufacturer of these chemicals because the foreign manufacturer can use the inferior kind of sulphuric acid. Is that correct?

*Mr. Gupta.*—Absolutely correct.

*President.*—As to what that may amount to it is difficult to judge, but there is that factor that in certain grades of chemicals it is possible for the foreign manufacturer to use this cheaper sulphuric acid particularly in the case of super phosphate.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—To that extent your article becomes really superior.

*Mr. Gupta.*—Yes.

*President.*—Would it necessarily fetch you a higher price in this country?

*Mr. Gupta.*—We have very little experience about the bulk sale of fertilisers but necessarily as you say there is that likelihood that if a thing is free from arsenic, the raiyat would like to pay more if he understands the point. It is quite natural for anybody.

*President.*—We are concerned with the Indian consumer. Does he really like to pay you more? Or from his point of view, is it very much the same?

*Mr. Gupta.*—The Indian consumer requires any kind of product. It is for us to tell him that he must use this and not the other which contains arsenic.

*Dr. Matthai.*—As far as larger buyers like planters and so on are concerned, they know what they are buying and there the question of quality would apply in your favour.

*Mr. Gupta.*—Yes, they do understand these things.

*Dr. Matthai.*—At present, they are the people who buy in bulk from you

*Mr. Gupta.*—Yes.

*President.*—In the United States, is it not a fact that they have to undertake drastic legislation to prevent this sort of fraud on the consumer?

*Mr. Gupta.*—Yes. The manufacturers have to attach a certificate guaranteeing the analysis on each bag they sell.

*President.*—Of course, the consumer would know.

*Mr. Gupta.*—Yes. Government also have inspectors who go to any consumer's point and take the sample and analyse it. If it does not tally with the certificate attached to the bag, the manufacturer is liable for prosecution.

*President.*—In these costs, really there are three fairly big items. The first is the cost of sulphur. What is the percentage of sulphur that you require? Does it vary between 30 and 36 per cent.? Is that about right?

*Mr. Gupta.*—Yes.

*President.*—Is it according to the European practice or is there more wastage here?

*Mr. Gupta.*—The actual plant efficiency is 95 or 96 per cent. For handling we make some allowance for losses and so it practically works out at 93 or 94 per cent.

*President.*—Do you mean on an average?

*Mr. Gupta.*—From each ton of sulphur we must get 3 tons of sulphuric acid cent. per cent. if we calculate. But our average is only 93 or 94 per cent. because we allow for some loss in handling and loss due to leakage, etc. But if the actual plant efficiency is taken into account, it may be 95 to 96 per cent. When we take stock at the end of the year, there is a small percentage of loss.

*Dr. Matthai.*—Your consumption of sulphur has more or less remained the same.

*Mr. Gupta.*—Yes.

*President.*—I can tell you this much. America may be very well advanced in matters of manufacture and so on but American costs are not necessarily low. As regards the consumption of material and so on, we can take the American percentages but as regards the total cost if we were to follow the American cost I don't think we would arrive at very correct results.

*Mr. Gupta.*—No. But you can take the English figures if you like.

*President.*—That is the trouble about American costs. As a matter of fact they are not really in competition against the rest of the world in many things and so their costs cannot be taken as competitive. There may be a lot

of internal competition but so far as the outside world is concerned, they are unable to compete. I simply go by the export figures.

*Dr. Matthai.*—Have you got any figures of American consumption of sulphur per ton of sulphuric acid?

*Mr. Gupta.*—It cannot be more than .85 ton. Taking up the actual efficiency of every plant, it works out to 95 or 96 per cent.

*President.*—What is the percentage of nitre required?

*Mr. Gupta.*—In India we require about 4 per cent. because we stop now and then. If the plant is worked continuously it may be brought down to 2 or 3 per cent.

*Dr. Matthai.*—You have steadily improved in the consumption of nitre soda.

*Mr. Gupta.*—Yes. In the first two or three years, men have to be trained.

*Dr. Matthai.*—The only other respect in which the cost has improved is the drop in the price of sulphuric acid, which is on account of the abolition of the duty on sulphur.

*Mr. Gupta.*—Yes.

*President.*—This charge on labour that you have given, is it the actual charge?

*Mr. Gupta.*—Yes.

*President.*—That I take it is all direct labour.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—By direct labour you mean the people who are actually handling the plant.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—It excludes all supervision.

*Mr. Gupta.*—Yes, it does.

*President.*—That may be taken as an accurate figure.

*Mr. Gupta.*—Yes.

*President.*—As regards power and fuel?

*Mr. Gupta.*—That is actual.

*President.*—Do you keep a separate account for each department?

*Mr. Gupta.*—Yes, fuel account is kept separate because we cannot work always all the plants.

*President.*—If your power plant is sufficiently large to supply you with power for all the products and if you are shutting down part of the plant, your cost will naturally be high.

*Mr. Gupta.*—Our power is not generated in the works; it is brought from outside.

*President.*—That is as regards electric power. But you use a lot of steam also.

*Mr. Gupta.*—That is the actual cost.

*President.*—Does each department make its own steam?

*Mr. Gupta.*—No.

*President.*—That is what I mean. Then, there must be some allocation

*Mr. Gupta.*—This is how we do. To-day we work the chamber plant. We work the boiler plant for the chamber plant only. We know the production of both the chamber plant and the power plant, and we say that the cost per ton is so much.

*Dr. Matthai.*—What happens if the chamber plant and two other salt plants work?

*Mr. Gupta.*—As regards the chamber plant, we know from our previous experience the consumption of the chamber plant. By deducting the consumption of the chamber plant from the total power produced, we say that the balance is consumed by the salt plants, and we allot it in that proportion.

*Dr. Matthai.*—Having had the advantage of working under capacity all these years, you have actually found out the consumption of each plant.

*Mr. Gupta.*—Yes, without putting the steam meter for each plant.

*President.*—When you use a large plant in India for the production of steam for a small production, the costs very often are not very accurate.

*Mr. Gupta.*—The cost of steam is more.

*President.*—If you are to put out the boiler every day and re-light it for the production of steam for one plant, it stands to reason that the cost of steam will be more than if you are running the boiler the whole time.

*Mr. Gupta.*—Actually it is more.

*President.*—It must have happened in these costs.

*Mr. Gupta.*—Yes.

*President.*—The correct way of doing it will be this. If you can at any time work all your plants simultaneously to their full capacity or anything like it, then you are in a position to say that your costs of power and fuel will be so much and then those will be accurate. Further you will also know that when you are not working to your full capacity you are losing so much.

*Mr. Gupta.*—That way we have tried.

*Mr. Ramsingh.*—Once we worked all the plants simultaneously to see how much steam they would consume and we found the difference to be about 6 or 7 per cent.

*President.*—Do you have separate meters for different parts when you use electricity or what do you have?

*Mr. Gupta.*—We have got separate motors for crushing, etc.

*President.*—Let me see what sort of power plant you have. You have an oil engine—I think it is Diesel—which you use ordinarily for generating electricity and for producing steam you have got a boiler.

*Mr. Gupta.*—Yes.

*President.*—Does it work any other machinery besides giving you steam?

*Mr. Gupta.*—We have also got a steam engine.

*President.*—What is it used for?

*Mr. Gupta.*—Sometimes we close the power plant at night and we work the steam engine.

*President.*—Instead of the electric power, you use steam power.

*Mr. Gupta.*—Yes.

*President.*—Why, what is the idea?

*Mr. Gupta.*—Electric power is not available to us all the 24 hours.

*President.*—You are following the reverse of what most people would do. Your steam will naturally become expensive if you are turning on steam at night.

*Mr. Ramsingh.*—We were buying our power from the Woollen Mills which worked only in the day, and when we wanted power to work our plant in the night, we had to use steam.

*President.*—That is not very good business.

*Mr. Ramsingh.*—The power required will be very small and that too only occasionally required. Further we require steam anyhow for our process purposes.

*President.*—Do you have to work day and night for some of your processes?

*Mr. Gupta.*—Yes, always we have to work day and night for practically all the main processes.

*Dr. Matthai.*—At present are you working entirely on steam?

*Mr. Gupta.*—Yes.

*President.*—You claim that your figure for power and fuel is reasonably accurate being based on actual experience.

*Mr. Gupta.*—Yes.

*President.*—What about the other item labour?

*Mr. Gupta.*—That is also actual.

*President.*—Have you taken the actual number of men employed?

*Mr. Gupta.*—Yes. There is a separate muster roll for each plant.

*President.*—To handle the material, to look after the plant and to handle the finished product?

*Mr. Gupta.*—Yes.

*President.*—For the purpose of allocation, we can take these three items, viz., raw materials, labour and power and fuel.

*Mr. Gupta.*—Yes.

*President.*—Water was mentioned yesterday. But I don't see a separate column for water in this statement.

*Mr. Gupta.*—It is so little.

*President.*—Under what head have you included it?

*Mr. Gupta.*—We have added it to power and fuel.

*Dr. Matthai.*—That also can be directly estimated.

*Mr. Gupta.*—Yes, we have a meter.

*President.*—When does your year end?

*Mr. Gupta.*—In December.

*President.*—You will be able to supply us this year's costs?

*Mr. Gupta.*—Yes, we can.

*Dr. Matthai.*—In this 1925 statement of yours, power, water and light in chamber acid you have taken on a basis of 30 per cent.

*Mr. Gupta.*—We made an assumption.

*Dr. Matthai.*—It is since then that you have been able to get accurate data?

*Mr. Gupta.*—Yes. Since then we found out the difficulties of putting power, light and water on the same basis.

*President.*—These three items exhaust the direct charges?

*Mr. Gupta.*—Yes.

*President.*—There are two very big items, repairs and renewals and general supervision charges.

*Mr. Gupta.*—Repairs and renewals are actuals. The engineer keeps separate muster for all these. Workshop charges go to general supervision: works office charges, chemists charges, works managers charges, laboratory charges all go under general supervision.

*President.*—Repairs and renewals?

*Mr. Gupta.*—That is actual charge. The engineer allocates every month. The storekeeper issues, say, so much material for each plant. The material issued every month is valued. There cannot be any mistake. The plant man goes with the chamber chemists issue note. That is a direct charge. There cannot be any mistake. The engineer has only to allocate the small number of labourers directly put on the plant, so that as far as we can see it is almost accurate.

*President.*—How many chambers have you got on your plant?

*Mr. Gupta.*—Four. We use generally three, now we are only using two.

*President.*—That charge of 6.60 for repairs and renewals runs right through the plant. Take the chamber acid and the sulphuric acid; it is 6.6 in both cases. If it was the actual figure for each department it won't be the same.

*Mr. Gupta.*—It is almost the same.

*Dr. Matthai.*—Take everyone of your costs; take zinc chloride for instance: it is 6.6.

*Mr. Gupta.*—I am afraid I am mistaken there. We have put it on the tonnage basis. We have put it like this: so much total was spent and we put per ton so much.

*Dr. Matthai.*—If you take chamber acid and sulphuric acid and your salts and something else which requires a different process and you add it four times over, that cannot be a very accurate method of arriving at the costs?

*Mr. Gupta.*—We have put the total expenditure and divided it by the total tonnage.

*President.*—What total tonnage did you take to start with?

*Mr. Gupta.*—Total tonnage of all our production.

*President.*—Did you include chamber acid twice over?

*Mr. Gupta.*—No, we didn't.

*Dr. Matthai.*—What was your total tonnage in 1926-27?

*Mr. Gupta.*—3,500 tons.

*President.*—Is this Rs. 25,000 for repairs and renewals actual from your books?

*Mr. Gupta.*—Yes.

*President.*—This statement that you give—reconciliation of block account, you say plant and machinery amount to Rs. 5,90,000. Does that refer to the sulphuric acid plant?

*Mr. Gupta.*—Yes. General supervision is also taken similarly.

*President.*—The figures are not uniform in that case. They may vary from product to product.

*Mr. Gupta.*—It is in proportion to the production.

*President.*—General services and supervision charges Rs. 25,000. There your allocation is different.

*Mr. Gupta.*—We have taken the actual works costs and allocated the general supervision charges on each product on works costs.

*President.*—That is to say, you have taken all other costs?

*Mr. Gupta.*—Yes, excluding general supervision charges.

*President.*—You have taken the works costs and divided the whole of your costs under general supervision according to the works cost and in proportion to the production?

*Mr. Gupta.*—Yes.

*President.*—I see in rents and taxes you have also taken a uniform rate as you have done in the case of repairs and renewals.

*Mr. Gupta.*—Yes, we have taken the total tonnage basis.

*President.*—That also is not an accurate method, is it? The thing to do is to take the three items—raw material, labour and power and fuel which are direct charges. Then take the total expenditure under these different heads. Then take the total cost and in proportion to the total works cost incurred under any particular head allocate these other charges.

*Mr. Ramsingh.*—If you want actual figures we have got records of the actual money spent.

*President.*—You can give me the total but after all it is a question of allocation. We must get your total costs under these three different heads.

*Mr. Gupta.*—We will let you have them.

*Dr. Matthai.*—You have given the costs in Form II in answer to question No. 76. They do not include depreciation neither on plant nor on buildings.

*Mr. Gupta.*—No.

*President.*—We will take each item separately as regards the cost and full capacity production. Now let us take the raw materials first. You have taken there the rate of sulphur at Rs. 120. In the last year's costs the figure is Rs. 116. But in the cost per ton in the first case it is Rs. 40·9 and in the

future estimate Rs. 36.48. There is a difference of Rs. 4.5. How do you expect that?

*Mr. Gupta.*—When the plant works full capacity.

*Dr. Matthai.*—As a matter of fact in your costs on full capacity, the only reductions that you allow for are under the general services and repairs and renewals.

*Mr. Gupta.*—And labour also.

*Mr. Ramsingh.*—I am sorry another mistake has crept in rents, taxes, insurance, etc. It ought to be Rs. 1,760 and the cost per ton comes to .22.

*President.*—All these figures require very much revision, I am afraid. On what basis have you made the estimate of the cost of labour? You say the labour which cost you Rs. 2,500 on 1,000 tons would cost you Rs. 5,000 when your production goes up to 8,000 tons.

*Mr. Gupta.*—When the whole plant works to full capacity, the labour will have a uniform rate. We are going to work 300 days and per day the labour is so much and per ton it will be so much.

*President.*—How do you say twice as many men? You are going to have 8 times the production.

*Mr. Gupta.*—Even to make that 1,400 tons, we have got to repair the plant. Actually we only work 6 months and even with a small tonnage. If we shut down the plant and if we want to work it again, 14 days are required to start the plant. The labour is already there for 6 months, so we have merely totalled the labour twice.

*President.*—It may take you a long time before you reach full production.

*Mr. Gupta.*—Exactly.

*President.*—In making an estimate, what should be taken into account?

*Mr. Gupta.*—We must consider in 5 or 10 years what is going to be the production.

*President.*—In the meanwhile what allowance are we to make?

*Mr. Gupta.*—That has to be decided.

*Dr. Matthai.*—The problem will be this. Supposing we gave you sufficient protection to enable you to sell at current market prices and make a reasonable profit, if that happens, what part of the Bombay market accessible to you would you capture during the five or ten years. You have estimated that you are going to make 8,000 tons.

*Mr. Gupta.*—We have given the answer according to the question. We have not considered that in 10 years how much we will be able to make.

*Dr. Matthai.*—If you get a reasonable measure of protection, what is the extent of the market that you are likely to get in the near future. That is roughly the sort of estimate that we want.

*Mr. Gupta.*—We will have to think it over and will let you have the figure later.

*President.*—The point is in how many years do you expect that your plant will work to full capacity. That is essential. Then having got the number of years you say in the first year it would be so much in the second year it would be so much more, in the third year so much more and so on.

*Mr. Gupta.*—It will be on a progressive scale.

*President.*—Yes and then we can say that such and such would be the average production per year without necessarily taking the arithmetical average, because we know that things do not in the world follow arithmetic very much. It might be a very different figure from the average figure, but we must get some idea from you as to how many years do you think you would require to get to the full capacity. You must take other manufacturers into consideration also in making your estimate. If you had the field to yourself, then you can say: "There is nobody else to compete with us. We can increase our production and work to full capacity. In a case like this you cannot do that. This estimate as regards the future is based entirely on a



hypothetical figure which is subject to modification. Really you have applied arithmetical calculations to arrive at those results.

This power and fuel also I don't understand. You simply multiply it by 8 times.

*Dr. Matthai.*—You took it as a direct charge and multiplied it 8 times.

*Mr. Gupta.*—Yes.

*President.*—As regards Repairs and Renewals you have allocated the same amount.

*Dr. Matthai.*—The same amount is divided among a larger tonnage.

*Mr. Gupta.*—Yes.

*President.*—In the case of sulphuric acid plant, the more sulphuric acid you produce, the wear and tear would be greater.

*Mr. Gupta.*—But the repairs would be less. Of course this is hypothetical more or less.

*President.*—You say that it is not going to cost you any more even if you have 8 times the production you have at present. It would be very unusual if it happened in your case. Just now it stands to reason that there will be more wear and tear, more repairs and renewals required in the case of your sulphuric acid plant if you get 8,000 tons instead of 1,000, but you have not made any allowance for it.

*Mr. Gupta.*—I should think the repairs would be less.

*President.*—The repairs may be less per ton, but the aggregate amount has been increased only by 600 for the additional 7,000 tons. It does seem to me a little too optimistic. You must give us an estimate which we must consider as fairly accurate. You are at liberty to say that your estimate is correct, but I am just pointing out to you that it seems rather doubtful if your production went up by 8 times, there would be no expenditure on repairs and renewals.

*Mr. Gupta.*—When the plant works to full capacity, there is no chance for repairs except when there is an accident. This is all a hypothesis. We think that repairs and renewals will not be any more than what it is.

*Dr. Matthai.*—Take the lead chambers.

*Mr. Gupta.*—Depreciation will be more.

*President.*—Why should the depreciation be more on the plant?

*Mr. Gupta.*—Depreciation will be a direct charge. Labour spent on that will be actually less, because the plant will work continuously. There is no shutting down and for repairing sprays or pumps or some crack here and there it will not be much more than what it is now.

*President.*—If you use your motor car for 1,000 miles and the same car for 8,000 miles, there will be some difference in the cost. I am not talking of the petrol, but of the wear and tear. Would it not be so? Why should it be different in the case of any plant?

*Mr. Ramsingh.*—At present repair charges are more, because we have got to shut down the plant now and then. Whenever we shut down the plant, repairs are more.

*President.*—If you shut down the plant, repairs are more.

*Mr. Ramsingh.*—Because they get rusty.

*President.*—I am just warning you that it is no use giving me an estimate which really cannot be supported reasonably. Mr. Sharpe, what is your opinion on this point?

*Mr. Smith-Wright.*—Certainly in the aggregate, repairs must come to more. Working on an enormously increased production, the cost per ton would naturally be reduced and the savings on repairs would be affected. On the whole the aggregate bill at the end of the year must naturally be much greater. That is my opinion.

*Mr. Sharpe.*—I don't think the analogy of a motor car is a happy one.

*President.*—If the car runs 8,000 miles, there will be more wear and tear than the car when it runs 1,000 miles. Obviously the life of the car is limited.

*Mr. Sharpe.*—We say we produce 2,000 tons and we have got to produce 8,000 tons in the same time. It is not a question of life there. It is a question of the pressure in which they are working.

*President.*—The plant instead of working 8 hours a day works 24 hours a day.

*Mr. Sharpe.*—It is working 24 hours irrespective of the quantity.

*President.*—In the same way if you run your motor car for 24 hours, the wear will be much more.

*Mr. Wright.*—When a plant is run continuously, it doesn't cost relatively more, but when it is shut corrosion takes place more rapidly and consequently repairs and renewals are more. But I do admit that when the production goes up by nearly 8 times, in the aggregate your bill must be bigger.

*President.*—That is the point. If you admit that it must be more, how much it would be?

*Mr. Gupta.*—I beg to differ. I don't think anybody would accept that the repairs on a chamber plant working to full capacity will be more than shutting down now and then.

*President.*—You take the risk if you make an under-estimate.

*Mr. Ramsingh.*—On thinking it over, if we think that it is necessary to revise the figure, we shall inform you later.

*President.*—That does not help me very much. It is not merely a question of changing the figure. It is a matter of thinking out as to what actually happens. I have never come across a case like this. Of course applicants sometimes have put forward figures like this but in my experience this is the first time in which I come across a statement that when the production goes up 8 times, the total aggregate bill for repairs and renewals will be the same. I am prepared to admit that the charge must come down per ton but here the total amount remains the same.

*Mr. Sinclair.*—The point they (Messrs. Dharamsay, Morarji Chemical Company) are making is that when a plant is shut down in a chemical factory, depreciation is much higher.

*President.*—The damage arising from dis-use may be much greater.

*Mr. Sinclair.*—If a plant in a chemical factory is worked even at an excessive rate continuously, there will be no repairs and renewals. But when once you shut down, corrosion takes place and the bill for repairs and renewals becomes heavy. If a plant is worked for, say, 9 months in a year the repair bill would be considerably less than it would be if it were shut down in the middle. It is one of the contradictions in chemical plants as compared with other plants.

*President.*—I am prepared to make allowance for all that. There is also this point to be considered. I take it that in this plant as in any other, as the plant gets older and older the cost of repairs and renewals will be heavier and heavier. You have got to make allowance for two things. First of all, increased production may result in increased aggregate cost. Then, every year that you add to the age of the plant, means more repairs and renewals ordinarily. If you say that your industry is an exception to that, I have nothing to say.

*Mr. Sinclair.*—Depreciation will be increasing year after year.

*President.*—I am not talking of depreciation but of patching up and looking after the plant.

*Mr. Sinclair.*—That is true.

*President.*—As you say depreciation also must increase as the plant gets older. For that you have not made any allowance. No one can say what it would cost. Should we not take that into account in making a future estimate. That is what I am asking you. The whole point is this. Supposing the life of your plant is 20 years—we will put it that way then you set aside 5

per cent. for depreciation. Before you are in a position to scrap the whole plant and renew it, is it not a fact that every year as the plant is used assuming that the production remains the same for the time being, repairs and renewals would probably increase?

*Mr. Gupta.*—If it is not a question of full production, surely the cost of repairs and renewals will be more—I agree. The question is how many times we are going to shut down. Shutting down causes the greatest amount of loss in the case of chemical plants.

*President.*—That we have already considered. The point that now remains to be considered is this. Not having reached your full production supposing your production increases in a certain proportion till you reach your full production, as you are doing that, does not the plant require more attention because of the ordinary use?

*Mr. Gupta.*—If the plant is old, surely it would require more attention.

*President.*—Your plant is middle aged. I would like you to revise your estimate and tell me what you really think.

*Mr. Ramsingh.*—Yes, we will do so.

*President.*—As regards general services and supervision, they come down from 6.62 to .93, the aggregate more or less remaining the same. At present these charges include the cost of a chemist, local management and what else?

*Mr. Gupta.*—And laboratory charges.

*President.*—You don't anticipate any increase in those charges.

*Mr. Gupta.*—No.

*President.*—That is possible. Actually your aggregate costs have come down in your future estimates.

*Mr. Gupta.*—Yes, because we have made allowance for greater production in other products which we have not shown.

*President.*—This aggregate as I say must be altered. We are taking the total for the year as Rs. 2,400 in round figures. Have you taken the same figure as regards the future?

*Mr. Gupta.*—Yes.

*President.*—As regards rent and taxes also you have taken the same figure.

*Mr. Gupta.*—Yes.

*President.*—Is there a ground rent to be paid?

*Mr. Gupta.*—Yes. We have to pay ground rent, municipal taxes and insurance for the plant.

*President.*—It does not seem to be a very large sum.

*Mr. Gupta.*—It is not.

*President.*—Are you within the municipal limits?

*Mr. Gupta.*—We are within the notified area.

*Dr. Matthai.*—Comparing your 1924-25 charges with your 1925-26, I find that general services and supervision have increased from Rs. 7,086-3-10 to Rs. 10,404-6-5 and repairs and renewals have increased from Rs. 7,448 in 1924-25 to Rs. 11,951 in 1925-26 because your output has increased from 1,064 to 1,406 tons. That principle would apply to full capacity, would it not?

*Mr. Gupta.*—There was very little difference because the number of days worked was about the same.

*President.*—That does not explain. What my colleague has been telling you is this. When you were producing 1,064 tons, your total charges for repairs and renewals were about Rs. 7,400 but when your production went up to 1,400 tons, your repairs and renewals also went up to as much as nearly Rs. 12,000.

*Mr. Gupta.*—In that way we have allowed for a proportionate increase in our charges.

*President.*—But you have not allowed in the aggregate amount. Further as you came down in your production to 1,185 tons in 1926-27, your repairs and renewals also came down.

*Mr. Gupta.*—That was because we had to shut down.

*President.*—This disposes of the Chamber Acid for the time being. All these figures will have to be worked out again.

*Mr. Gupta.*—Yes.

*President.*—It would help us very much if you would now make the allocations as regards repairs and renewals, general services and supervision, rents, etc., in the way in which we suggested yesterday. You take the total costs of raw materials, labour, power and fuel and you allocate for each product the charges in the proportion in which the costs incurred in each particular product bear to the total costs.

*Mr. Gupta.*—Yes.

*President.*—That is to say in the same way more or less as you have done in the general service and supervision charges. It is simply a lot of arithmetic. You must give us these revised figures. We would like to have these not later than Monday or Tuesday.

*Mr. Gupta.*—Yes.

*President.*—We will now go on to concentrated sulphuric acid. There is a drop in the works costs from about Rs. 151 to Rs. 135.

*Mr. Gupta.*—That is due to the price of sulphur.

*Dr. Matthai.*—And to some extent reduced consumption?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Here also do you claim that power and fuel and labour are actuals?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Curiously enough you have got the same figure of 2,500 as you have got in the other for labour.

*Mr. Gupta.*—Same number of men worked for the same period.

*Dr. Matthai.*—Last year it used to be 2,500 and it came down to 2,000; is that correct?

*Mr. Gupta.*—That is so.

*President.*—Please explain to me why in this process the charge for fuel is very much larger? What does this process of concentration involve chiefly?

*Mr. Gupta.*—Evaporation of water from the acid.

*President.*—You say the loss would be about 10 per cent.?

*President.*—Is that in accordance with the foreign practice? 90 per cent. is considered good?

*Mr. Gupta.*—Yes.

*President.*—Is that what you actually get?

*Mr. Gupta.*—Yes.

*President.*—Why do you call it 95 per cent.?

*Mr. Gupta.*—95 per cent.  $H_2SO_4$  as such is sulphuric acid with 5 per cent. excess water in it. Then there is some residual matter also.

*President.*—It is sold in the market according to the percentage of acid it contains?

*Mr. Gupta.*—Yes. We sell it on the 95 per cent. basis.

*President.*—Why do you call the chamber acid 100 per cent.?

*Mr. Gupta.*—Because on that basis checking becomes very easy.

*President.*—It is not 100 per cent.?

*Mr. Gupta.*—No. It is not 100 per cent. acid; it is 64 per cent.

*President.*—You simply convert that into 100 per cent. by arithmetical calculation? That 100 per cent. is used in a very different sense there.

*Mr. Gupta.*—Yes.

*President.*—That 100 per cent. is merely theoretical?

*Mr. Gupta.*—Yes.

*President.*—But the ordinary strength of the chamber acid is 64 to 65 per cent.?

*Mr. Gupta.*—Yes.

*President.*—And the battery acid, what is it supposed to be?

*Mr. Gupta.*—In the battery acid 1.275 sp. gr. acid is used, but we supply the parties 1.84 sp. gr., that is 95 per cent. and they mix it with distilled water, before use.

*President.*—What is the specific gravity of 100 per cent. chamber acid?

*Mr. Gupta.*—95 per cent. is 1.84; the specific gravity of 100 per cent. chamber acid is about 1.82.

*President.*—That is the purest?

*Mr. Gupta.*—You can even go up to 120 per cent.

*President.*—In 1925-26 your production was 776 tons and charges for power and fuel came to 12.2. It came down to 8.64 in 1926-27 though the production was less. What was it due to?

*Mr. Gupta.*—Use of bad coal, bad oil or too much shutting down. Each time we re-heat the furnace it requires more fuel. During the year under review we were using oil the price of which was reduced.

*President.*—Has it gone up again?

*Mr. Gupta.*—It is about Rs. 39 now.

*President.*—Is that ex-main ocean installation?

*Mr. Gupta.*—It depends also on the quantity we buy.

*President.*—May I take it that you manufactured in that year 1,185 tons of chamber acid of which you used up 760 tons for making strong acid, 425 tons was used for the other products and that 631 tons was what you sold as such?

*Mr. Gupta.*—Yes. Strong acid we have used for the manufacture of copper sulphate.

*President.*—Roughly speaking this is right?

*Mr. Gupta.*—Yes.

*President.*—In the selling organization you have shown a charge of Rs. 60,000. There is a uniform charge of Rs. 60,000 there. How do you calculate that?

*Mr. Gupta.*—This include Godown charges in Bombay, head office sales manager, his assistant, his office, his travelling allowance, lorry charges and so on.

*President.*—Does it include agent's commission?

*Mr. Gupta.*—No. These are the direct charges incurred for selling the products.

*President.*—Does it include anybody's commission?

*Mr. Gupta.*—No.

*President.*—What I want to know is, as regards the future also you have put down the same figures. Why should it be so much per ton?

*Mr. Gupta.*—We think it won't increase.

*President.*—Is that a fixed charge or what is it?

*Mr. Gupta.*—Yes, for each material per ton.

*Dr. Matthai.*—It is calculated at so much per ton?

*Mr. Gupta.*—Yes, total tonnage produced so much, total expenditure so much per ton proportionate to the cost of the product.

*President.*—Your present selling charges are Rs. 60,000 and you have allocated it in proportion to the tonnage in the same way as in the case of general supervision charges.

*Mr. Gupta.*—According to the cost price.

*President.*—Then when you have reached full production and you make the same charge per ton, the costs having come down.

*Mr. Gupta.*—We will have to make some allowance. We are not able to arrive at what the actual figure will be.

*President.*—If you say the allocation was made in proportion to the works cost then in making your estimate as regards the future you should have made some allowance and not taken the same figure.

*Mr. Gupta.*—Yes, we should make some allowance in arriving at the future cost.

*President.*—It is the highest figure in the costs and if that figure is written off these figures that you have given us become of very little assistance, and your whole estimate as regards the future is completely thrown out because you have retained the same figure. I think you have done the same thing as regards the packing charges. Give me details as regards the selling organization, how you arrived at this figure of Rs. 60,000.

*Mr. Gupta.*—That is the charge we incurred for the sales.

*President.*—I want the exact figures.

*Dr. Matthai.*—Does the sales organisation cover your Head Office expenses?

*Mr. Gupta.*—No, only the Sales Manager's Department.

*Dr. Matthai.*—The Sales Manager's Department charges the transport from Ambernath to Bombay.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—It also includes godown charges, and lorry charges.

*Mr. Gupta.*—Yes, distribution charges. We supply the goods at the mills in our lorrys.

*Dr. Matthai.*—Everything except the trader's commission.

*Mr. Gupta.*—Yes.

*President.*—Your sub-agents' commission is not included in this.

*Mr. Gupta.*—No.

*President.*—Is that included afterwards?

*Mr. Gupta.*—Yes.

*President.*—Do you sell your products ex-godown Bombay?

*Mr. Gupta.*—Free delivery to the customers' godown.

*President.*—I would like to have details as regards this because it involves a very heavy item in the selling price.

*Mr. Gupta.*—Yes.

*President.*—The whole thing is this method of allocation will not apply to acids in the same way as it will to salts. I don't suppose you put the acids in the godown here. You sell only a very small quantity.

*Mr. Gupta.*—Major portion is acid.

*President.*—You keep it ready packed in containers at the godowns.

*Mr. Gupta.*—Yes.

*President.*—That would apply to the whole of your production except the chamber acid which you use in manufacture.

*Mr. Gupta.*—The upcountry despatches are always made direct from the works.

*President.*—I think we have asked for these figures.

*Mr. Gupta.*—We are preparing a statement showing the total despatches from Ambernath and total despatches from Ambernath to godown for distribution in Bombay.

*Dr. Matthai.*—Where you sell upcountry, charges f.o.r. Ambernath would not include more than half the selling charges. It would include charges you incur on your Sales Manager's Department, but it would not include the transport charges to Bombay or the godown charges here or the distribution, is that right?

*Mr. Gupta.*—Yes.

*Mr. Smith-Wright.*—We have worked out the amount of sulphuric acid sold upcountry and in Bombay. Do you want for other products as well?

*President.*—Yes.

*President.*—Packing charges are given as Rs. 10. How do you arrive at those charges?

*Mr. Gupta.*—Actual labour charge and the packing material like straw, saw dust and things like that per ton. It is without containers. These are direct charges for making 25 cases per ton.

*President.*—Does this include the cost of wooden cases?

*Mr. Gupta.*—No.

*Dr. Matthai.*—By containers you mean carboys or jars.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—It is simply the labour for packing and the subsidiary materials, so that to get at your packing charges we have to include some charge on the container.

*Mr. Gupta.*—Yes and the cost of packing case.

*President.*—Those prices that we saw this morning in the papers are prices—works in bulk.

*Mr. Gupta.*—Yes.

*President.*—They correspond to this except that there is no packing.

*Mr. Gupta.*—Yes.

*President.*—The sulphuric acid that you sell is in small quantities.

*Mr. Gupta.*—Yes in jars, one case or several cases.

*President.*—In one case how many jars do you put?

*Mr. Gupta.*—2 jars. One jar contains 41 lbs.

*President.*—It is really in very small lots. Does any one buy in bulk?

*Mr. Gupta.*—The railway people buy in bulk and also the Government arsenal at Kirkee. The mills buy half a ton or so at a time.

*President.*—How do you supply?

*Mr. Gupta.*—We supply with the containers; jars of 41 lbs. or carboys of 90 lbs.

*Dr. Matthai.*—Whatever quantity is sold, it is always sold in the container of either 41 lbs. or 90 lbs.

*Mr. Gupta.*—Yes.

*President.*—What is the largest container in which you can supply?

*Mr. Gupta.*—The custom generally in India is to supply in carboys or jars.

*President.*—Supposing an upcountry man wanted to go in for large quantities for making phosphates, how can he get his supplies?

*Mr. Gupta.*—He can take them in tank wagons.

*President.*—Are tank wagons available for sulphuric acid?

*Mr. Gupta.*—It can be bought at any time.

*President.*—What would be the way by which you would supply to him?

*Mr. Gupta.*—He can get a tank wagon and take it.

*Mr. Ramsingh.*—Or in drums.

*President.*—Can he get a wagon?

*Mr. Ramsingh.*—Yes.

*President.*—I mean a tank wagon.

*Mr. Gupta.*—Yes, it is just like an oil wagon.

*President.*—You can't buy it from outside.

*Mr. Gupta.*—It has to be put on the railway by the buyer or by the railway people.

*President.*—By a tank wagon, you mean it is a tank which has to be fitted on to the wheels. You pour the acid into it and when you get to the other side, you have to take it out.

*Mr. Gupta.*—You can put a pipe and take the acid out.

*President.*—I want to know the practice in India.

*Mr. Gupta.*—In India there is no tank wagon supply.

*President.*—Do these railway people allow these private tank wagons?

*Mr. Gupta.*—I don't know.

*Mr. Ramsingh.*—We were supplying sulphuric acid to Tatas' Works in drums before. At that time we contemplated to have tank wagons and the railway Company agreed to supply us tank wagons and to charge for it.

*President.*—If they don't have small plants for manufacturing sulphuric acid, they will have to have some arrangement by which the acid can be supplied in bulk.

*Mr. Gupta.*—Tatas have their tank wagons.

*President.*—Tatas don't sell much of their sulphuric acid.

*Mr. Gupta.*—What I say is that there is no difficulty of getting tank wagons.

*President.*—I am simply asking you how you would distribute your sulphuric acid if you were to manufacture on a large scale.

*Mr. Gupta.*—The most economical way is to send acid in tank wagons.

*Dr. Matthai.*—You mean Tatas have tank wagons for handling within the works.

*Mr. Gupta.*—Yes.

*President.*—How does the imported sulphuric acid come in?

*Mr. Gupta.*—In steel drums.

*Dr. Matthai.*—Are they 40 to 60 gallons?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—If we are trying to get the price of your acid at Bombay, then we have got to include this Rs. 10 which is simply the labour involved in packing and subsidiary materials. We have to add an item corresponding to carriage of jars first to Bombay from your place and then from Bombay up-country.

*President.*—Why should you charge Rs. 10 if you use drums?

*Mr. Gupta.*—In that case there will be no packing charge.

*President.*—So far as sulphuric acid as such is concerned you are able to compete against the imported article, because they have to pay freight, packing charges, cost of containers and various other things. Really speaking the question of containers and packing charges does not arise as regards that. The question will arise only as regards supplies in bulk hereafter if there is a development of the subsidiary industries which have to depend upon sulphuric acid.

Therefore to make a comparison between your fair selling price and the price in foreign countries, we need only take the price of the naked acid, that is to say *ex-works* in bulk for industrial purposes, wouldn't that be so?

*Mr. Gupta.*—That is a fair comparison.

*President.*—The point we have to consider is that supposing protection was given in some form or other to the manufacturer of sulphuric acid, would the other industries be able to get sulphuric acid at about the same price as in Europe and other countries for industrial purposes, that is to say in bulk.



*Mr. Gupta.*—When that occasion arises, they will get it at a fair price.

*President.*—What I want to know is would that be a fair way of comparison?

*Mr. Gupta.*—I should think so.

*President.*—Is it not the case that people who manufacture these other products also manufacture their sulphuric acid?

*Mr. Gupta.*—In the case of chemical works, it is a fact.

*President.*—We have to find out, supposing they manufacture their own chemicals, at what figure we should take your future cost of sulphuric acid that you use for your other products. The whole point is this. Sulphuric acid must be made cheap if other industries are to be established. How can it be made as cheaply here as in the competing countries. If protection is granted, you cannot get it for all times. You must be able to show that the price of sulphuric acid would come down to such a level that you would not require any further assistance. For that purpose it is necessary for us to make an estimate which would enable us to see how your future costs would compare with the price of the imported article and I am asking you what would be the best way of doing it. We cannot take £6-5-0 or whatever the price is because that is the price for practical purposes for people requiring small quantities of sulphuric acid. It does not mean that that is the cost to the manufacturer of these various products in which sulphuric acid is used.

*Mr. Ramsingh.*—In England I have seen how they sell acid for the manufacture of chemicals. Their practice is to base it on the sulphur price plus cost of manufacture plus 10 per cent. profit.

*President.*—How do they calculate? Have you got figures?

*Mr. Ramsingh.*—No, but that is the practice. Supposing their cost of chamber acid is Rs. 55 they will add 10 per cent. on it and if the sulphur price goes up or down, they will charge more or less accordingly.

*President.*—Supposing we accept the estimate of yours as correct, we don't get a figure which is near enough to the foreign manufacturer's figure. Your estimate is Rs. 135 including packing and selling organisation. Even if I cut out the selling organisation and the packing to reduce it to bulk, we get about Rs. 95. Is it not?

*Mr. Gupta.*—Yes.

*President.*—But the price of £6-5-0 is equal to about Rs. 83 and there is a difference of Rs. 12 which would be accounted for by the difference in the price of sulphur, as you pay about Rs. 12 more per ton of sulphuric acid.

*Mr. Gupta.*—Yes.

*President.*—You pay Rs. 107 and they pay £6-5-0 roughly. You have still to add the overhead charges, depreciation and return on capital so that your sulphuric acid even making allowance for the fact that you have to pay more for your sulphur would be dearer.

*Dr. Matthai.*—That is on the present output.

*President.*—It also assumes that the selling price of £6-5-0 is the cost of the manufacturer which is far from being the case.

*Dr. Matthai.*—Would you be able to give us information about the supply of sulphuric acid to the manufacture of other chemicals?

*Mr. Ramsingh.*—I will try and find it.

*President.*—You said this morning that the arsenic free sulphuric acid might cost £1 more. If that is added the figure may correspond approximately. It is impossible to say how they would charge the other departments for sulphuric acid in the process of manufacture. You would have to charge the other departments at least Rs. 95 if your estimate is taken as correct.

*Mr. Gupta.*—Which other departments?

*President.*—Glauber's salt, Epsom salt, etc.

*Mr. Gupta.*—We supply the acid direct to the departments. In that case, the concentration charges are saved.

*Dr. Matthai.*—If you take copperas for example you use only chamber acid and charge Rs. 64.

*Mr. Gupta.*—Yes, for cent. per cent. acid.

*Dr. Matthai.*—Where do you use concentrated acid?

*Mr. Gupta.*—On copper sulphate and we charge there with the cost of concentration. For use in every other chemical department we supply chamber acid and charge on the cent per cent. basis.

*President.*—We have got no evidence as to the chamber acid.

*Mr. Gupta.*—They base it on cent. per cent. calculation.

*President.*—On what?

*Mr. Gupta.*—Per ton of sulphur coming.

*Dr. Matthai.*—There is no quotation for that.

*Mr. Gupta.*—No.

*President.*—It is impossible for us to know how your chamber acid which you use for other products compares with the chamber acid used by others as regards the cost and we have no figures to compare. As regards containers what figures are we to take?

*Mr. Gupta.*—Any reasonable figure you can take. We consider that a container will come back as many as 8 times. The price of a container is Rs. 3-8-0. For all practical purposes, one-eighth should be debited for containers.

*Dr. Matthai.*—It costs Rs. 3-8-0.

*Mr. Gupta.*—Yes, that is the cost per jar. Fifty jars roughly make a ton, and the cost of fifty jars is Rs. 175. One-eighth of Rs. 175 would be a fair charge: at least that is our opinion.

*Dr. Matthai.*—You charge Rs. 23 in the table for the year 1925.

*Mr. Gupta.*—Yes.

*President.*—If you use it 8 times, the freight on the way out should have to be included. The jars will have to come back eight times empty. Should you not add the freight on jars eight times?

*Mr. Smith-Wright.*—We generally endeavour to sell the containers outright to our customers. We make them pay not only for the acid but also for the containers. In a few cases of course we allow them to return the jars to us. But we don't bring those jars at our expense. If they come back, they come at the expense of our customers.

*President.*—You are in the same position as the foreign importer if you sell the containers.

*Mr. Smith-Wright.*—Except in the matter of freight. There we are at a disadvantage.

*President.*—I am talking of the container.

*Mr. Smith-Wright.*—We sell it outright if we can.

*President.*—Your container would be more expensive than the container of the other man.

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—Supposing you have a standing customer, why should he buy every time his container?

*Mr. Smith-Wright.*—Need not, but he will have to pay for the carriage back of these jars.

*President.*—What happens is this. If you send sulphuric acid to some outstation, you send it to some particular place and the man there will probably distribute it in some small lots. Therefore it is not always easy for the containers to be returned.

*Mr. Smith-Wright.*—Originally we used to sell the acid in jars on loan. But then the trouble was that they did not come back and then we had difficulty in realising the money from our customers. Since then, we have made it a rule to make the purchaser of the acid buy also the container.

*Dr. Matthai.*—The bulk of your sales is done on the basis of the container being bought outright by your customers.

*Mr. Smith Wright.*—I should think half and half: half we sell and half we loan.

*President.*—How is sulphuric acid distributed on a small scale in England?

*Mr. Gupta.*—In 5 gallon or 10 gallon drums or carboys.

*President.*—You don't make carboys here?

*Mr. Gupta.*—They are being made here in India.

*President.*—How do they compare in price?

*Mr. Sinclair.*—They are dearer.

*Mr. Gupta.*—There is a works at Talegaon. We tried the Talegaon people and their price compared favourably with the price of the foreign article and they gave us an understanding that if we used their carboys in larger number they would reduce the price.

*President.*—Will you give us some figure, Mr. Smith-Wright, which we can add to the other charges to get the price of the packed sulphuric acid?

*Mr. Smith-Wright.*—I have got the prices worked out for our sulphuric acid packed per ton. I have got it worked out in jars or cases per ton. Packed in jars in cases *ex-works* f.o.r. Bombay it comes to Rs. 441-12-0. The actual cost of jars in packing cases comes to Rs. 230 per ton.

*President.*—I take it the imported sulphuric acid comes in drums only?

*Mr. Smith-Wright.*—Yes.

*President.*—If you were to use drums, would you give us an alternative figure?

*Mr. Smith-Wright.*—We cannot get the drums here. We have cabled home to find out what the price of these drums are. We cannot get them here and even if we get them they are very expensive.

*Mr. Gupta.*—We got a price of 25 shillings c.i.f.

*President.*—We understood they cost about Rs. 15. Is there no way of making the drums here?

*Mr. Sinclair.*—It won't pay us if we started a factory here. There are many second-hand drums in India and second-hand drums can always be purchased in India.

*Mr. Ramsingh.*—We lost about Rs. 25,000 in this drum business. I gave contracts to people out here for drums for supplying acid to the Tata Iron and Steel Company. By the time the acid reached Jamshedpur there was a loss of 25 to 30 per cent. in acids.

*President.*—Try to give us figures for drums, jars and carboys if you can.

*Mr. Smith-Wright.*—We will.

*President.*—Now let us go on to nitric acid. This nitrate of soda is all imported from Chili, is it not?

*Mr. Gupta.*—Yes.

*President.*—What is the price of nitrate of soda in Europe c.i.f. United Kingdom port? Are they given in the journals you have lent us?

*Mr. Gupta.*—Yes.

*President.*—F.o.r. Liverpool £10-2-0. What is your price?

*Mr. Gupta.*—The present rate c.i.f. is higher. We got it at £12.

*President.*—You have got Rs. 200 here in this statement.

*Mr. Gupta.*—Because there is a loss in wastage. There is a reduction of about 10 per cent. on storage.

*President.*—What is the actual price that you pay?

*Mr. Gupta.*—£12.

*President.*—£12 plus what charges?

*Mr. Gupta.*—We have to add Rs. 4-5-6 plus the loss of 10 per cent.

*President.*—The other manufacturer may also have to incur that loss of 10 per cent.?

*Mr. Gupta.*—They may not because they don't have to carry over such a long distance as we have to.

*President.*—Let us take nitric acid statement. Here also you are at a disadvantage of about £2 a ton in the price of nitrate of soda. It means one ton of nitric acid *plus* the difference in the sulphuric acid.

*Mr. Gupta.*—Yes.

*President.*—What is the price of nitric acid 80° T. W. there?

*Mr. Gupta.*—£21 *ex-works*.

*President.*—That is about Rs. 280. There it is a very big difference. Is it that this may be made by the synthetic process?

*Mr. Gupta.*—The price is governed by both ways.

*President.*—You give here Rs. 409 not taking into account any selling organisation or packing charges. That is a very big difference.

*Mr. Gupta.*—Because the production is only 46 tons.

*President.*—Are these labour figures actuals?

*Mr. Gupta.*—Yes up to power and fuel. General service and supervision charges, we have shown proportionately. Repairs and renewals and rents, taxes, insurance, etc., have to be revised.

*Dr. Matthai.*—If it is possible in the case of imported nitric acid to have the drums returned, you would be in a position of disadvantage.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—That is so in the case of nitric acid. It is easier in the case of imported nitric acid to have the drums returnable.

*Mr. Sinclair.*—Because it is an aluminium drum, it is a valuable container. You would have a sale here for the sake of the metal.

*Dr. Matthai.*—So that you are really in a position of disadvantage as compared with the other acids.

*Mr. Sinclair.*—That is true.

*President.*—We don't know how much nitric acid this country can absorb. For what purposes do you use nitric acid?

*Mr. Gupta.*—For gold refining, cleaning and in the manufacture of explosives.

*President.*—There is not much field for expansion there so far as you are concerned.

*Mr. Gupta.*—No.

*President.*—Is there any prospect of your being able to manufacture 600 tons of nitric acid?

*Mr. Gupta.*—No, till artificial silk is made in this country.

*President.*—How can you then make an estimate as regards the future? What figure do you expect us to take?

*Mr. Ramsingh.*—Take the average of the last three years' consumption.

*President.*—That would not reduce your cost very much.

*Dr. Matthai.*—You can leave out the explosives, because the Military Department make their own nitric acid. What is left is simply gold refining.

*Mr. Gupta.*—We supply nitric acid to Kirkee.

*Dr. Matthai.*—What is their annual demand?

*Mr. Gupta.*—15 tons.

*President.*—That is not very much. Can it be used for any other purpose?

*Mr. Gupta.*—It can be used in artificial silk industry.

*President.*—We have not got any artificial silk industry.

*Mr. Ramsingh.*—No. We had some correspondence with the Mint whether silver and gold refining were to be undertaken by the Government of India.

*President.*—At present the mint consumes about 200 tons.

*Mr. Ramsingh.*—They don't consume anything at present.

*President.*—Mr. Smith-Wright, what is this particular case that you reported to us?

*Mr. Smith-Wright.*—When their new plant is completed, they will take 200 tons a year.

*President.*—From January next they may take 200 tons a year.

*Mr. Sinclair.*—Yes, plus the market demand. Possibly about 300 tons including the acid sold outside.

*President.*—Really speaking there is no nitric acid imported except in this one particular instance.

*Mr. Smith-Wright.*—20 or 30 drums are coming in at a time.

*Dr. Matthai.*—The imports are increasing at your expense.

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—It doesn't mean that the market is increasing.

*Mr. Smith-Wright.*—No.

*President.*—That part of the business doesn't seem to be very promising so far as this country is concerned, is not that so? The market is so small.

*Mr. Smith-Wright.*—The market is not large, but it helps in the off take of chamber acid. We have got to find an outlet.

*President.*—Your chamber acid is very little.

*Mr. Smith-Wright.*—It won't be very much. Hydrochloric acid has not a very extensive market. If we don't have these outlets for our sulphuric acid, the cost of our sulphuric acid will go up. Even if we sell 50 tons of our products here, it is of some help to us.

*President.*—If you have to depend on these acids, you won't be able to do much. You cannot build sulphuric acid industry on the production of nitric acid and hydrochloric acid. There is not enough scope in that direction.

*Mr. Sinclair.*—Assuming that this mint contract didn't come off in India they ought to take additional sulphuric acid. Including the bazaar trade it would be about 400 tons, 95 per cent.

*Dr. Matthai.*—In terms of sulphuric acid?

*Mr. Sinclair.*—Yes, it is about 10 per cent. of the total requirements of the Presidency.

*President.*—Do you use any nitric acid in the production of fertilisers?

*Mr. Gupta.*—No.

*President.*—It is always sulphuric acid.

*Mr. Gupta.*—In superphosphates no nitric acid is used.

*President.*—You don't make any other fertiliser except phosphates.

*Mr. Gupta.*—Not for the present.

*President.*—Altogether the total import of nitric acid is 475 cwts. up to March, so that it is really negligible.

*Mr. Sinclair.*—It is increasing. It is about 20 tons.

*President.*—Of which 75 per cent. goes to Burma and it is not your market at all, so that the whole of India requires 5 tons of nitric acid. What did you say was the c.i.f. price of nitric acid?

*Mr. Smith-Wright.*—As. 2-3 per lb. of 100 per cent. acid.

*Dr. Matthai.*—What is it per ton?

*Mr. Smith-Wright.*—About Rs. 315. That is 100 per cent. acid, duty paid everything. That is the price quoted delivery into the mint, the drum being returnable.

*President.*—It barely covers the cost of your raw materials.

*Mr. Smith-Wright.*—Quite.

*Mr. Gupta.*—It is all synthetic nitric acid.

*President.*—Is nitric acid used for any of these nitrogenous fertilisers?

*Mr. Gupta.*—Not directly as such.

*President.*—When it is manufactured by the synthetic process?

*Mr. Gupta.*—It can be converted into nitrate of soda and nitrate of ammonia.

*President.*—Therefore synthetic nitric acid may be so much cheaper, because they are able to produce enormous bulk of fertilisers.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—I suppose this is practically the first time that there has been so much demand for nitric acid.

*Mr. Smith-Wright.*—Yes. They have not worried themselves to come into the market, as the market is a small one.

*President.*—In this case will you please give us the additional charges for packing, jars, etc.?

*Mr. Gupta.*—Yes.

*President.*—Hydrochloric acid, you manufactured only 60 tons last year and your full capacity is 900 tons.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—What is the demand for hydrochloric acid?

*Mr. Gupta.*—Our idea is to use all of it on zinc chloride, but we can't compete at present in that product.

*Dr. Matthai.*—For what they use hydrochloric acid?

*Mr. Gupta.*—For dye works and for chrome tanning.

*Dr. Matthai.*—Do you expect to go up to 900 tons?

*Mr. Gupta.*—We want to consume it in making zinc chloride.

*Dr. Matthai.*—Is there a big demand for zinc chloride?

*Mr. Gupta.*—About 1,200 tons. Out of that, 80 to 90 per cent. of the market is in Bombay. We were making in small quantities, but we found it quite impossible to manufacture at present costs.

*Mr. Ramsingh.*—Messrs. Brunner Mond and Company are selling zinc chloride. I wanted zinc chloride for our mills and I just asked for quotation in the ordinary course. (Handed in a letter showing the prices of zinc chloride and epsom salt.)

*Dr. Matthai.*—What is the price of zinc chloride there?

*Mr. Gupta.*—Rs. 15-2-0 per cwt.

*Dr. Matthai.*—That is about Rs. 310 per ton.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—As a matter of fact in 1927 the price was Rs. 363.

*Mr. Gupta.*—Yes, but now it has gone down. The price is so low now that it is impossible to manufacture and sell in competition against the foreign product.

*President.*—If you cannot sell zinc chloride you cannot increase the output of hydro-chloric acid.

*Mr. Gupta.*—That is true. Zinc chloride is required only in the Bombay Presidency.

*President.*—The difficulty is owing to the zinc, is it not?

*Mr. Gupta.*—That problem we have solved, because we can get the residue from Tata's cheaper than the market price for zinc.

*President.*—Then, what is the trouble?

*Mr. Gupta.*—The trouble is the price of hydro-chloric acid.

*President.*—Your cost of hydro-chloric acid is so enormous because your output is so small.

*Mr. Gupta.*—Yes, that is true.

*Mr. Ramsingh.*—Further, zinc chloride is being sold now at low rates.

*President.*—If this estimate that you have given here is correct in respect of hydro-chloric acid, it is only Rs. 91 . . . . .

*Mr. Gupta.*—That is without other charges.

*President.*—If you use it for making zinc chloride you don't want selling charges and packing.

*Mr. Ramsingh.*—No.

*Mr. Gupta.*—Even then something more has to be added.

*President.*—I am giving you your own figures.

*Dr. Matthai.*—At the works, it will be Rs. 105 which is the actual cost.

*President.*—That Rs. 105 would be reduced to Rs. 91 when you make full production.

*Mr. Gupta.*—Yes.

*President.*—How much has zinc scrap come down to? You have taken it at how much per ton?

*Mr. Gupta.*—At Rs. 150 per ton, whereas the market price of zinc is about Rs. 450.

*President.*—Can you get sufficient quantities from Tata's?

*Mr. Gupta.*—Practically we had to drop the idea because of other difficulties. We did not go into it further.

*President.*—If you have this big market and if you can make larger quantities of hydro-chloric acid, then the price of Rs. 300 is not very much lower than yours. What is it that prevents you from doing it?

*Mr. Gupta.*—To make it at Rs. 300 would take us some time. Further our cost of hydro-chloric acid is more because our cost of sulphuric acid is more. To make 900 tons of hydro-chloric acid we require about the same quantity of sulphuric acid—900 to 1,000 tons.

*Dr. Matthai.*—Looking at the consumption figure of other works besides Bombay I find that in the manufacture of hydro-chloric acid your consumption of both salt and sulphuric acid is rather high.

*Mr. Gupta.*—That is because we have very small production whereas the capacity of the plant is very much more.

*Dr. Matthai.*—Working at full capacity what do you think would be your consumption?

*Mr. Gupta.*—I cannot say off-hand.

*Dr. Matthai.*—Your consumption of salt and sulphuric acid per ton of hydro-chloric acid is 1.1 and 1 tons whereas I have seen figures as low as .6 and .7.

*Mr. Gupta.*—Those may be small plants.

*Dr. Matthai.*—That might make a considerable difference.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Supposing you are making zinc chloride up to your full capacity, could you get 150 tons of scrap?

*Mr. Gupta.*—Yes.

*President.*—There is no difficulty about that?

*Mr. Gupta.*—We are going to buy the residue from Tata's.

*President.*—Is it dross or scrap?

*Mr. Gupta.*—Either dross or galvaniser's residue.

*President.*—Do you get dross in the liquid form or what?

*Mr. Gupta.*—Melted, semi-melted or solid. Really speaking if we can consume that amount of sulphuric acid for manufacture, zinc chloride will become a possibility then and not otherwise.

*President.*—What is the price of hydro-chloric acid now?

*Mr. Gupta.*—Last year we realised Rs. 289.

*President.*—What is the import price?

*Mr. Gupta.*—Very little is imported.

*Dr. Matthai.*—As far as actual realisations are concerned on all the three acids you have done well. Taking your sulphuric acid, your cost is Rs. 135 and realised price is Rs. 224.

*Mr. Gupta.*—To our cost we have not added our head office charges.

*Dr. Matthai.*—There is still a considerable margin. In the case of hydrochloric acid your works cost is Rs. 172 whereas your realised price is Rs. 239. As regards nitric acid, your cost is Rs. 470 and your realised price is Rs. 595.

*Mr. Gupta.*—Yes, last year we did well on all the three acids. The difficulty is that we can only make acids and nothing else. Here is a market for zinc chloride, which we cannot cater for. There is also a considerable market for alum to the extent of 4,000 tons and alumina sulphate to the extent of 4,000 tons. It all depends on the quantity of sulphuric acid we can produce. It is always a sulphuric acid problem.

*Dr. Matthai.*—I am not quite able to understand your point. Your most important salt is alumina sulphate, is it not?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Your largest capacity is in respect of alumina sulphate.

*Mr. Gupta.*—That alumina sulphate goes towards the manufacture of alum.

*Dr. Matthai.*—As regards alumina sulphate as such, I don't see why you should not be able to get a bigger share of the market because your costs compare very well with the market price.

*Mr. Gupta.*—The difficulty is this. We manufacture only for water works. We cannot go beyond a certain limit. Beyond that, other people supply. The Bengal Chemical Works make alumina ferric. Messrs. D. Waldie and Company also manufacture alumina ferric.

*Dr. Matthai.*—What kind of estimate do you make for Bombay?

*Mr. Gupta.*—As far as our product is concerned, it only goes to water works.

*Dr. Matthai.*—What is the total market that there is for alumina ferric for a works situated like yours in Bombay leaving out Bengal and other provinces?

*Mr. Gupta.*—200 to 300 tons.

*Dr. Matthai.*—It is surely more than that.

*Mr. Gupta.*—That is for pure alumina sulphate.

*Dr. Matthai.*—You have not manufactured alumina sulphate.

*Mr. Gupta.*—No. We have only made trials.

*President.*—Alumina sulphate you have not gone into at all.

*Mr. Gupta.*—No.

*Dr. Matthai.*—Take the alumina ferric. What do you estimate the market for alumina ferric in Bombay?

*Mr. Gupta.*—200 to 300 tons.

*Dr. Matthai.*—What did you make last year?

*Mr. Gupta.*—65 tons.

*Dr. Matthai.*—You made only 65 tons.

*Mr. Gupta.*—Yes, for that purpose.

*Dr. Matthai.*—You got only one-fifth of the market roughly.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Your cost on that is Rs. 78, and the current market price is Rs. 100. Therefore at any rate you would be able to get all your works cost on alumina ferric.

*Mr. Gupta.*—But we have not added other charges to our cost.

*Dr. Matthai.*—How much does that come to?

*Mr. Gupta.*—We have given you the proportion.



*Dr. Matthai.*—Take the same proportion.

*Mr. Gupta.*—Rs. 6—agents commission and head office charges. Then there is packing.

*Dr. Matthai.*—How much is that?

*Mr. Gupta.*—Per ton it comes to about Rs. 10.

*Dr. Matthai.*—Is there anything else?

*Mr. Gupta.*—There is freight.

*Dr. Matthai.*—How much is that?

*Mr. Gupta.*—Say Rs. 5.

*Dr. Matthai.*—All that comes to Rs. 99.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—You can cover your works costs and realise part of the overheads if you can increase your production to the extent of 300 tons. This is one of the few salts in which you can get a surplus over your works cost.

*Mr. Gupta.*—Our idea is to make more alum where the market is more or less easy to get and we can make it easily.

*President.*—Why is it called ferric? Is there any iron in it?

*Mr. Gupta.*—There is a small percentage of iron.

*President.*—Does that come from bauxite?

*Mr. Gupta.*—Yes.

**THE EASTERN CHEMICAL COMPANY, LIMITED.**

**Oral Evidence of Messrs. W. S. SINCLAIR, E. G. SMITH-WRIGHT  
and H. SHARPE, recorded at Bombay, on Thursday, the  
15th November, 1928.**

*Preliminary.*

*President.*—Mr. Smith-Wright, what position do you hold in the Eastern Chemical Company?

*Mr. Smith-Wright.*—I am representing the Managing Agents, Messrs. E. D. Sassoon and Company, Mr. Sinclair is the Works Manager, and Mr. Sharpe is the Chief Chemist.

*Dr. Matthai.*—Have you been the Chief Chemist since the beginning?

*Mr. Sharpe.*—Since 1919.

*President.*—This Company is a sterling company and is registered in England, is it not?

*Mr. Smith-Wright.*—Yes.

*President.*—It was registered in 1913?

*Mr. Smith-Wright.*—Yes.

*President.*—Is it entirely an English Company? How did it come to start business in India in chemicals?

*Mr. Smith-Wright.*—I do not know very much about the early days, but I take it that the directors saw that there was a field for manufacturing chemicals in India.

*President.*—Are your directors interested in any other chemical works?

*Mr. Sinclair.*—I think Sir Thomas Holland and the Government had something to do with the starting of this company. They considered that there would be a field here for the manufacture of Chemicals. Mr. Morris was the first to come out and got Government assistance in connection with the selection and lease of land for the factory.

*President.*—What are the British companies in which your directors are interested?

*Mr. Sinclair.*—Mr. Petro, the Chairman, is a Financier, and interested in several commercial enterprises, Mr. Morris has his own company of Chemical manufacturers; Mr. Stanley Smith is on the Board of the Chemical and Metallurgical Corporation and is the Principal of Messrs. Stanley Smith & Co.; Mr. Smythe is a director in Messrs. R. W. Greef & Co., Ltd., Mr. Syme is a Partner in Messrs. Bullock Brothers of Rangoon.

*President.*—It is very curious that Bullock Brothers had something to do with this?

*Mr. Sinclair.*—There was nobody with sufficient experience of Indian conditions to start a Company and owing to their experience they were approached in the beginning. I understand that they were also approached for financial assistance.

*Dr. Matthai.*—There is no director resident in India?

*Mr. Sinclair.*—No.

*President.*—Supposing we decided to give a bounty, you would be debarred from getting anything.

*Mr. Smith-Wright.*—The company could be re-registered in India as an Indian concern.

*President.*—That won't suffice. It should be more or less of Indian character: there should be a certain number of Indian directors, a certain proportion of shareholders, and they may insist upon the head office being in India. I don't know what conditions they might impose but certainly

they have so far insisted upon a rupee company, registered in India, with a reasonable number of Indian directors, and with provision for training of Indian apprentices. They may also insist that the directors must be resident in India.

*Mr. Sinclair.*—When this company was started it was impossible for anybody with the requisite knowledge in India to start a company.

*President.*—The tax-payer has to pay the piper and he has a right to call the tune, and he might impose such conditions as he thought reasonable. We are considering conditions under which a business is given protection.

*Mr. Sinclair.*—Then there was the difficulty about raising capital in India. Nobody would have subscribed money for the manufacture of chemicals without previous experience.

*Mr. Smith-Wright.*—Supposing we could not raise further money in India, would it be sufficient for us to turn it into an Indian company registered in India?

*President.*—It would be for the Government to consider whether they should impose certain conditions or not. We are bound more or less by what has been done before. Take the case of the steel industry for instance: they certainly did impose those conditions.

*Mr. Sinclair.*—In 1921, this question was discussed when one of the directors was here, but the matter was dropped then owing to the conditions of industry.

*President.*—I am simply suggesting to you that if this scheme of bounties is accepted, so far as we are concerned, we must exclude you in our recommendations since it is a sterling company. As to what further conditions the Government of India and the legislature may impose I cannot say.

*Mr. Sinclair.*—Then there does not seem to be any point in going much further, does there?

*President.*—You have not got the bounty yet! I am just trying to point out to you that if we did recommend a bounty we should have to exclude you as you stand at present.

*Mr. Sinclair.*—Then our hope of salvation lies in re-construction!

*President.*—The same thing applies to one other company in India and we told them the same thing. As things go, that condition seems to be a very reasonable one.

*Mr. Smith-Wright.*—Except for the fact that this company has a sterling capital it is to all intents and purposes Indian.

*President.*—Sterling capital means that the control is outside and the Indian consumer has no chance of sharing in the company's profits. The ordinary tax-payer may say "I would like to put my ten rupees in the business, but it is registered in England: I have no control in it and I can't put my money in it".

*Dr. Matthai.*—The policy that the Tariff Board has followed in this matter you will find in the report of the Fiscal Commission.

*President.*—With regard to bounties on wagons we have insisted upon that. In the case of the match industry we have more or less followed the same line of argument, but, as my colleague has pointed out, it is really the Fiscal Commission's report which discusses that.

#### *The Company's products.*

*Dr. Matthai.*—This list of products that you give in answer to question 3, they have all been manufactured at one time or another in your works, or are they simply products which you can manufacture?

*Mr. Smith-Wright.*—All have been manufactured and most of them are manufactured now.

*Dr. Matthai.*—The salts that we are concerned with in our terms of reference are—Magnesium sulphate, ferrous sulphate, potash alum, aluminium

sulphate, sodium sulphide, zinc chloride, copper sulphate and Glauber's salt—you don't produce any of these, do you?

*Mr. Smith-Wright.*—No, with the exception of Ferrous Sulphate because we cannot produce these at competitive rates. We make a little Glauber's Salt but have discontinued the manufacture of Magnesium Sulphate.

*President.*—Washing soda also you are not producing now?

*Mr. Smith-Wright.*—Yes. It is mentioned in the list.

*President.*—Washing soda is sodium carbonate?

*Mr. Smith-Wright.*—Yes.

*President.*—How is it different from sodium bi-carbonate?

*Mr. Sharpe.*—That is rather an awkward question to a layman. One contains half the equivalent of sodium that the other does.

*President.*—It is sodium carbonate which is used largely in industries?

*Mr. Sharpe.*—Sodium carbonate is used where an alkali is needed, to a great extent in the Mill industry, and Sodium bi-carbonate where  $\text{CO}_2$  is required, chiefly for the manufacture of mineral waters.

*Dr. Matthai.*—I take it that most of the sodium carbonate which is imported into India comes in the form of soda ash?

*Mr. Sharpe.*—That is so.

*Dr. Matthai.*—The bulk of that soda ash comes from England?

*Mr. Sharpe.*—Yes.

*Dr. Matthai.*—They produce it there by the ammonia-soda process?

*Mr. Sharpe.*—Yes.

*Dr. Matthai.*—I find that very considerable quantities are also coming from Africa.

*Mr. Sinclair.*—These were imported by the Magadi Soda Works before Brunner Mond took over the latter.

*President.*—What is the principal raw material in this?

*Mr. Sharpe.*—Common salt.

*President.*—And ammonia?

*Mr. Sharpe.*—Yes.

*President.*—How do you get the ammonia?

*Mr. Sharpe.*—That is the difficulty here. No one is making ammonia.

*President.*—In the ammonia plant do they employ the synthetic process?

*Mr. Sharpe.*—Most of the ammonia comes from the gas works.

*President.*—What would you do? There are not many gas works here.

*Mr. Sharpe.*—That is the difficulty.

*President.*—Ammonia can be produced by the synthetic process, can it not?

#### *Costs of power.*

*Mr. Sharpe.*—Yes, but there is the question of high cost of power.

*President.*—If anybody produces electricity in the coalfields with cheap coal, would it really be more expensive than the cost of electricity in Europe?

*Mr. Sinclair.*—What about its transmission?

*President.*—That does not seem to be an insuperable difficulty now when they are manufacturing electricity on a very large scale in the coalfields. I think there is a lot of loose talk about electricity being dearer in India. Nobody has attempted to work out what it would cost in India if it were manufactured on a really large scale.

*Mr. Sharpe.*—That is being done now.

*President.*—Not out of coal?

*Mr. Sharpe.*—The Great Indian Peninsula Railway are actually doing it.

*President.*—They are doing it at Kalyan, not in the coalfields.

*Mr. Sharpe.*—I agree with you there.

*President.*—You can get second class coal at Rs. 3 to Rs. 4-8 and first class at Rs. 5 or Rs. 5-8 at the pitsmouth. We are talking of electricity being very dear but it is dearer in England.

*Mr. Sharpe.*—It is half a penny per unit in England.

*President.*—That is what they want it to be when the super power stations are finished. It may be the cost in some places where it has been produced on a large scale but in England electricity is not cheap. If it was cheap they would not undertake all these big works they are doing now. It does seem to me that there is much exaggeration in this idea that you cannot have any synthetic process in the country because electricity is dear. It could be made cheap and I should say very cheap.

*Mr. Sinclair.*—It looks suspicious that there should be no one of sufficient enterprise here to make it cheaply.

*President.*—That is the point. Where you have the cheapest coal, one would imagine that if it was used properly you would be able to get power as cheap as anywhere in the world. Hydro-electric work has this disadvantage that transmission is very costly and construction is not so very cheap; of course where there is no coal a hydro-electric scheme is the only alternative, but in a country where you don't know really what to do with the coal, electricity should be very cheap.

*Mr. Smith-Wright.*—I certainly agree that cheap power could be made in India.

*Dr. Matthai.*—You say unless electricity is cheap you cannot attempt this synthetic process. To what extent do you want electricity to be cheaper than it is now in order to make it possible for you to consider this scheme of manufacture by the synthetic process?

*Mr. Sharpe.*—It is now 725 anna per unit. We should want it at not more than half this rate.

*President.*—It is supplied at that rate in Calcutta.

*Mr. Sharpe.*—725 is Tata's rate.

*President.*—Tata's rate is based on a different thing. That is based on the price of coal in Bombay.

*Dr. Matthai.*—Supposing it came down to 3 pies a unit would it be a feasible proposition?

*Mr. Sinclair.*—Yes.

*Dr. Matthai.*—You were speaking the other day of a plant somewhere near Bombay for the manufacture of alkalies.

*Mr. Sharpe.*—I understood it was their intention to make alkalies. From what I could make out they were going to generate electricity and use . . . turbo-generators for this purpose supplied with steam from very efficient water-tube boilers.

*President.*—They have got no coal.

*Mr. Sharpe.*—They could possibly get coal at a cheap rate *via* Port Okha.

*President.*—They must bring coal either from Bengal or from South Africa. Even the South African coal is not cheaper than the coal that you get from the Calcutta side at the mines.

*Mr. Sharpe.*—It is superior.

*President.*—That is just now in dispute. At the pitsmouth Indian coal is not inferior.

*Mr. Sinclair.*—We have tried South African coal. We now get a fairly good coal at a reasonable rate from the C. P. We have tried mixing South African and Pench, but found after trial that it was cheaper to use an un-mixed Pench.

*President.*—Jhari coal and some other coal will compare with the South African coal only it is not so hardy. In transshipment it suffers more.

*Mr. Smith-Wright.*—We have very little detailed information about the proposed Company. All we have had is a letter from the Company asking us to give them some information as to how we run our works.

*Manufacture of alkalis.*

*Dr. Matthai.*—You will admit that as one of the leading manufacturers of chemicals in India, unless the Indian Chemical industry is going to tackle alkalis, its future is really never assured. The bulk of the chemical products imported into India are sodium carbonate and its allied products, the value of which is about a crore of rupees. Now the whole of that is outside the sphere of Indian Chemical manufacturers.

*Mr. Smith-Wright.*—Is it ever possible that without having very heavy protection any Indian Company can compete with the Imperial Chemical Industries?

*President.*—How can you expect any protection when you are badly located? No one has investigated what the costs are going to be. It is no use asking for protection unless you attain a certain degree of efficiency and unless you promise to be more efficient than you are. As Dr. Matthai has put it, the chemical industry's future can never be assured unless it tackles alkalis.

*Mr. Smith-Wright.*—At present we can't make them.

*Dr. Matthai.*—Unless you tackle what at present is the most valuable of the chemical products imported into India, your future would not be assured. I want to put to you a concrete proposition. Supposing the Tariff Board recommended and the Government decided to put a duty of 25 or 30 per cent. instead of the present duty of 15 per cent. under present conditions would you consider the question of making alkalis in India?

*Mr. Sinclair.*—We are up against the proposition of Imperial Chemical Industries. It is a question of raising capital for putting up a plant which would have to be on a very large scale. After all, the Company has got to look after the shareholders' interests and it is questionable if anybody would put his money, into such a scheme. He would say "You have the Imperial Chemical Industries. They have tremendous resources. How are you going to compete with them? They can give it away for a couple of years almost for nothing".

*President.*—We will assume for the sake of argument that Government is willing to protect you against that sort of unfair competition.

*Mr. Smith-Wright.*—Then we could probably get the necessary capital.

*President.*—The whole point is this just now. We have got the power on the Bengal side. The market at present also is very largely on that side. Bengal has got no salt. You have got the salt, but you have got neither the market nor the coal. The odds are therefore that if the business was really started, it would be on the Bengal side.

*Mr. Sinclair.*—Although the Magadi Soda Company had a place in Calcutta before Brunner Mond took them over, they could not make it pay, even with their soda as a natural deposit costing them practically next to nothing.

*Dr. Matthai.*—You said that if sufficient protection was granted, the question might be considered. What is your idea of sufficient protection talking quite off hand?

*Mr. Smith-Wright.*—I don't think merely doubling the existing duty would be sufficient, not if the people at home were seriously bent on retaining the market.

*Dr. Matthai.*—The point is this. Since nobody in India has any experience in the manufacture of sodium carbonate, it is impossible for us to say what is the amount of protection needed, because we have no idea of your possible costs. The suggestion I am making to you for purposes of argument is that supposing we raised this duty from 15 per cent. to 30 per cent. that would give you a little more incentive than you have now. Supposing an effort

was made by a leading chemical manufacturer to make sodium carbonate and then we got a tentative idea of the costs that would be incurred in an Indian factory, it might be possible on the basis of that to propose a definite scheme of protection later if it was necessary, but at present we are entirely in the dark as to what the costs might be and you cannot propose a very high rate of duty on what might after all be a hypothetical figure.

*President.*—Is it from the synthetic process that you get sodium carbonate?

*Mr. Sharpe.*—The ammonia may be made from the atmosphere and from hydrolysis of water.

*President.*—Then there would be no question of any raw materials not being available here.

*Mr. Sharpe.*—They are all available here.

*President.*—You have got salt and you have got the power.

*Mr. Sharpe.*—Salt, yes, but not power.

*President.*—You have got the market.

*Mr. Sinclair.*—The market is the only definite thing.

*President.*—It is there, but you have not the enterprise.

*Mr. Sinclair.*—We have not got the capital.

*Mr. Smith-Wright.*—It is all a question of capital. I think it would be possible to raise the capital if some one could pioneer a scheme which showed that profits were possible.

*President.*—Nobody has seriously worked out the thing. I don't see what advantage the foreign countries have over you in this respect.

*Mr. Sinclair.*—They have got years of experience behind them.

*President.*—Experience has to be paid for. I want to know what advantage the foreign countries have over you.

*Mr. Smith-Wright.*—The Imperial Chemical Industries control over 40 factories.

*President.*—Quite true. It does not necessarily cheapen the cost. We understand that point, because the cost of distribution and other things are very much smaller. We would admit that, but leaving that special feature out, what advantage have they over the Indian manufacturer?

*Mr. Sinclair.*—They have a world-wide market. If a plant is put up, it will have to be in competition with the Imperial Chemical Industries. The plant will have to be on a very big scale producing more than the requirements of India. Moreover it would have to be an exporting concern, because a factory large enough to take care of the Indian market alone could not produce at competitive rates.

*President.*—There is a limit to the size of the plant?

*Mr. Sinclair.*—Yes.

*President.*—You must have the smallest economic unit.

*Mr. Sinclair.*—Is that going to be large enough to compete against these other people who can sell at comparatively cheap rates? After all the Indian market, big as it is, is only a small amount of their production compared with the total production. Is this economic unit going to be sufficiently large to compete with them?

*President.*—That is for you to consider.

*Dr. Matthai.*—That difficulty would apply also in the case of some of these other articles. For instance take epsom salt.

*President.*—It will apply to everything.

*Mr. Sinclair.*—That is true.

*Dr. Matthai.*—You are definitely asking for protection in the case of epsom salt.

*Mr. Sinclair.*—Yes.

*Mr. Smith-Wright.*—Our policy is to ask for protection for articles that we are making or have made and not on articles that we could make.

*Dr. Matthai.*—The point we are suggesting is simply this. If the biggest market in the country is for this particular product which you have not attempted at all, we should like to know clearly the position with regard to that.

*Mr. Smith-Wright.*—We have mentioned in our replies that for the manufacture of caustic soda we have a plant and we have actually made caustic soda.

*President.*—What process do you employ?

*Mr. Smith-Wright.*—We don't make it now.

*Mr. Sinclair.*—It was only a war-time measure.

*President.*—Caustic soda is being made to a certain extent by the Paper Mills in Calcutta for their own use.

*Mr. Sharpe.*—They just make it for their own requirements and not for outside sale. They make it in a dilute solution. If they had to concentrate that solution and make solid caustic soda the cost would become prohibitive. One of their raw materials is imported soda.

*President.*—I don't think they use imported soda. They make it out of chlorine.

*Mr. Sharpe.*—Possibly.

*President.*—In the electrolytic process they use common salt?

*Mr. Sinclair.*—Yes, a brine solution electrolytically decomposed, with caustic soda as the main product and chlorine as the by-product.

*President.*—Here is this paper Company where every part of the plant is obsolete except this one and they find it rather cheap to manufacture their own caustic soda.

*Dr. Matthai.*—You don't make any fertilisers?

*Mr. Sinclair.*—No.

*Dr. Matthai.*—You have not attempted it?

*Mr. Sinclair.*—When I was in England in 1923, I went into the question then with the idea of starting the manufacture of fertilisers. I can let you have the quotations and the position then was that unless we were operating on a scale of 50 tons a day, there was no chance. Even people operating on that scale were only just able to keep their heads above water.

*Dr. Matthai.*—50 tons of what?

*Mr. Sinclair.*—Superphosphates. I have got all these quotations and I can let you have them.

I also went into the question of acetic acid. That didn't offer any field. When we had paid freight on raw materials our manufactured cost came to about As. 7 per lb. while the bazaar price was then As. 7.

*Dr. Matthai.*—Do you mean the freight on lime acetate?

*Mr. Sinclair.*—Yes. Our production cost was going to come out at As. 7, but the selling price in India was As. 7, so it was a pretty hopeless proposition. I also went into the question of using concentrates by the Elmore process, but owing to the large capital expenditure and the amount of research that would have been necessary the proposal was temporarily turned down, although we will have it in mind for future consideration.

*President.*—In these different products that you have given, is sulphuric acid used in all of them or most of them?

*Mr. Sharpe.*—In Nitric acid, hydrochloric acid, epsoms, green copperas and turkey red oil.

*President.*—What is this Turkey red oil? Is it used in the Textile industry?

*Mr. Sharpe.*—Yes.

*President.*—Is it used for bleaching or what?



*Mr. Sharpe.*—It is used for finishing. It is used more in alizarine dyeing.

*President.*—You simply treat castor oil with Sulphuric Acid?

*Mr. Sharpe.*—Yes.

*President.*—What is killed spirit?

*Mr. Sharpe.*—That is a solution of zinc chloride.

*President.*—In sulphuric acid?

*Mr. Sharpe.*—No—in hydrochloric acid.

*Mr. Sinclair.*—It is liquid zinc chloride.

*President.*—This salt cake is the by-product of hydrochloric acid?

*Mr. Sinclair.*—Yes.

*President.*—In other countries hydrochloric acid is a by-product from the salt cake?

*Mr. Sinclair.*—Yes, because there is a market for the latter.

*President.*—What is this salt cake used for chiefly?

*Mr. Sharpe.*—In glass manufacture and in the Lefranc process. The glass manufacturers absorb a tremendous quantity.

*President.*—There are some glass manufacturers here.

*Mr. Sharpe.*—But they won't use sodium sulphate.

*President.*—What action has this salt cake in the manufacture of glass?

*Mr. Sharpe.*—It is used as a flux in fusing the sand.

*President.*—What do they use then here?

*Mr. Sharpe.*—Soda ash.

*President.*—Is it cheaper? What is it due to?

*Mr. Sharpe.*—They prefer it.

*President.*—I should not have thought that soda ash was cheaper than salt cake. There is a glass industry in the country?

*Mr. Sinclair.*—There was one at Matunga and one at Kurla, but they all seem to have been shut down.

*President.*—Did the Japanese have a glass factory?

*Mr. Sinclair.*—Some of the Indian factories had Japanese foreman. There is a Company operating at Ogale.

*Mr. Sharpe.*—Another outlet for salt cake is sodium sulphide.

*President.*—That you don't manufacture.

*Mr. Sharpe.*—No.

*President.*—Then these germicides, do they contain sulphuric acid?

*Mr. Sharpe.*—None of these contain sulphuric acid.

*Mr. Sinclair.*—There is a point, here. We are making these germicides because there is no dumping. Even in spite of keen competition, we can manufacture germicides and work at a profit. There is little chance of creosote ever being dumped.

*President.*—Where do you get creosote from?

*Mr. Sinclair.*—We are importing English creosote.

*President.*—What are the names of your brands?

*Mr. Smith-Wright.*—There are about 11 brands—

Pheneccol, black.

Pheneccol, white (Admiralty type).

Sun Brand, black.

Sun Brand, white (Admiralty type).

Purrecol.

Gold Mohur.

Eastern's Lysol.

Creseccol.

Rajeccol.

Raneccol.

Pinodo.

Sun Brand disinfecting powders.

*Dr. Matthai.*—Did you try Mysore creosote?

*Mr. Sharpe.*—It is a wood creosote.

*Dr. Matthai.*—You talk of some wood preservatives. I was wondering whether you were making good creosote.

*Mr. Sharpe.*—These were not creosote, but mineral salts.

*President.*—What is this 'Killed Spirit'?

*Mr. Sharpe.*—It is zinc chloride.

*President.*—Is it made out of zinc and hydrochloric acid?

*Mr. Sharpe.*—Yes.

*President.*—What is this 'Tree Killer'?

*Mr. Sharpe.*—It is a sort of poison. As a matter of fact, it is an arsenite.

*President.*—What is the idea of killing trees?

*Mr. Sharpe.*—This is not a product which we manufacture and hold in stock.

*Mr. Smith-Wright.*—We have been asked by private landowners to supply them with this in order to kill the *pipal* tree which grows in buildings.

*President.*—As regards these paints and other things, what is the principal chemical that you use?

*Mr. Sharpe.*—Creosote—that is, creosote residue mixed with pitch which is entirely for the protection of iron.

*President.*—These are almost side lines?

*Mr. Smith-Wright.*—Yes, the biggest line being disinfectants.

*Mr. Sinclair.*—Another hope is the printing ink.

*President.*—What about the Hooghly Ink Company's product?

*Mr. Sinclair.*—I notice in the Tariff Board's report on *Printer's Ink* a statement to the effect, that the Manager of *The Times of India* was not satisfied with some of the consignments of the Hooghly Ink Company, but we have got a fine chit from *The Times of India*.

*President.*—The whole point about printing ink is that you have not got a big enough market.

*Mr. Smith-Wright.*—That is why we have now brought out a plant capable of producing jobbing ink and lithographic ink also.

*Mr. Sinclair.*—We are making every endeavour to make ourselves a self-supporting company by going in for things which have a chance of paying.

*President.*—Your capacity compared to your actual production is very much bigger.

*Mr. Smith-Wright.*—Yes.

*President.*—Your plant must have become very out of date.

*Mr. Smith-Wright.*—In what way?

*President.*—Not exactly out of date, but worn out being not used.

*Mr. Sharpe.*—It would be more likely to be worn out if we worked it under high pressure. The maximum production of the plant is 5,400 tons, but as we have said, the economic unit of working is only half of that, i.e., 2,700 tons. That is economic from all points of view—from the point of view of cost of production, water, power, plant, etc. If we were to work the plant to its maximum capacity, i.e., 5,400 tons, then naturally the depreciation costs would go up.

*President.*—But I understood you to say the other day that if you did not use the plant continuously, it was likely to deteriorate.

*Mr. Sharpe.*—It is more likely to deteriorate rapidly over the economic than under the economic unit.

*President.*—When we were on the question of depreciation I was trying to point out that depreciation and repairs and replacements were very high and I was told that that was due to the fact that the plant was not working the whole time and that part of the time it had to be shut down.

*Mr. Sharpe.*—If it was entirely shut down, depreciation would be more.

*President.*—Your capacity is 5,400 tons and at present you are manufacturing only 1,200 tons.

*Mr. Smith-Wright.*—It is only during the last two years that we have had these considerable "shut down" periods. Previously we were able to keep the plant going all the year round, so that it cannot be said that our plant has deteriorated considerably on account of "shut down" periods.

*President.*—The capacity is 5,400 tons and you manufacture about 1,500 tons.

*Mr. Sharpe.*—We are manufacturing about 1,400 tons.

*Mr. Smith-Wright.*—I would not say that the plant had deteriorated and the fresh valuation that we have made goes to support that.

*Mr. Sinclair.*—Our plant has been well maintained and we have done all that is possible during the periods in which it has been shut down to keep it in an efficient condition.

*President.*—Now really speaking you depend on sulphuric acid.

*Mr. Smith-Wright.*—Yes, and without that it is impossible to continue.

*Dr. Matthai.*—You give your capacity of the chamber acid on what basis?

*Mr. Sharpe.*—95 per cent. basis.

*President.*—As regards magnesite referred to in answer to question 7: is magnesite used for any purpose other than the manufacture of Epsom salt?

*Mr. Sharpe.*—It is used in the manufacture of refractory bricks and cement.

*President.*—Is it used in the manufacture of cement also?

*Mr. Sharpe.*—Yes, for a particular kind of cement.

*President.*—Do they make any magnesite bricks in Salem?

*Mr. Sharpe.*—They calcine the magnesite and then export it. The weight is reduced in that way.

*President.*—The carbon dioxide is wasted?

*Mr. Sharpe.*—Presumably.

*Mr. Sinclair.*—Collecting it is rather a costly business. They did try it out here at one time before the Sirdar Gas Company was started. Colonel Pennington started that and seeing that it was not a paying proposition gave it up and went in for coke.

*President.*—Is there any use for carbon dioxide?

*Mr. Sinclair.*—Yes, for soda-water manufacture.

*President.*—That does not absorb a large quantity.

*Mr. Sinclair.*—It is a tremendous business.

#### *Imports through Kathiawar.*

*President.*—In your answer to question 7 (c), you refer to the competition from the Kathiawar ports as being on a large scale, but the figures that we have in our possession really do not suggest that the imports are on a very big scale, which need cause any apprehension.

*Mr. Smith-Wright.*—The Customs Returns do not show imports through the Kathiawar ports separately.

*President.*—But I think they are supposed to furnish information to the Collectors of Customs. You will find that they are ordinarily included in the Customs Returns.

*Mr. Smith-Wright.*—I have definite information from the members of the acid selling syndicate, Bombay, from which it appears that a considerable quantity of acid is coming in here from the Bhavnagar Chemical Works.

*President.*—They do import but they are a very small works. The point is whether the quantities are sufficiently large to cause any real apprehension.

*Mr. Smith-Wright.*—Yes, in this way. If you impose duties on acids coming into the country, there would be a tendency for more and more to come into India through Kathiawar ports.

*President.*—You cannot fix the duty in such a way that any industry is able to capture the whole market. That is not done.

*Mr. Smith-Wright.*—I am not asking for a monopoly.

*Dr. Matthai.*—Is it your point that the sulphuric acid imported at the port of Okha goes into the Bombay and Ahmedabad markets at a lower rate of freight than you would have to pay from Bombay? But I take it that the landed price at Okha is more or less the same.

*Mr. Smith-Wright.*—There may be no Customs duty or less Customs duty.

*President.*—Do you mean to suggest that there is smuggling? If that is so, then in the case of acids of high value it would make an enormous difference.

*Mr. Smith-Wright.*—Yes.

*President.*—The Indian States' case is that when protection is given to any industry in India some burden is thrown on them too, and that therefore they are also entitled to benefit by any duty, protective or revenue. You cannot treat them as if they were foreign manufacturers. So long as they are subject to more or less the same fiscal system as we are, they are entitled to make use of it in the same way as we are and therefore British India cannot impose on them any different terms. Each State is entitled to protect itself in such a way as it can. If you are so situated that you are at a geographical disadvantage compared to them, how can you deprive them of that advantage which they naturally possess?

*Mr. Smith-Wright.*—It is an argument in favour of a bounty as against duty, because the duty might be minimised to a large extent by acids coming through Kathiawar.

*Dr. Matthai.*—Are you suggesting that these imports coming into Okha really depress prices in the Bombay market?

*Mr. Smith-Wright.*—They do have that effect.

*Dr. Matthai.*—Do they have a perceptible effect on the market?

*Mr. Smith-Wright.*—There is one dealer—Sorabji Pestonji—who is the biggest importer in Bombay from Bhavnagar. After all even if he only gets 15 to 20 drums at a time, it would certainly affect prices.

*President.*—It does seem to me that they must pay more or less the same freight to Bhavnagar as to Bombay and if they are exporting from there to Bombay, how do you account for that?

*Mr. Smith-Wright.*—I can only say that the duty might be considerably lower. Merchants have to pay 15 per cent. duty and Rs. 3 as port dues here. If the duty was about half there, it would make a big difference.

*Dr. Matthai.*—The duty would make a difference.

*President.*—That is not competition. So far as British India is concerned, it is really smuggling. That is what it comes to at first sight.

*Mr. Smith-Wright.*—The port is open. So, it comes to Okha first and then it comes to Bombay.

*President.*—We went into the question of smuggling when we enquired into the Match Industry. They have now re-opened the Customs barrier which is intended to prevent that sort of business.

*Mr. Smith-Wright.*—I will put it this way. The Bhavnagar people are only importing the acids. Why should it pay them to import acids for the benefit of a customer in Bombay and rail them all the way to Bombay?

*President.*—That is smuggling pure and simple.

*Mr. Smith-Wright.*—On the face of it, it appears to be so.

*President.*—That is what it is. If that is the case, the Customs authorities ought to be more vigilant. That is all one can say. There were complaints made in the Match Industry. At that time they had removed the Customs barrier. Now they have reimposed it since 1927 and we have been told that sort of smuggling has more or less stopped. Is this very recent?

*Mr. Smith-Wright.*—It was only yesterday that another consignment came.

*President.*—If I were you, I would certainly inform the Collector of Customs about it and it is his business to look into it. You must draw his attention to it stating the facts as you know them. I am sure he would be very glad to get this information.

#### *Quality of local manufactures.*

*Dr. Matthai.*—When you say that your sulphuric acid compares favourably with the imported acid, partly it is question of corrosion and partly it is due to the fact that you are manufacturing your acid out of sulphur and not pyrites?

*Mr. Smith-Wright.*—Yes.

*Mr. Sharpe.*—Customers would definitely specify that it should be made from sulphur or from pyrites in the case of the imported article.

*Dr. Matthai.*—In question 8 (b) where you make a statement that the imported article fetches a slightly higher price, you don't give your realized prices, so that I cannot make out how far this statement is correct. But looking into the figures given to us by the Dharamsi Morarji Chemical Company I don't think this statement is borne out. Apparently the Indian article fetches more or less the same price as the imported article except in very rare cases?

*Mr. Smith-Wright.*—There I am speaking generally. I think you will find throughout that the price of copperas is always higher.

*Dr. Matthai.*—As far as salts are concerned, there is a slight prejudice against you though you say in answer to question 8 (d) "We are glad to say that there is no prejudice of any kind against our products".

*Mr. Smith-Wright.*—I have explained my reasons in 8 (c), that the bazar dealer is never prepared to pay quite so much for Indian made goods as for those imported from abroad.

*Dr. Matthai.*—On your acids which seem to be superior you get the same price?

*Mr. Smith-Wright.*—We may even get a little more.

*Dr. Matthai.*—On the salts you don't quite make so much as the imported article, so there must be a certain amount of prejudice?

*Mr. Smith-Wright.*—For acids we get a slightly better price as our acids are definitely superior; in salts we are just as good but as we have no superiority, these do not fetch the same price.

*Dr. Matthai.*—The market does not recognize that, that is what it comes to.

*Mr. Smith-Wright.*—That is the trouble!

*President.*—These figures that you have given in answer to question 14 about the relative quantities of raw materials, are they theoretical figures or are they actual? I see that 6½ cwt. of sulphur is about 30.77 per cent. That is a theoretical percentage. Have you attained that?

*Mr. Sharpe.*—These are round figures. When I worked it out 30.77 gave a figure near 6½ cwt.

*President.*—Have you attained that figure of 30.77 in actual practice?

*Mr. Sharpe.*—We give the actual figures from our records.

*Mr. Sinclair.*—Here is the statement. 6½ cwt. is slightly more than is required for 95 per cent. acid.

*President.*—I find some difficulty about your hydrochloric acid figures.

*Mr. Sharpe.*—That is because our hydrochloric acid is 100 per cent. the same with nitric acid, so that you will find that our figures and Dharamsi's will agree if calculated on the same basis.

*President.*—In Epsom salt you have 8 cwts. of magnesite and  $8\frac{1}{2}$  cwts. of sulphuric acid. What is the balance?

*Mr. Sharpe.*—Water.

*President.*—That would be about 20 per cent. water?

*Mr. Sharpe.*—A little less than that.

*President.*—In copperas you have 5 cwts. of iron scrap and 8 cwts. sulphuric acid; what is the balance?

*Mr. Sharpe.*—There also water.

*President.*—In the Turkey Red Oil also the remainder would be water?

*Mr. Sharpe.*—Yes. That is sold on the basis of 50 per cent.

#### *Sulphur.*

*President.*—Take this price of sulphur. You have given \$33.20 per ton c.i.f. You get it from America?

*Mr. Smith-Wright.*—We get a dollar price quoted to us.

*President.*—How many rupees is it?

*Mr. Sinclair.*—About Rs. 93.

*President.*—That gives a price of Rs. 101 delivered at the works?

*Mr. Sinclair.*—Yes.

*President.*—I saw in some of the representations that it is put at about Rs. 105?

*Mr. Sinclair.*—If you take the bags into account and then take the loss in transit it would be as much.

*President.*—Tata Iron and Steel Company mentioned it as Rs. 98-8-0 at the works. That figure is certainly very much lower than you have given.

*Mr. Smith-Wright.*—The price is moving up and down. It has just come down again. It is fluctuating. It may fluctuate 10 shillings either way. Then they get it in much bigger quantities than we do.

*Mr. Sinclair.*—They may buy forward for the whole year's contract.

*President.*—We may take Rs. 100 as the average.

*Mr. Sinclair.*—This would take the loss into account. This of course the buyer has to bear.

*President.*—You have £6/7 here and I see that the English price is £6/5 so that really there does not seem to be much in your argument that the price there is lower because they have got pyrites.

*Mr. Sinclair.*—The freight from Sicily would be not very different to India from what it is to England.

*President.*—The difference is 15 shillings which is equal to a difference of 5 shillings per ton on sulphuric acid. That is your disadvantage.

*Mr. Smith-Wright.*—Yes, compared with the English manufacturer.

*President.*—We do not know what the prices are in Germany, but there could not possibly be much difference because in that case they might take sulphur from Germany to England. So that the whole thing is that your disadvantage comes to 5 shillings on one ton of sulphuric acid.

*Mr. Smith-Wright.*—Yes.

*President.*—For nitrate of soda the British price is £10/2, but the consumption of nitrate of soda is so small—it is only 20 lbs.—that per ton of sulphuric acid it would mean a very small quantity.

*Mr. Sinclair.*—Yes.

*President.*—So you start with that disadvantage really. They sell sulphuric acid in England at £3/2. We are now talking of the chamber acid.

*Mr. Sharpe.*—Then you must compare free from arsenic at £4.

*President.*—The whole point is that the other acid must be used for industrial purposes and therefore really speaking you should not compare it with the better quality unless you get the price of that superior quality which you don't. If this chemical industry were to be established in the country, really the kind of figure that would make it possible would be £2/2 and not £4.

*Mr. Sharpe.*—That is so.

*Mr. Sinclair.*—We have got to work down to that cheap basis.

*Mr. Smith-Wright.*—With this price there is a very small margin between raw materials and the finished product.

*President.*—I am talking of the establishment of the chemical industry. You will not then sell sulphuric acid as such but most of it will be sold for the manufacture of other products. Then the question will be, to what level could the price of the chamber acid be reduced in order that other industries may establish themselves? Should we take this figure of £3/2? It is quite possible they may be charging subsidiary industries £3/10 and selling it at £3/2 but the safer figure would be £3/2, would it not?

*Mr. Sinclair.*—Yes.

*President.*—How are you going to get down to £3/2 at the works, that is the point. It doesn't appear to me that if about 5 shillings is the disadvantage that you have in the principal raw material, your sulphuric acid should cost you more than theirs.

*Mr. Smith-Wright.*—I don't think in actual manufacturing costs, you will discover it in that way. We have not got the demand for the output. They are forced to sell their acid. They have got a certain quantity of acid which has got to be disposed of and it is quite possible they sell even below cost as they are making their profit on the secondary by-products.

*President.*—It is quite possible that the sulphuric acid made from pyrites is £1 cheaper.

*Mr. Smith-Wright.*—It would be cheaper.

*President.*—Would it be as much as a £1?

*Mr. Sharpe.*—It is possible.

*President.*—If we take the raw material—sulphur—at £6-5-0 and sodium nitrate, 96 per cent., at £10-2-0, will that be correct?

*Mr. Sharpe.*—Yes.

*President.*—It comes to 48 shillings.

*Mr. Sharpe.*—Yes.

*President.*—That seems reasonable enough in that case. If it is £4 there is a big margin. You cannot say that they are throwing away sulphuric acid for the price.

*Mr. Sharpe.*—They cannot be making very much on sulphuric acid.

*Mr. Smith-Wright.*—They have to add overheads and labour.

*President.*—There is a fair amount there. That is not a small amount.

*Mr. Smith-Wright.*—It leaves £1-12-0.

*President.*—In the Steel Company the cost above material is only Rs. 8 a ton. I do not know what percentage of acid it is.

*Mr. Smith-Wright.*—Sulphuric acid?

*President.*—Yes. That is the works cost. That of course doesn't include depreciation and profit. What I am trying to suggest is that there is a margin of £1-12-0.

*Mr. Smith-Wright.*—Our labour is 37 per cent. Take it even at 23 per cent. for more efficient labour.

*President.*—I am not concerned with percentage. I am talking in rupees. It is only about Rs. 8.

*Mr. Sinclair.*—Is that the total cost?

*President.*—That is the total cost above materials. You have got to add depreciation and profit to that.

*Mr. Smith-Wright.*—If you take 12 shillings that leaves £1 to cover overhead and depreciation. That is not very much.

*President.*—The price doesn't seem to be unreasonable compared to the cost already attained in this country.

*Dr. Matthai.*—Your point might be substantiated to this extent that there is a margin of £1. As the President pointed out that represents the surplus over materials, but it doesn't include depreciation or any of the other overheads.

*Mr. Sinclair.*—They can't be selling at much of a profit.

*Dr. Matthai.*—Therefore they are not selling at a profit.

*Mr. Sinclair.*—That is what I say.

*President.*—That is possible. In calculating the costs of the subsidiary products, I don't think we should be justified in taking a higher figure than this or that. If the other products are to compete, you must produce sulphuric acid at about that figure.

*Mr. Sharpe.*—I don't think there is any justification for doing anything else.

*President.*—The whole question arises as to how to bring down the costs to that level.

In answer to question 17, you say that it is not possible to make nitrate of soda, because electric power is not cheap. We don't want to go into that question again.

*Dr. Matthai.*—On this question of salt, the price that you give is Rs. 1-10-0 per maund. That works out to Rs. 44 a ton, does it not?

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—Messrs. Dharamsi Morarji Chemical Company have given us a figure of Rs. 22 for salt landed at their works. What is the difference due to?

*Mr. Sinclair.*—Refund of duty has to be deducted from this price.

*Dr. Matthai.*—Supposing you made allowance for that?

*Mr. Sinclair.*—For this we have to take Re. 1-3-0 which we recover. Our price actually comes to about Rs. 17 a ton.

*Dr. Matthai.*—It will be more or less Rs. 18.

*Mr. Sinclair.*—Yes. The actual figures with duty are Rs. 98 for 120 maunds and without the duty it is Rs. 48-12-0. That is our present contract rate.

*President.*—Rs. 48-12-0 a ton.

*Mr. Sinclair.*—For 120 maunds.

*President.*—In answer to question 21 you say "nitric acid could not be made with Indian potash".

*Mr. Sinclair.*—We have given costs as regards that in Statement 2A that we have sent you to-day. I have got some relative costs which should have been added to this Statement 2A. (Handed in.)

*President.*—Rs. 100 would be the extra cost.

*Mr. Sinclair.*—Yes.

*President.*—What about the potash that you get from it?

*Mr. Sharpe.*—If you can get a market for potash, then you can credit sale-proceeds to the nitric acid plant.

*President.*—It is a fertiliser.

*Mr. Sharpe.*—It contains 30 to 35 per cent. sulphuric acid. It is an acid potassium sulphate.

*President.*—Potassium nitrate would be used in the manufacture of nitric acid. Then there would be potash cake left.

*Mr. Sharpe.*—Yes.



*President.*—Has it no marketable value?

*Mr. Sharpe.*—Not as such. We have tried experiments, using it for the manufacture of alum.

*President.*—What does the potassium nitrate contain?

*Mr. Sharpe.*— $\text{KNO}_3$ ,—potassium, nitrogen and oxygen. The action of sulphuric acid on potassium nitrate gives nitric acid and potassium bisulphate. The latter contains about 30 to 35 per cent. free sulphuric acid and 60 to 65 per cent. potassium sulphate. The presence of 30 per cent. free acid in it prevents it from being used as a fertiliser. During the war thousands of tons of nitre cake were dumped into the sea.

*President.*—Can't you extract acid out of it?

*Mr. Sharpe.*—That has been the great bug bear of chemical manufacturers. You cannot get your full value out of bisulphate.

*President.*—But then a lot of this potassium nitrate is exported. What do they do with it then?

*Mr. Sharpe.*—I don't think they use it for the manufacture of nitric acid.

*President.*—It must have some use, because it is exported.

*Mr. Sinclair.*—It is probably used in the manufacture of gunpowder.

*President.*—Could it be used for fertilisers?

*Mr. Sinclair.*—That I can't say.

*President.*—Do you know, Mr. Gupta, whether fertilisers can be made out of this potassium nitrate?

*Mr. Gupta.*—It can be used in the manufacture of fertilisers and also in the manufacture of potash alum in both of which we are interested. In the case of manufacture of superphosphate, potash bisulphate can be mixed with sulphuric acid and reacted with bones or rock phosphate. Then soda bisulphate will be utilised and more or less a compound fertiliser will be obtained containing both potash and phosphate.

*President.*—Really speaking then so far as sulphuric acid is concerned, nitrate of soda required is so little that you don't want this potash nitrate.

*Mr. Smith-Wright.*—We have mentioned that there.

*Dr. Matthai.*—Have you made any enquiries about the sulphur content of Indian pyrites?

*Mr. Sharpe.*—I find from my office records that analysis has been made of samples of Indian pyrites, but then we have never been able to find sufficient quantities. We have never had anybody offering it to us.

*Dr. Matthai.*—In the pyrites which you have examined, how much of sulphur was there?

*Mr. Sharpe.*—35 to 40 per cent.

*Dr. Matthai.*—40 per cent. of sulphur is quite good enough. Generally it has got about 45 per cent.

*Mr. Sharpe.*—Yes, on an average.

*President.*—They have used down to 35 per cent.?

*Mr. Sharpe.*—Yes.

*President.*—We don't know what quantities of pyrites exist in India.

*Mr. Sharpe.*—It is curious that the geological survey gives very little information on that.

*President.*—We have written to them, but we have not yet heard.

*Mr. Smith-Wright.*—On the question as to what we do to assist our labour, I forgot to mention that we give free medical attendance and we have a provident fund scheme.

*President.*—For ordinary labour?

*Mr. Smith-Wright.*—Yes.

*President.*—The labour question is not really a very acute one in this industry.

*Mr. Smith-Wright.*—That is true.

*Dr. Matthai.*—Have you ever been able to take advantage of the railway concessions on acids?

*Mr. Sinclair.*—Oh, yes. We have put in a statement on that.

*Dr. Matthai.*—In your reply to question 18 (b) about Epsom salts you say "The ease with which foreign manufacturers have entirely captured the market for Epsom salts can be largely traced, in our opinion, to the high transport charges on magnesite". But that is really a very small factor.

*Mr. Sharpe.*—No, it is not.

*Dr. Matthai.*—You give your works cost as Rs. 120 for Epsom whereas the market price is Rs. 65. Straightaway there is a difference of about Rs. 60. Now the freight on magnesite per ton of Epsom would be about Rs. 16, so that even if you were to get the whole thing free, even if the transport were entirely free, you would still have a difference of Rs. 50. Thus it will be seen that the transport charge on magnesite is really relatively a small factor and that the difficulty about Epsom is entirely different.

*Mr. Sharpe.*—We have under consideration an idea of not charging any overheads to the chamber acid because we do not want to sell it as such. We are thinking of charging only the acid cost without overheads to the other plants and allocating the overhead to the finished products. If we do that, it would cheapen the cost of Epsom salt.

*Dr. Matthai.*—If you cut overheads out of chamber acid, by how much would you bring down your cost?

*Mr. Smith-Wright.*—The chamber acid would then cost about Rs. 49 instead of Rs. 92 as shewn in Form II.

*Mr. Sinclair.*—I went into the question of freight on Epsom and I found that it came to about Rs. 3-9-4 per cwt. from Madras to Bombay.

*Dr. Matthai.*—On this question of your total disbursement of wages I find that in 1927-28 on your output it was nearly Rs. 51,000. That is your total wage bill?

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—I was comparing your figure with the disbursement figure of the other company and I found that their bill came to about Rs. 35,000 or Rs. 36,000 during the same period. On the face of it, without looking into the details, it does strike one that you are probably spending very much more on labour. They make all the products that you make. They have a larger variety of products than you have, and their total output during this period is not very much less than yours and yet your total wage bill is at least 20 per cent. higher.

*Mr. Smith-Wright.*—I don't think that you have got our total output. You have not included our disinfectants.

*Dr. Matthai.*—You don't have fertilisers which they have.

*Mr. Smith-Wright.*—Their output of fertilisers is not so much as our disinfectants.

*Dr. Matthai.*—Have you included your disinfectants in your answer to question 6. Taking 1927-28, what further figure would you add?

*Mr. Sharpe.*—Taking everything our total production would be about 3,466 tons.

*Mr. Sinclair.*—Here is a statement (handed in) which will give the information you want.

*Dr. Matthai.*—With reference to your reply to question 32, I understand that you are using steam for your chamber process.

*Mr. Sharpe.*—That is so.

*Dr. Matthai.*—That is supposed to be rather an ancient method.

*Mr. Sharpe.*—No, it is still used.

*Dr. Matthai.*—I gather from text-books that jets of steam are not used but it is almost entirely water spray that is used now.

*Mr. Sharpe.*—We had sprays but we never found them successful.

*Dr. Matthai.*—Mr. Gupta, what is your method?

*Mr. Gupta.*—We use sprays.

*Dr. Matthai.*—If you use steam, it makes the cost higher.

*Mr. Sinclair.*—The actual steam used in the chamber plant is not very much. Further we have to generate steam any way for other products.

*Dr. Matthai.*—Did you actually try it?

*Mr. Sharpe.*—We tried it but we did not find it successful.

*Mr. Sinclair.*—If I were designing a chamber plant for India I would still stick to steam if we were making other by-products.

*Dr. Matthai.*—What is the difference between India and other countries?

*Mr. Sinclair.*—If we generate steam, there is always a little that can be spared.

*Mr. Sharpe.*—The boilers work more efficiently with a better off-take.

#### Costs.

*President.*—In dealing with your costs, what I propose to do is this. You have not reached your full production at all. These are only estimates. Therefore I propose to take up the cost of the Tata Iron and Steel Company as regards the future. They have been working this plant for the last five or six years and they are now producing about 15,000 tons of chamber acid. If we were to take a plant of reasonable efficiency—I don't admit that the Tata Iron and Steel Company's plant represents ideal efficiency but any how they have obtained results which are not obtained by either of you—don't you think that it would be reasonable for us to assume that you would attain the same amount of efficiency as Tata's if you worked to your full capacity.

*Mr. Sinclair.*—We have 92.44 per cent. efficiency.

*President.*—I don't judge efficiency by any other standard than that of costs.

*Dr. Matthai.*—The case that we have got to make is: your Works were set up in 1914 and since then there has not been very much renovation of plant. The Chemical Industry has improved a tremendous lot since the war and therefore one would say that your plant is probably out of date.

*Mr. Sharpe.*—It is not.

*Dr. Matthai.*—It is a matter on which we have to take expert opinion I am just giving you the sort of first impression one would form.

*President.*—It is a pre-war plant, is it not?

*Mr. Sinclair.*—Yes.

*President.*—Many things have happened since the war.

*Mr. Sinclair.*—Yes.

*President.*—Plants have undergone changes in all industries and so has the chemical plant.

*Mr. Sinclair.*—Yes.

*President.*—It may be that the principle is the same. But it works in a different way.

*Mr. Sinclair.*—I went into the question of a contact Sulphuric plant when I was at home, but I found that the capital expenditure would be much too high. If we were to replace our existing plant by a contact plant, it would only fetch us its scrap value. That is the position. We welcome any suggestion. We are always willing to go in for any products which can be manufactured with a reasonable degree of safety and chance of success.

*President.*—I am just trying to draw your attention to the point that we have got actual experience of production of sulphuric acid on a fairly large scale. I believe the Indian Iron and Steel Company have got a sulphuric acid plant but we have not got their costs, but the costs of the Tata Iron and Steel Company are public property now, and as I said, even the Steel Company's plant is not in all respects the most efficient.

*Mr. Smith-Wright.*—Do you wish us to take their cost as the basis?

*President.*—Very largely. It is the largest plant at present in India. We may be able to give you their more recent costs; we have got their latest costs but we are not at liberty to make them public without their permission, but I may tell you that there is not very much variation. As regards question 42, you don't answer this question "Were the prices received by you during the war, the current prices prevailing at the time in India"? You certainly ought to know that?

*Mr. Smith-Wright.*—We were not managing agents at that time and we have not got any records. Messrs. Shaw Wallace and Company were the managing agents then.

*President.*—It is rather important in this sense that as a war material it is of national importance.

*Mr. Smith-Wright.*—When you say current prices what prices do you mean?

*President.*—I mean world prices.

*Dr. Matthai.*—These figures that you give, do they include your sales to Government?

*Mr. Smith-Wright.*—Yes.

*President.*—As regards foreign competition, we have been in communication with this German Company and we do not know whether they will give evidence or not, but they want some further information from us as to the points on which we would examine them. The points on which we propose to examine them are mainly the position of the Trust. Have you got any reports of the Imperial Chemicals or the I. G. F.?

*Mr. Smith-Wright.*—I have got a copy of a report of the first meeting of the I. G. and some notes on their selling organization (handed in).

*Dr. Matthai.*—With regard to this statement that you make that Germany itself may be regarded for all intents and purposes as the competing country, looking at the trade figures I find that it is true as far as the salts in which you are interested are concerned. As far as magnesium chloride is concerned the main competition is from Germany, but as regards the other salts practically the chief competing country is England.

*Mr. Smith-Wright.*—The Imperial Chemicals are by far the biggest exporters.

*Dr. Matthai.*—So that looking at the articles included in our terms of reference we must include both the I. G. F. and the I. C. I.?

*Mr. Smith-Wright.*—Yes. While on the subject of foreign competition, you will remember the President asked whether we could establish that the prices at which they sold these salts in India were lower than at home. We can establish the fact that alkalies which we do not manufacture and which can be sold here at a legitimate price, are being sold at this higher price. We are not making them and they don't bother to cut their prices down.

*President.*—As regards Germany they have a strong argument that having got to pay these reparations, in their own country they must sell all their commodities at a higher price than abroad. They must make their own nationals pay as far as possible, and, secondly, they must get enough money to be able to pay the reparations. Therefore in their case you cannot necessarily say that they are dumping in the ordinary sense because they have got to find money from their surplus production. On the one hand they make their own people pay a higher price and on the other, in order to get their surplus production sold, they have got to sell it at a lower rate. That does not apply to the Imperial Chemicals. The position of Germany in that respect differs to some extent, if you look at it from that point of view.

*Mr. Sinclair.*—They are taking this money from us really; that is how we look at it!

*President.*—As regards nitric acid (question 43 (c)) if we wrote to the mint should we be able to get the correct information?

*Mr. Smith-Wright.*—Yes.

*President.*—These figures may be accepted as correct now?

*Mr. Smith-Wright.*—Perfectly. Colonel Stace gave us permission to mention this to you.

*President.*—Really it works out at a very big figure. It is Rs. 315 and the price in England is £21. Then there is 15 per cent. duty on it. It does seem to me to be some special price.

*Mr. Smith-Wright.*—They say they may require it for the next ten years or more and their idea probably is that if they can secure the order they would kill the Indian manufacturer and then sell in the Indian market at their own price.

*Dr. Matthai.*—As regards these prices that you give in answer to question 46, I take it that if you add the three items against each product you get the price at which the dealer gets the article from the importer?

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—It is very important from our point of view, in fixing the measure of protection we have to take the current prices and get correct estimates. But the totals I get from your figures are entirely different from the current market prices that Messrs. Dharamsi Morarji have given us and I want to be in a position to reconcile the two. Take for example coppers. Your total is Rs. 699; the current price that they give us is Rs. 82. There is a difference between the estimate of current prices of about Rs. 13.

*Mr. Smith-Wright.*—These are not really market prices. These are merely the prices which an indenter gets. He will have to add his profit on to them.

*President.*—These are the wholesale import prices?

*Dr. Matthai.*—How much has to be added in order to get the market price?

*Mr. Smith-Wright.*—That is difficult to say. Some of these people work practically for no profit. Some importers sell on their own account retail; others sell to other smaller dealers in which case that dealer has to make his own profit too.

*Dr. Matthai.*—It is of importance for us to know precisely what to add to these figures.

*Mr. Sinclair.*—We had a case yesterday. Messrs. Brunner Mond's price for bleaching powder was Rs. 175 a ton. They had no stock, whereas some of the merchants in the bazar had stocks and yesterday their price was Rs. 210 because Brunner Mond were out of stock, while they had bought from them, i.e., Brunner Mond at Rs. 175 a ton. It may possibly be Rs. 240 this evening! It may be difficult to reconcile the two prices.

*Dr. Matthai.*—As a matter of fact I find that even your c.i.f. prices of acids are lower than any I have received.

*Mr. Smith-Wright.*—I may explain perhaps that they are not very recent. It is rather difficult to get hold of these figures.

*Dr. Matthai.*—Can you give us more recent figures?

*Mr. Smith-Wright.*—It is not very easy to get hold of them.

*President.*—I think we can get them from Messrs. Brunner Mond and Company or the Havero Trading Company, Limited.

*Mr. Smith-Wright.*—Yes, you might ask them.

THE EASTERN CHEMICAL COMPANY, LIMITED.

Oral Evidence of Messrs. W. S. SINCLAIR, E. G. SMITH-WRIGHT  
and H. SHARPE, recorded at Bombay on Friday, the 16th  
November, 1928.

*President.*—In answer to question 38, you refer us to some article written by Sir Thomas Holland in the Geological Survey of India, Volume XLVI. Have you got that?

*Mr. Smith-Wright.*—I haven't got that now. We quoted that in our original preliminary statement at some length and I merely referred to it in my reply.

*President.*—I suppose he refers there to the export of bones and things like that.

*Mr. Sinclair.*—I gather he is pointing out that the material that might be used for fertilizers is shipped to other countries and brought back as fertilizers.

*President.*—What is this 20 millions sterling he is referring to? Is that the imported value of fertilisers?

*Mr. Sinclair.*—I don't know whether he is referring to other chemicals also, but I should imagine that he is referring to fertilisers only. 90,000 tons of bones are exported.

*President.*—In answer to question 47, you say "In Bombay the sale of our nitric, sulphuric and hydrochloric acids is in the hands of a syndicate composed of 4 Indian merchants." What merchants are they?

*Mr. Smith-Wright.*—They are local merchants.

*President.*—Are they your sub-agents?

*Mr. Smith-Wright.*—It was agreed about a year or a year and a half ago, I think, that we would not sell acids in the market to the local dealers, and would only sell to the mills, Government, public bodies and railways. This syndicate composed of 4 principal dealers looks after the sale of all acids to local dealers.

*President.*—Do they do it on commission?

*Mr. Smith-Wright.*—We fix the wholesale price to them and we fix the retail price at which they should sell again. Each paid us a security deposit in the beginning.

*President.*—They take the difference between the wholesale price and the retail price.

*Mr. Smith-Wright.*—Yes. Every month they divide the profit among the four in equal shares irrespective of the business each does.

*President.*—What does it mean?

*Mr. Smith-Wright.*—It is very much simpler for us.

*President.*—How much does it mean in the distribution charges?

*Mr. Smith-Wright.*—It doesn't cost anything in the way of distribution charges. The wholesale price at which we sell to them is higher than the price which we charge to the mills and other people.

*President.*—What margin do you give?

*Mr. Smith-Wright.*—As. 4 a gallon on Sulphuric.

*President.*—Do they sell all of any acids?

*Mr. Smith-Wright.*—All the three acids—sulphuric, nitric and hydrochloric.

*President.*—What percentage would it come to on the whole value of the acids? Would it be 2 per cent. on their sales?

*Dr. Matthai.*—What is the margin that is allowed under your arrangement between wholesale and retail prices?

*Mr. Smith-Wright.*—It remains at As. 4 for sulphuric acid. If it is expressed in percentages, it will depend on the price which is fluctuating.

*President.*—You know the volume of business done there. You may say Rs. 2 lakhs. On that they get As. 4 a gallon. How much does it work out to? Will you please work it out and let us have it?

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—That is to say when market conditions change and you have got to fix a different retail price, then you change your wholesale price correspondingly, but there is always a difference of As. 4.

*Mr. Smith-Wright.*—We used to give them more, but owing to competition we have had to reduce the retail price. We cannot reduce it still further. Actually out of that As. 4 they give back As. 2 as a security deposit on which we pay interest. They get only As. 2.

*President.*—I take it that As. 2 belong to them.

*Mr. Smith-Wright.*—Yes. We are paying interest on it and it is a sort of security against future business.

*Dr. Matthai.*—If you gave us for two or three years the actual retail prices that you fixed in arrangement with these people that would be more or less the market prices in Bombay?

*Mr. Smith-Wright.*—Yes. That would be the market retail price. At the present moment it would be Rs. 2 to Rs. 2-2-0.

*Dr. Matthai.*—Could you give us a statement showing the prices fixed under your system both wholesale and retail?

*Mr. Smith-Wright.*—Yes, during the period of the agreement. Actually in a rough and ready method we can more or less say what percentage it represents. Each member of the Syndicate was making Rs. 1,000 a month.

*Mr. Sinclair.*—They are making at least 14 per cent. That is only on sulphuric acid. They are better off than we are.

*President.*—That is precisely what I want to know. How many mills are controlled by Messrs. E. D. Sassoon and Company?

*Mr. Smith-Wright.*—12 mills including one woollen mill.

*President.*—In Bombay there are about 90 or 100 mills?

*Mr. Smith-Wright.*—About 100 mills.

*President.*—Do they take your sulphuric acid?

*Mr. Smith-Wright.*—Yes.

*President.*—And the other products?

*Mr. Smith-Wright.*—They can't take our epsom salt, because the price is too high. They take a small quantity of washing soda occasionally. Our Dye Works make their own Turkey red oil. Of course the bulk of the Mill requirements is alkalies.

*Dr. Matthai.*—So far as the salts are concerned, does the Syndicate arrangement apply?

*Mr. Smith-Wright.*—No, it only applies to acids.

*Dr. Matthai.*—As far as other products are concerned, you deal directly?

*Mr. Smith-Wright.*—Yes. As a matter of fact we have just got the dealers in the bazaar to form a Copperas Syndicate. There are 9 merchants who have formed themselves into a copperas syndicate under which they have agreed not to deal in imported copperas.

*Dr. Matthai.*—That doesn't affect your sales to mills direct?

*Mr. Smith-Wright.*—No. In acids also we are free to deal with the mills.

*Dr. Matthai.*—I am speaking of copperas. Your sales outside the mills will be done through this Syndicate.

*Mr. Smith-Wright.*—The sale of copperas will also be done by the Syndicate. It practically embraces all the dealers, because copperas dealers are situated in Vadgadi. These 9 people are the principal dealers in copperas.

*Dr. Matthai.*—When you give us a statement of retail prices, could you also give us a statement of prices at which your acids, copperas, glauber's and epsom salts have been sold to the mills, because all your sales have been to the mills?

*Mr. Smith-Wright.*—Copperas is not generally sold to the mills.

*Dr. Matthai.*—You might give us copperas prices differently.

#### *Freights.*

*President.*—The freight figures that you have given in answer to question 54 are rather interesting. I don't understand why there is this variation. Is this railway run by the State?

*Mr. Smith-Wright.*—Yes.

*President.*—It does appear as if on the outward traffic from the port to the interior, there is a lower freight rate apparently, but what I can't understand is from Bombay to Vartej, that traffic must run on the same system part of the way, that is to say on the British railways. How is it arranged?

*Mr. Smith-Wright.*—The freight on the G. I. P., I suppose, accounts for the difference, and also the railway may charge them higher for the on-carrying traffic that passes over their line.

*President.*—If the reductions in freights are allowed, the freights from the ports to the interior would be lower. They apparently make a distinction between the commodities made in British India and the imported commodity.

*Mr. Smith-Wright.*—Possibly. These are comparisons of the maximum rates all the way through. The rates that they quoted when we wrote were quoted on the maximum basis. If we were to take the concessional rates, which we have given in a separate statement, then the concessional rate on the G. I. P. is higher than the maximum rate from Okha to Petlad, etc.

*President.*—Does the concessional rate apply to wagon loads?

*Mr. Sinclair.*—Yes.

*President.*—This is for what?

*Mr. Sinclair.*—For small lots. If we compared it with the concessional rate, a similar difference would be seen.

*President.*—We have to ask the railway authorities when they come here how this is done.

*Mr. Smith-Wright.*—Yes, what arrangements they have for on-carrying traffic over the other line.

*Dr. Matthai.*—To what period do these sea freight rates relate?

*Mr. Smith-Wright.*—We got them by telegram during the course of making out our replies in September.

*Dr. Matthai.*—Take for example the acids. The freight is 100 sh. per ton. I add 10 per cent. to that and I get Rs. 110. Then I take 5 per cent. off and deduct from that 10 per cent.

*Mr. Smith-Wright.*—I think they take Rs. 100 plus Rs. 10 which comes to Rs. 110. Then they take 5 per cent. of Rs. 100 and then they take 10 per cent. of Rs. 100. They base it all on the original Rs. 100.

*President.*—In answer to question 55 (h), you only mention silica ware.

*Mr. Smith-Wright.*—Lead is another very big import.

*President.*—What I want to know is the total quantities that you would require per year. I understand lead is the most important.

*Mr. Smith-Wright.*—Yes.

*Mr. Sinclair.*—We have got a large stock which was purchased five years ago and we are still working on that. We have not imported any lead for the last five years.

*President.*—Was lead free then?

*Mr. Sinclair.*—No. We had to pay 15 per cent. duty.



*President.*—Still you ought to be able to say this is what you approximately pay.

*Mr. Sinclair.*—We can find out exactly what we have paid on all our stores. We have complete records of these.

*President.*—You must tell us what it comes to per year.

*Mr. Smith-Wright.*—Yes.

*President.*—Do you have to pay duty on carboys?

*Mr. Sharpe.*—Carboys are made in India.

*President.*—On jars you pay 15 per cent?

*Mr. Smith-Wright.*—Yes.

*President.*—Lead is the principal thing.

*Mr. Smith-Wright.*—Yes, but silica ware is imported in fair quantities.

*President.*—For what purpose is it used?

*Mr. Sinclair.*—For sulphuric acid concentration.

*President.*—Now there is no duty on machinery.

*Mr. Sinclair.*—I think that there is a duty of 2½ per cent. or so on machinery.

*Mr. Smith-Wright.*—I think that we have to pay duty on parts.

*President.*—You have to pay duty on parts which cannot be identified. The idea is that machinery has been exempted from taxation subject to certain exceptions, but the principle has been recognised. As regards this arrangement about internal competition: your scheme I understand applies to acids only at present?

*Mr. Smith-Wright.*—Yes, except that we have a working arrangement with regard to copperas as regards price.

*President.*—Do they also manufacture copperas?

*Mr. Smith-Wright.*—We both do. In order to stabilise the price, we have agreed not to sell below a certain price. That is just to keep the market up.

*President.*—What is the advantage in both of you manufacturing copperas?

*Mr. Smith-Wright.*—We have to make it to find additional off-take for the sulphuric acid. At the same time it must be admitted that there is not a very big market for both of us to sell in.

*President.*—Then, it is all the more reason why the available market should not be split up into two.

*Mr. Smith-Wright.*—How is that to be arranged? Do you mean that one should not manufacture it at all? We have not got many other outlets for our sulphuric acid if we do not make copperas. If we do not make copperas, then the price of sulphuric acid will become higher.

*Dr. Matthai.*—On the acids you have a system of allocation between the two firms?

*Mr. Smith-Wright.*—On a fixed quota basis.

*Dr. Matthai.*—What are the present proportions?

*Mr. Smith-Wright.*—We get 60 per cent. and they get 40 per cent. of sulphuric acid.

*Dr. Matthai.*—Of the Bombay city market?

*Mr. Smith-Wright.*—Everywhere.

*President.*—I should have thought that if there was going to be any arrangement at all, sulphuric acid would be manufactured in one place and the other things in the other or all things would be manufactured in one place, the other being shut down entirely. Take the capacity of Dharamsi Morarji's works. It can supply everything. There is no occasion at all for your works to be going. Looking at it from the common sense point of view it does strike me that there is one works too many.

*Mr. Sinclair.*—We, however, were the pioneers.

*President.*—I am not suggesting anything. I simply say this that you are carrying on business in a way which must increase your costs.

*Mr. Smith-Wright.*—Quite true.

*President.*—At present, taking the requirements of Bombay as they are, I can see no room at all for two works manufacturing the same products.

*Mr. Smith-Wright.*—We are trying to come to an understanding. We both realise that there is not a sufficient field. When there was no room for another factory, they should not have started.

*President.*—You must remember that at that time expectations were high all over the world. Apart from any national assistance it does seem to me that you can bring down your costs. You are producing about 1,000 tons of sulphuric acid on an average and they are also producing the same quantity. There is apparently some unnecessary waste of plant, material supervision and everything.

*Mr. Smith-Wright.*—I agree.

*Dr. Matthai.*—As a matter of fact looking at your estimate for the present markets in Bombay and Sind, the total capacity of sulphuric acid will be exactly your capacity?

*Mr. Smith-Wright.*—Yes, that is what we have found out.

*President.*—But if the market expands it is much better to utilise the bigger plant.

*Mr. Sinclair.*—It would be very difficult to capture the whole market.

*President.*—I am not disputing that there may be some room for two plants working at the same time. If you have got two plants and you cannot scrap them, you will start working with the smaller plant and get full output and when you feel that your market has become bigger, you may use the bigger plant. When the market has become still bigger you can have both the plants working. There must be some co-ordination between the two. I am not suggesting that you should combine and raise prices—not a bit. I am suggesting that you should combine and bring down your prices.

*Mr. Smith-Wright.*—Apart from the question of size, our factory is better situated.

*President.*—I am not suggesting anything. What I mean to say is that obviously there are conditions here which really do increase the costs of both.

*Mr. Smith-Wright.*—Yes.

*President.*—It is a very uneconomic proposition to my mind.

*Mr. Smith-Wright.*—That is true.

*President.*—It is really uneconomic that two works should really go on when even one could not work to its full capacity.

*Mr. Sinclair.*—We are trying to find a remedy for that.

*Mr. Smith-Wright.*—It was realised that the pooling arrangement was the best arrangement that could be made at the time, but that it must necessarily be of a temporary nature only.

*President.*—That is all right as far as sales are concerned. It should also extend to manufacture.

*Mr. Smith-Wright.*—The only difficulty is to arrive at a basis which would satisfy the shareholders of both the Eastern Chemical Company and Dharamsi Morarji & Co.

*President.*—In other parts of the world they have combined 4,000 subsidiary companies.

*Mr. Smith-Wright.*—On the face of it, it is very simple but we have not found it quite as simple as that.

*President.*—There is not really much in it. In two hours it should be possible to find a solution satisfactory to both. You have also got an arrangement with the Baroda people?

*Mr. Smith-Wright.*—Yes; it is a very small plant they have.

*President.*—They manufacture about 140 tons of sulphuric acid?

*Mr. Smith-Wright.*—Yes.

*President.*—You see, there is the danger that the grant of a bounty on the production of sulphuric acid might lead to the erection of such small plants. You may find sulphuric acid plants springing up like match factories. I suppose that a sulphuric acid plant would not cost much more than a match plant if it is to produce only 100 tons of sulphuric acid.

*Mr. Sinclair.*—A little more.

*President.*—Not very much more.

*Dr. Matthai.*—You do all the selling of acids on behalf of the two?

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—So that you see that the allocation is observed?

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—Do you also arrange that copperas are sold at the standard price?

*Mr. Smith-Wright.*—There is no quota arranged in respect of copperas. We get whatever business we can.

*Dr. Matthai.*—Only the maximum price is fixed.

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—How far below the import price it is to be, is fixed by mutual arrangement?

*Mr. Smith-Wright.*—The difficulty was this. As we were both manufacturing copperas we were trying to find an outlet by underselling each other and in that way we lost much more than was necessary. By fixing the price together as at present, we stop cutting each other's prices unnecessarily.

*President.*—Is not the plant of Messrs. Dharamsi Morarji & Co. more modern than yours?

*Mr. Sinclair.*—I would not say that. I don't think that there are any more modern principles in their plant.

*President.*—In the case of a motor car, the main principle has not been altered and yet a 15 years old car is very different from that of to-day even though there is no fundamental change in the principle.

*Mr. Sinclair.*—We think that we have got a higher efficiency.

*President.*—That may not be altogether due to the merit of the plant. I do not know but it strikes me that your plant is not so modern as theirs.

*Mr. Sinclair.*—A chemical plant never looks so smart as an engineering plant.

*President.*—That would not affect the cost very much.

*Mr. Sinclair.*—No.

*President.*—The lay out and equipment would.

*Mr. Sinclair.*—I do not know, but I may say this. If I were designing a plant for India now, there would not be many changes except for the circulation of acid where I would substitute pumps for air lifts. There again it is a question of capital.

*President.*—Is your plant working in all departments?

*Mr. Smith-Wright.*—Yes, with the exception of Epsoms.

*Dr. Matthai.*—This arrangement that you have by which you specialise in some products and they specialise in others, that does not really work?

*Mr. Smith-Wright.*—It was the best mutual compromise that we could make at the time of the pooling arrangement. They should concentrate on

fertilisers, alum and one or two other things and we should concentrate on disinfectants and other things.

*Dr. Matthai.*—So far as Epsom and Copperas are concerned?

*Mr. Smith-Wright.*—In Epsoms we realise that we cannot make money. The position regarding copperas we have already explained.

*President.*—Have you ever considered the question of working one plant?

*Mr. Smith-Wright.*—We have.

*President.*—And shutting down the other whichever one deserves to be shut down?

*Mr. Smith-Wright.*—That is what we are trying to see. The ideal arrangement would seem to be that we should make acids, being more favourably situated, and that they should concentrate on making fertilisers and one or two things on which they have made experiments and also zinc chloride. We would arrange to supply them with acids at a low enough cost to make fertilisers—at least as economically as they are doing at present.

*President.*—That means that parts of both the plants should be closed down apart from the question of keeping it going.

*Mr. Smith-Wright.*—It would really come to their acid plant being shut down.

*President.*—The acid plant is the one on which they have spent more money.

*Dr. Matthai.*—Would this arrangement that you mentioned now mean that you would keep your plant working more or less as it is now and that they would shut down a considerable part of their plant?

*Mr. Smith-Wright.*—They would shut down their acid plant. But they would get their acid cheaper from us for making fertilisers and other things.

*Dr. Matthai.*—You would make all acids, copperas and Epsom, if it was possible and also you would make all your disinfectants.

*Mr. Smith-Wright.*—Yes.

*President.*—What would happen if a bounty was recommended and you were left out?

*Mr. Sinclair.*—I don't think that it would take us many months to meet the conditions recommended by the Fiscal Commission. As we pointed out in our representations to you, we were the pioneers in the Chemical Industry. If any bounty was recommended, it would not be fair to leave us out.

*President.*—That is the attitude of the legislature and the Government.

*Mr. Smith-Wright.*—It would be only a case of time before we met those conditions.

*President.*—I think that it is now the accepted principle.

*Mr. Smith-Wright.*—We are perfectly ready to turn ourselves into a rupee company or anything else that may be required.

*President.*—Is there any chance of any further development as regards this co-ordination?

*Mr. Smith-Wright.*—At the moment, I am waiting for a move from the other side.

*President.*—The other side is not very far from you.

*Mr. Smith-Wright.*—But I am finding it difficult to obtain a definite reply. The whole matter was threshed out months ago.

*President.*—It is for you to consider that. This Board has got to look at one thing, whatever it does, that every industry that gets assistance is first of all reasonably equipped and that it does not adopt any method which will unnecessarily increase costs.

*Mr. Sinclair.*—We are trying to put our house in order.

*Mr. Smith-Wright.*—We had hoped to have this matter finalised before this enquiry started.

*Dr. Matthai.*—I don't know if you have seen the estimate sent to us by Messrs. Dharamsi Morarji Chemical Company about the probable increase of the demand in the market within five or ten years. You have not given us a statement on those lines and I would like you to look at it and give your judgment on it. The estimate that you give is of the present market in Bombay and Sind; the imports into Bombay and Sind and the production of the two companies. That gives the market on the western side of India. That is the present market. Supposing we agreed to protect the industry and protection is fixed for a period of five or seven or, say, ten years, we ought to get some idea of the probable increase in the market within the next few years.

*Mr. Smith-Wright.*—We do not expect a very great increase over the figures we have given. To judge by the manner in which the chemical demand has increased in the past there is not likely to be a large increase.

*Dr. Matthai.*—I suppose the only line in which you expect a big increase is in regard to fertilisers?

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—That of course is an uncertain proposition?

*Mr. Smith-Wright.*—Yes.

*President.*—You have not given the prices of the bones that you buy?

*Mr. Gupta.*—Rs. 68 to 70 per ton delivered at the works.

*President.*—I find that in Liverpool Indian bone meal is sold at £8 to £9 per ton. That is crushed, I take it?

*Mr. Gupta.*—Yes. The freight would be about 20 to 25 shillings.

*President.*—For crushing and other things?

*Mr. Gupta.*—The crushing charges are not heavy.

*President.*—Are bone superphosphates imported?

*Mr. Gupta.*—No. Some rock phosphates have been imported. They use bone for other purposes also in other countries.

*President.*—The whole point is this, that your principal raw material is at present available in the country but will it be able to compete against chemical superphosphates?

*Mr. Gupta.*—Provided sufficient facilities are given for the transport of bones and sulphuric acid is made cheaper, there will be no difficulty.

*President.*—That requires careful working out. It has got to sell in competition against chemical fertilisers.

*Mr. Gupta.*—Rock superphosphates.

*President.*—So that until we know really what the cost will be, it is not easy to judge what the expansion of the industry might be, in terms of sulphuric acid of course. Until we really get some idea of the price at which you can sell in competition this bone superphosphate against imported superphosphate, it is very difficult for us even to hazard an estimate of what the future market might be.

*Mr. Gupta.*—Even if the situation arises that rock superphosphates are used in India, it is not difficult for us to get it. The main source is South Africa and the South Seas. Everybody gets it from there and it won't be difficult for us to get it from the same source and at the same rate.

*President.*—Your freights are not favourable.

*Mr. Gupta.*—I can give you actual quotations. They want to exploit the importation of rock superphosphates to India and the price quoted for India is cheaper than for other countries.

*Dr. Matthai.*—As a matter of fact what might happen is that people who import ammonium sulphate into this country might be prepared to take local superphosphates provided the local superphosphate can be had at a price which would compare favourably with the imported article.

*Mr. Gupta.*—The sulphate of ammonia people are buying our superphosphate.

*Dr. Matthai.*—I believe they would do that if prices were favourable.

*Mr. Gupta.*—3 per cent. nitrogen in the soluble portion of the superphosphate is a great advantage. Bone superphosphate is soluble in water whereas rock superphosphate takes a long time to dissolve in the soil.

*President.*—Do this federation of sulphate of ammonia when they sell here, also supply bone superphosphate?

*Mr. Gupta.*—No. They don't deal in bone superphosphates.

*Dr. Matthai.*—Messrs. Brunner Mond & Co. deal in superphosphates?

*Mr. Gupta.*—Yes, but not bone superphosphate.

*Dr. Matthai.*—Is there any kind of superphosphate imported by Messrs. Brunner Mond?

*Mr. Gupta.*—They don't import. The users of ammonium sulphate sometimes do.

*Dr. Matthai.*—I thought there was some rock phosphate imported into India by a combine?

*Mr. Gupta.*—I don't think so.

*Dr. Matthai.*—Where does this come from?

*Mr. Gupta.*—From Belgium and the Continent where it is made cheaper than in England.

*Dr. Matthai.*—I find that the Royal Dutch Shell Company is going to start a fertilising works in Holland in competition against Belgium.

*Mr. Gupta.*—Their rock can be brought direct from the African mines and Holland is very well situated for that sort of work.

*President.*—In answer to question 59 (b) you say "As a rough approximation we would place the figure in each case at half the figure given in our reply to question No. 5". Your unit is already not too big and you want to halve it?

#### *Economic unit.*

*Mr. Sharpe.*—You asked for an economic unit.

*President.*—By economic unit we mean a unit which will keep down costs.

*Mr. Sharpe.*—3,000 tons is a more or less economic unit of working.

*Dr. Matthai.*—I take it what you mean is this. Supposing you were increasing your output, when you increase it to 3,000 tons your overhead comes down?

*Mr. Sharpe.*—Considerably.

*Dr. Matthai.*—But at the same time subjecting your plant to more wear and tear?

*Mr. Sharpe.*—Not very much more in actual practice.

*Dr. Matthai.*—When you increase from 1,000 to 1,500 you save in overhead and there is no increased expenditure on depreciation. When you pass on to 2,500 tons, you save in overhead, but from that point depreciation will be considerably more and therefore the saving in overhead will be offset by the increase in depreciation.

*Mr. Sinclair.*—Not until you pass the 4,000-ton limit.

*Dr. Matthai.*—If that is so, then 4,000 tons is your economic unit.

*Mr. Sinclair.*—2,500 to 4,000 tons we would call the economic limit.

*President.*—At what stage would it pay you to have an additional unit rather than increase the capacity of the unit that you may be working for the time being? Take the match industry. Let us put it this way, that a capacity of 10,000 gross per day is about the limit of the unit. Then they would rather have two factories than go on increasing the capacity of that unit. The superior establishment cannot cope with a unit that is unwieldy.

That is the idea I have in my mind. You may have a factory producing 5,000 gross a day but it is not as economic as the other because head office charges, local supervision, sales organization charges and so on would be just the same for 5,000 or 10,000 gross per day. Beyond 10,000 you would require a separate organization.

*Mr. Smith-Wright.*—Mr. Sharpe gave the smallest economic unit.

*President.*—By smallest economic unit we mean a unit which if worked to full capacity would give the best result.

*Mr. Sinclair.*—If we were fortunate enough to get up to 4,000 tons a year, it would be easy enough to get that from our present plant by the addition of an extra Qua-Lussac tower.

*President.*—You must get the maximum service from all parts of the plant.

*Mr. Sharpe.*—If we make 1,000 tons a year no part of it is shut down; if we make 4,000 tons the same plant will be used, the only question will be more gas pressure. It will be four times as much, but we don't shut down any part of it.

*President.*—Therefore I say if you manufacture 4,000 tons from the same plant, it would be cheaper than when you manufacture 1,000 tons, but if you exceeded 4,000 tons then the question arises whether it would be cheaper to produce more than 4,000 tons from the same plant or to have another plant.

*Mr. Sharpe.*—Possibly we will have to have another tower, but we have not had any experience of that.

*Dr. Matthai.*—You would have another plant if you exceeded 4,000 tons?

*Mr. Sharpe.*—In the modern apparatus that has been coming into use within the last two or three years, the only way in which the chamber system has been modified is the question of speeding up production. The chamber plant that exists to-day is exactly the same. Probably the only thing that has been altered is the speeding up of the formation of the acid. That could always be done at very little expense.

*President.*—We are just trying to explain to you what we mean by economic unit.

*Mr. Smith-Wright.*—I would say between 2,400 and 4,000 tons.

*President.*—The whole trouble arises in this way. You are making different products. The difficulty is that a plant is very seldom well-balanced. You may require 1,500 tons of sulphuric acid, and your plant is capable of producing 4,000 tons. You may require a plant to manufacture 2,000 tons of Epsom salt and you can make only 1,000 tons. It is that which makes a plant uneconomic—it is the want of balance between the different products.

*Mr. Sinclair.*—It is very difficult to estimate. You design a plant for Epsoms, to cope with the demand of the whole market, and then you find you have not captured the market for your product to the extent of your plant.

*President.*—I think the simplest thing for us to see is as regards sulphuric acid—what is the economic unit?

*Mr. Smith-Wright.*—That is the keynote to the others.

*President.*—We shall take your capital account. In answer to question 68, you say: "The amount set aside for depreciation hitherto exceeds the amount which should be necessary, according to the valuation, by Rs. 45,031-9-6". What is the meaning of that? First of all please tell me whether Messrs. Gilbert Lodge & Co. are chemical engineers?

*Mr. Smith-Wright.*—They are a recognised firm of land valuers, estate agents, etc

*President.*—You require a very different kind of expert to revalue your plant. What I wanted was, what would be the replacement value of a plant like that to-day if you were to build one.

*Mr. Smith-Wright.*—That is what they have given.

*President.*—They are ordinary surveyors.

*Mr. Smith-Wright.*—They have only given the replacement costs. They have measured everything.

*President.*—How can they measure? How can they say whether a plant is modern or not?

*Mr. Smith-Wright.*—As far as the plant itself is concerned, they have got estimates for what that plant now costs at home. In the case of machinery they can also get quotations.

*Dr. Matthai.*—Do you mean to say that this Rs. 12 lakhs is given as the replacement cost of buildings and plant?

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—Do you think you can now erect a modern chemical plant to-day with your capacity, producing the same kind of articles, and housed in the same way, at Rs. 12 lakhs?

*Mr. Smith-Wright.*—Yes, exactly the same plant.

*Dr. Matthai.*—Not the same plant, but a modern up to date plant, having the same capacity as yours?

*Mr. Smith-Wright.*—It doesn't allow for different kinds of plant.

*President.*—Supposing the plant itself is out of date, what is the good of getting another out of date plant and say that it would cost you about the same?

*Mr. Sinclair.*—We don't admit that our plant is out of date.

*President.*—What we want to know is really the cost of a plant producing the same quantity as yours.

*Mr. Sinclair.*—A valuer can only tell you what that plant as it is would cost to replace. That is the only basis on which you can work.

*President.*—Your plant may be 100 years old.

*Dr. Matthai.*—The point which is not concluded by this estimate is, is there a modern plant of smaller value that you could get which would do the same work?

*Mr. Sharpe.*—No, I don't think so.

*Mr. Sinclair.*—The valuers measured up every square foot of land and material in the works, allowing so much for materials and so much for labour. As regards the Chamber acid plant which is the biggest item, valuers can get within 2½ per cent. whether they know anything at all about a chemical plant or not. As regards buildings they took into account all the bricks, the depth of the foundations and everything else.

*President.*—Why should you have the same sort of building?

*Mr. Sharpe.*—We must have the same building in the tropics.

*President.*—The value of the building will depend very much upon the lay out of the plant. But what often happens is that a manufacturer gets a building erected for some other purpose and then tries to fit his plant into it.

*Mr. Smith-Wright.*—In our own case we have got the cheapest building suitable for the purpose.

*President.*—I am talking of the estimate by a Surveyor.

*Mr. Smith-Wright.*—That doesn't fall within his range. It is a matter for shareholders.

*President.*—Supposing your plant was in this building and you brought a Surveyor to value this building. He will say that it is a very fine building and it is worth the money that was spent on it. The whole point is whether this plant should be put in the same building.

*Mr. Smith-Wright.*—That is outside his range.

*President.*—An estimate of this kind is not what we want.



*Mr. Sinclair.*—We would have to redesign the whole plant and get an estimate for a different plant, although we don't think we would alter it very much.

*Dr. Matthai.*—Supposing you were going to start another works having the same capacity and making the same products, would you spend Rs. 12 lakhs in order to get the works set up?

*Mr. Smith-Wright.*—We would not spend any less. In our case it might have cost more to sink foundations, but on the other hand, I think if we could have gone nearer Bombay, we would have had to pay more for the land.

*President.*—The trouble is that recently there has been no plant erected in the country.

*Mr. Sharpe.*—That is so.

*President.*—I suppose Messrs. Dharamsi Morarji's is the most recent, but I do not know whether they specially built that building. It seemed to me that it is a very good building. I do not know whether it was required. As I say we very recently saw a plant housed in a building which was never intended at all for it. My point is if a man wanted to start a new works in this country, what would the building and the equipment cost?

*Mr. Sinclair.*—I should say it would cost him the figure we have given here.

*President.*—You say that it is the present valuation. Have you any reason to think that if you were rebuilding a factory, it would cost you so much.

*Mr. Sinclair.*—Yes.

*President.*—You have not stated that.

*Mr. Smith-Wright.*—We thought our answer would give you that impression.

*President.*—I have just given you my reasons.

*Mr. Smith-Wright.*—We should perhaps have gone on to state that although these figures apply to our plant, in our opinion a plant having the same capacity could not be erected for less.

*President.*—You would have to make enquiries whether somebody has built a recent plant, but I think it might be possible for you to get us an estimate of the cost of a new sulphuric acid plant and we don't wish to trouble you about the buildings.

*Mr. Smith-Wright.*—We could get the cost of erecting a modern chamber acid plant, or say, an Epsom Salt plant, having the same capacity as ours, from home, but it would take time.

*Dr. Matthai.*—How long would it take you to give the information?

*Mr. Sinclair.*—If the manufacturers find that we are not serious in making the enquiry, they may not give us a genuine quotation.

*Dr. Matthai.*—Could you give us an estimate on those lines some time about January?

*Mr. Smith-Wright.*—We will try and get it, but it will have to be realised that the people at home will not be able to tell you the cost of erection in India. As regards buildings, we will have to take the figures given by Messrs. Gilbert-Lodge & Co.

*President.*—You are at liberty to accept anybody's valuation. We don't pledge ourselves to accept it unless we are satisfied that it is what it should be.

*Mr. Smith-Wright.*—I am just pointing out that if we got this estimate, we would have to take certain of these figures as being correct. They have gone into the question of the site and foundations, what it would cost to put in those foundations, etc. These were all detailed figures.

*President.*—We are not concerned really with the valuation of your present building. What I want is an estimate of what a man whose factory is suitably located as regards raw materials and so on would expect to spend. For special reasons you may spend 5 times the amount of money which would be justified.

*Mr. Sinclair.*—It is a big job.

*Dr. Matthai.*—Would it be so difficult to give us an estimate of the machinery and plant, leaving alone the building and erection charges?

*Mr. Smith-Wright.*—We will try and get the cost of the plant and machinery.

*Dr. Matthai.*—We want an estimate of a modern chemical plant having your capacity and producing the same kind of products as you do.

*Mr. Smith-Wright.*—Yes. You were asking us how we have arrived at this surplus of Rs. 45,000. I have taken the total of (c), (d) and (e) and subtracted from that the reserve which I have given as Rs. 3,83,359-15-8. That comes to Rs. 11 lakhs odd as against this figure of Rs. 12 lakhs. There is a difference of Rs. 45,000 between the two. It means that we have on our liability side a depreciation reserve sufficient to write off the requisite amount.

*President.*—You have not answered question 78 at all as regards the figure costs. That is the more important statement. It is a hypothetical question, but without an answer to that, no proposals can be made.

*Mr. Sinclair.*—Our answer would also be hypothetical.

*Mr. Smith-Wright.*—In answering the previous question perhaps we should have added that the works costs were increased owing to the works being shut down for periods totalling at least three months. There would be a saving of about 20 per cent. if a full output had been obtained.

*President.*—That would not lead to 20 per cent. saving. That is not an answer. What would be the reduction in costs if you were working to full capacity? We say to-day this particular article is being imported into the country at Rs. 105, but at present it is being manufactured at Rs. 145. Then if you were not able to show that at some future date you would be able to manufacture it at Rs. 105, then we say that this industry would never be able to do without protection and therefore we cannot make any recommendation. You have got to show that you are in need of temporary assistance which arises owing to lack of experience or some other cause. If protection is given to you say for 5, 10 or 15 years or for any reasonable period, you must say that your costs would come down and that you would be able to sell in competition with the rest of the world. Unless we have that figure, we should say that this industry will never be able to do without protection and there is an end of it. If is for that purpose that we really want those figures. If your cost for chamber acid remains at Rs. 94 and the chamber acid is imported into the country at Rs. 80, then there is no case at all for protection.

*Dr. Matthai.*—If the cause of these low prices are going to be permanent, and if your costs are also permanent, there is an end of it.

*President.*—We have got to look at the present costs and then at the future costs. Then we say in course of time their costs will come down in such and such a way. That will bring down the fair selling price more or less to the level of the import price, and we say "All right, we give them time". So that you have got to take the same table (the same form) and make your estimate which has got to be justified. You have got to give reasons why you think so. If you simply say 5, 10 or 30 per cent., but you cannot tell us why you think that it will come down by that figure, we will find it very difficult to support it.

*Dr. Matthai.*—Supposing you make an estimate of the possible market that you can get during the next few years—say 5 or 10 years—then you can say that if you increase your production to that extent, your costs would be so much.

*Mr. Smith-Wright.*—We have made the estimate of the market.

*Dr. Matthai.*—All the figures that you give are on your present output.

*Mr. Sharpe.*—We have given you what market we hope to get. We have also worked out our costs on that basis and shown the reductions possible in our costs.

*Mr. Smith-Wright.*—We do not anticipate that there will be a bigger off-take than that.

*President.*—There are really speaking three estimates. The first is the actual cost.

*Mr. Sinclair.*—That we have given.

*President.*—Then, the next thing is the maximum output cost, and then there is the intermediate stage. You say that you cannot attain maximum production but that the utmost that you can do is 4,000 tons or so.

*Dr. Matthai.*—In your case the estimate that you have given of the market on this side of India happens to be your full capacity.

*Mr. Sharpe.*—That is purely a coincidence.

*Dr. Matthai.*—That is to say if the other plant is not working.

*Mr. Smith-Wright.*—We cannot go on any other hypothesis. That is the only way in which we can work it out.

*President.*—That would be precisely one of the arguments I was using earlier in the day. If instead of one plant there are two, you have got to pay for it.

*Mr. Smith-Wright.*—We work on the assumption that we can go up to our capacity.

*President.*—Supposing we take your full capacity, we have to estimate how many years you would take to work up to full capacity. Then, we have to find some average figure for the period.

*Dr. Matthai.*—If you suggest a particular period during which under favourable conditions you would obtain the full market, then the question of average becomes an arithmetical calculation.

*Mr. Sinclair.*—What you want is: supposing some form of protection is given, how long is it going to take us to get the whole market.

*President.*—Further the figures that you have given should be made comparable with those given by Messrs. Dharamsi Morarji & Co. Have you seen their figures?

*Mr. Smith-Wright.*—No.

*President.*—There is an enormous difference between the two. But their figures are comparable with those of the Tata Iron and Steel Company. As I said to you earlier we do not consider that the Tata Iron and Steel Company's costs are the lowest that can be attained. Supposing we accepted Dharamsi's figure as correct, there is a difference of about Rs. 36 a ton in the Chamber acid. The best thing would be for both of you to put your heads together and give us comparable figures. I can tell you that supposing we want to make any recommendation, we do not necessarily take the costs of the most efficient works but we must take what we consider to be the costs of a plant of reasonable efficiency. It would save us a lot of time if you sat together and reconciled the figures as regards direct charges and then made the allocations in the way we suggested the other day.

*Mr. Smith-Wright.*—I should like to explain our difficulty in this connection. Prior to March 1928, our costing system was not such as would enable us to separate works costs from overhead in the way in which you want them.

*President.*—Then give us your present figures and the future estimates on those lines. What we want to do is to compare the costs of the two works. Both statements will have to be made on the same basis.

*Mr. Smith-Wright.*—Ours will be since March 1928 to October.

*Dr. Matthai.*—As regards your answer to question 81, supposing we ultimately decided to give the whole protection in the shape of a bounty of so much per ton of sulphuric acid you made, would it make any difference on what basis we allocate? Supposing our conclusion was this, that acids as such did not require protection and that protection was required by the secondary products, and the difference between the price of the salts and the cost of manufacture would be the measure of the bounty and the bounty would be distributed on the basis of the sulphuric acid tonnage, does it make any difference on what basis we allocate because in the end we come to the same thing?

*Mr. Sharpe.*—The quantity would vary with each product.

*President.*—First of all you have got to determine the measure of protection.

*Mr. Smith-Wright.*—I ought perhaps to explain that under this system of allocation given in answer to question 81 we are trying the experiment of allocating no overheads to chamber acid. We take merely the raw cost of materials, power and fuel, not even our works salaries, not even supervision and so on. That means that other products get the benefit of very cheap acid.

*President.*—In the end it will come to the same thing. When you take the total works cost it will be the same in the final allocation.

*Mr. Smith-Wright.*—We have been endeavouring to work out to what extent a bounty would be necessary to make, under our present costs, all other products saleable.

*President.*—After getting the costs on this footing we may have to recast them in this way. We may take chamber acid with all its charges into each of the products. That would be the way for getting the fair selling price for that product. Otherwise some product may use less sulphuric acid than another and so on and in that case we might get some absurd result.

*Dr. Matthai.*—The other Company will do the same to help the discussion.

*Mr. Gupta.*—Yes, we will.

*President.*—Are those figures given in Statement 2A very recent?

*Mr. Sharpe.*—They are taken from the same cost sheets in the original statements where we left out four items.

*President.*—Do you mean to say that they require revision?

*Mr. Sinclair.*—Yes. We are going to make these figures comparable with those of Dharmasi Morarji's.

*President.*—As regards Statement D taking round figures, really 3rds of your output is practically sold in Bombay.

*Mr. Smith-Wright.*—Yes, although a large proportion of that is sent up-country. The Syndicate sell a lot up-country.

*Mr. Sinclair.*—The up-country sales on the statement are direct up-country despatches sent from the factory.

*Dr. Matthai.*—I take it the Syndicate through whom you are selling sell in the Bombay city?

*Mr. Smith-Wright.*—I should think at least 50 per cent. of their sales are made to various places up-country.

*Mr. Sinclair.*—A lot goes to Poona.

*Dr. Matthai.*—For what?

*Mr. Sinclair.*—Mineral water manufacture from soda bicarbonate and sulphuric acid.

#### *Railway freights.*

*President.*—It is difficult to estimate what benefit you would get supposing we made recommendations to reduce the freight.

*Mr. Sinclair.*—We can try and find out from the Syndicate how much of their stuff goes up-country.

*Mr. Smith-Wright.*—We have made proposals regarding the reduction in freight on finished goods generally.

*President.*—That we will deal with separately.

*Dr. Matthai.*—On this particular point that you are raising, supposing there was a reduction in the package rate, then the amount of benefit that you would get as compared with the importer in the aggregate, would depend on the proportion of distribution between up-country and Bombay.

*Mr. Smith-Wright.*—We will not be paying the acid rate on the containers. If you reduce the freight on copperas and epsom, the importer also has the same benefit.

*Dr. Matthai.*—This proportion between Bombay and up-country may vary entirely when your output increases.

*Mr. Sinclair.*—That is so, especially if you take Sind into account. Of course it would affect the whole question again. I have detailed figures for the Sind area.

*Dr. Matthai.*—For the Sind area you have the import figures.

*Mr. Sinclair.*—Yes. You can have a look at these figures. (Handed in.)

*Dr. Matthai.*—Supposing it was necessary for us to assume a certain proportion of sales between Bombay and up-country, that proportion may not hold good at all where the output instead of 1,000 tons of sulphuric acid may be 4,000 tons. Over 50 per cent. may go up-country.

*Mr. Sinclair.*—Yes. I should say that the up-country acid sales would go up very considerably. This is a market we are not touching at all. Sales there will all have to be added.

*Mr. Smith-Wright.*—Epsom salt may go up in Bombay and also Glauber's salt.

*President.*—Really speaking there is no means of judging how much you would benefit by the reduction in freight, because so much would depend on distance and so much would depend on quantities.

*Mr. Sinclair.*—I think we are satisfied as regards freight, except on the question of package rates and the acid rates. If we had some adjustment made there, at least we would be on a competitive basis.

*President.*—I am referring merely to the sales just now.

*Dr. Matthai.*—If we could arrange for a concessional rate of railway freight for Indian chemicals as different from imported chemicals, then of course the ordinary question of freight would become one of considerable importance.

*Mr. Smith-Wright.*—I think it would be almost impossible in actual administration to work this, because the local dealers are the people here who send these things up-country. We ourselves don't send very much. We only send a certain amount direct. A good deal of the stuff sold in Bombay also goes up-country. Take the case of epsom salt. How are the Railway authorities going to differentiate?

*President.*—You will have to change your system if you want to get the benefit. If they have got to go *ex-works*, how can the railways do anything?

*Mr. Sinclair.*—We do know of actual cases where nitric acid is sent as sulphuric acid at a cheaper rate. A corruption like this is very difficult to detect. I am afraid that would come in. We have to consider things as they are.

*Mr. Smith-Wright.*—With regard to freight we have to consider whether it would be feasible to apply some sort of concession to Indian made goods only. It could only apply to despatches from our factory. The man who sends the goods up-country from Bombay could not get the benefit of the concessional rate. In that case he will not be able to compete with the imported article.

*President.*—He can take the goods *ex-works*.

*Mr. Smith-Wright.*—They don't always like to disclose the names of their customers. They like to have the business themselves.

*President.*—Then they won't get the benefit. If he wants a certain benefit, he has to incur certain obligations. If he doesn't want the benefit, he will have to sell direct. We cannot provide against cases of dishonesty.

*Mr. Sinclair.*—That is true.

*President.*—That is all the railway administration can do.

*Mr. Smith-Wright.*—It would be difficult for us to derive the full benefit even if it was given.

*President.*—This estimate that you have given in E is actually based on the total figures *plus* the imports.

*Mr. Sinclair.*—Yes.

*Dr. Matthai.*—Taking the imports into Bombay and Sind?

*Mr. Sinclair.*—Yes, for the years stated below in the footnote.

*President.*—That is concentrated, I take it.

*Mr. Sinclair.*—It is all on 95 per cent. basis.

*Dr. Matthai.*—For your present purpose it will be unnecessary to take sulphate of ammonia into account. That will never be needed on the Bombay side. You have got to confine yourselves to superphosphates.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—I am thinking that if you don't have separate figures for superphosphates, we must ask the Collectors of Customs whether they could give us figures.

*President.*—You manufacture about 200 tons.

*Mr. Gupta.*—Yes. Messrs. Parry & Co. will be able to give you more information.

*President.*—They are only interested in Southern India.

*Mr. Gupta.*—Yes.

*President.*—Messrs. Parry & Co. are not applicants. Even if they give us, we cannot use them. What is the average price you realise?

*Mr. Gupta.*—Rs. 110 to Rs. 115.

*President.*—What is the price for sulphate of ammonia?

*Mr. Gupta.*—Rs. 160.

*President.*—There are 10 classes of freights.

*Mr. Smith-Wright.*—Yes.

*President.*—They have got these 10 classes as well as the telescopic rates?

*Mr. Sinclair.*—Yes.

*Dr. Matthai.*—When you get concession rate on wagon load both in the case of sulphuric acid and other acids, the minimum rate is the fourth class rate, although the ordinary rate for sulphuric acid is 6th and the other two acids are 9th. When it comes to concession rate, it is all the same.

*Mr. Sinclair.*—Yes. It has a decided advantage. It took us a long time to get permission to load two tiers in a wagon. This is a tremendous saving to up-country customers. The Railway Company only allowed one tier formerly and it took us about a year to get permission to load two tiers.

*Dr. Matthai.*—How do you do it?

*Mr. Sinclair.*—The bottom tier in flat-topped cases and the second tier in dog-kennel cases.

*Dr. Matthai.*—Can you convey in the same wagon load, sulphuric and hydrochloric acid?

*Mr. Sinclair.*—We have done so.

*Dr. Matthai.*—On that you will get the minimum rate.

*Mr. Sinclair.*—Yes.

*President.*—As regards Table F, are these rates per maund?

*Mr. Sinclair.*—Yes, per maund of 82.29 lbs., that is, if you send anything less than a wagon load.

*President.*—I suppose that both Bombay, Baroda and Central India and Great Indian Peninsula ton miles would work out to be the same.

*Mr. Sinclair.*—Somewhere about the same except that there is some difference in the minimum rate. The Great Indian Peninsula Railway's minimum is 150 maunds whereas the other people's is 200 maunds.

*Dr. Matthai.*—200 maunds on their metre gauge?

*Mr. Sinclair.*—Yes.

*President.*—I am talking of the smaller packages.

*Mr. Sinclair.*—They are practically the same on the mileage basis. The difference comes only when empties are returned. The Bombay, Baroda and Central India Railway charge rates according to class I whereas the other people charge 4th class rates. It is a hardship to our customers returning empty jars, and we can never understand why there is this difference. Both the systems work according to the same standard, regulations which are supposed to be the same. Yet the Bombay, Baroda and Central India will allow empties to come under class 1 whereas the Great Indian Peninsula insist on empties coming under class 4. There is a big difference in freight. We cannot make much fuss about it because the Bombay, Baroda and Central India may put up the freight. It puts us in a cleft stick really.

*President.*—The rates being telescopic, what is the average distance we should take?

*Mr. Sinclair.*—I should say Ahmedabad or Nagpur. Nagpur we regard as our economic distance. That is about the limit of our competitive market. If we get beyond that, Cawnpore would come in. From the other side, Madras also would come in.

*President.*—The telescopic rates become effective only after about 300 miles.

*Mr. Sinclair.*—The concession rates are effective for any distance provided it is a wagon load.

*President.*—That is not so. Take the two places you have mentioned. Ahmedabad is about 310 miles whereas Nagpur is about 700 miles.

*Mr. Sinclair.*—We have not got much experience of the telescopic rates.

*President.*—Has each railway got its own schedule?

*Mr. Smith-Wright.*—The Railway Board have standardised these particular rates for particular classes of goods.

*President.*—In what book do they give all these rates?

*Mr. Smith-Wright.*—It is a Railway Board publication.

*President.*—I want to know how they classify these goods.

*Mr. Smith-Wright.*—That is done by the Railway Board.

*President.*—These classifications are really based on several considerations, viz., the class of consumers, value of goods, handling, quantity, etc.

*Mr. Smith-Wright.*—It is really difficult to say on what principles they are based. For instance they have put Green Copperas under class 1 and Epsom Salt under class 4. There seems to be no system, except that you find that dangerous goods are in the highest class.

*Dr. Matthai.*—Ordinarily the goods are classified in the same way by all the railways.

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—The goods coming under different classes and the rates applicable to those classes are all standardised?

*Mr. Smith-Wright.*—Yes.

*President.*—Of course, in some of the Dominions, they have a different classification. It depends on the importance of the article.

*Mr. Gupta.*—Yes.

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*President.*—There it is one of the functions of the railways to encourage industries and their consideration is altogether different. Sometimes you find that the freight on luxuries—clothing for instance—in South Africa is the heaviest, whereas the freight on lime and some others like that, for which you can find no explanation, is very low.

*Mr. Smith-Wright.*—We cannot explain why the Railways here have put Epsom Salt under class 4 and Green Copperas under class 1.

*President.*—They frankly say that they do not follow any system. Their idea is to put on each commodity as much tariff as it can bear.

*Mr. Smith-Wright.*—That is much more likely.

*Mr. Sinclair.*—I would say that they put as much tariff as they can get.

*President.*—They say that they charge as much as each commodity can bear. They must of course take into consideration the distance in any case. As regards these percentages of weights, nett and gross, supposing they charge you on the net weight? The whole point is this. The railways do not charge you by measurement, do they?

*Mr. Sinclair.*—No, they charge by weight.

*President.*—If you send a wagon load?

*Mr. Sinclair.*—That is also charged by weight.

*President.*—What is the capacity of a wagon?

*Mr. Sinclair.*—If we get a double tier wagon it will be over 300 maunds and if we get a single tier wagon, it will be about 150 maunds.

*President.*—What I am suggesting to you is this. Supposing the full capacity is 300 maunds and that you have got 300 maunds of sulphuric acid, that means they have to give you two wagons. That would be the result. Instead of one wagon, they have to give you 2 wagons, whereas they will charge you for only one wagon full load.

*Mr. Sinclair.*—They always charge per wagon.

*Mr. Smith-Wright.*—They will charge us in that case for two wagons.

*Mr. Sharpe.*—At present we have to pay at the acid rate on the full wagon.

*President.*—What do you mean by the package rate?

*Mr. Smith-Wright.*—We say that the container should be charged at the lowest class rate and not at the acid rate. They take the whole thing and weigh it, and they charge us for the whole lot at the acid rate. If we were sending 100 tons of nitric acid, we would be paying freight on 192 tons or so at the acid rate.

*Dr. Matthai.*—If that concession is granted, taking for instance sulphuric acid, while the importer will benefit to the extent of 12 per cent. of the total you would benefit to the extent of 28 to 30 per cent.?

*Mr. Sinclair.*—That is so.

*President.*—Supposing they charged you the ordinary rate under what class would it come?

*Mr. Smith-Wright.*—It should be the lowest class, we should say in Class I, as in the case of the Bombay, Baroda and Central India Railway. What we want is that the freight charged should be at the package rate in the lowest possible class and that we should pay the acid rate on the net weight of acid railed. At present the rate of freight applicable to acids is charged on the full weight of the consignment including the containers.

*President.*—Have you represented this to the Company?

*Mr. Sinclair.*—Many times.

*Mr. Smith-Wright.*—As a matter of fact as soon as we put up this application, the Great Indian Peninsula Railway sent a representative round to enquire what were our complaints and we explained the position about the containers, and said that we were only asking for fair treatment. He said the Company would look into the matter.



*President.*—We have asked them to give evidence and we hope to find out what the exact position is.

*Dr. Matthai.*—How is nitric acid imported?

*Mr. Smith-Wright.*—In aluminium drums with steel crates.

*Dr. Matthai.*—What capacity?

*Mr. Smith-Wright.*—60 gallons.

*Dr. Matthai.*—Would that weigh more than a steel drum?

*Mr. Sharpe.*—I should say it would be less.

*Dr. Matthai.*—If it is less you would benefit more?

*Mr. Smith-Wright.*—Yes.

*President.*—The question does not really arise in connection with foreign competition because not much is sent from the ports to the interior.

*Mr. Smith-Wright.*—That is so.

*President.*—It is not going to affect the question very much as regards foreign competition. It is a very small quantity at present. The whole point is whether the cost of sulphuric acid to the consumers should be reduced or not, apart from the question of competition.

*Mr. Sinclair.*—Of course this advantage would be passed on directly to the consumer because he pays the freight.

*President.*—I suppose they may have something to say about it, but one does not see any reason why the containers should be charged at the same rate as explosives, or dangerous goods.

*Mr. Sinclair.*—We always regard that as unjust. We don't care so much about the acid classification as about the question of containers. We should be content to have the same rate on acids if they give way on the question of containers.

*President.*—It would mean on an average a difference of 50 per cent.

*Mr. Smith-Wright.*—Yes, but it is more than 50 per cent. because most of the acid is sent in jars and not in carboys.

*Mr. Sinclair.*—Our contention is that we are not asking for anything at all except bare justice.

*President.*—But you don't know what is the lowest rate?

*Mr. Sinclair.*—We would naturally put it under Class I which the Bombay, Baroda and Central India Railway allow for the empty containers. The Great Indian Peninsula Railway put it under Class IV, and at owner's risk under Class VI.

*President.*—There is a lot of difference between Class IV and Class IX. Class IX is just about double and that is the rate they charge you just now?

*Mr. Smith-Wright.*—On the outward journey, yes.

*Dr. Matthai.*—Do you get these wagon rates on salt?

*Mr. Smith-Wright.*—We have never had occasion to send wagon loads of salt!

*President.*—You say that it would not be feasible to have two rates, one for the Indian manufacturer and the other for the foreigner?

*Mr. Smith-Wright.*—I don't say that necessarily it would not be feasible; what I say is that it would be rather difficult to administer and owing to that we might really lose some of the benefit of it.

*President.*—There are administrative difficulties in anything!

*Mr. Smith-Wright.*—It would not be so difficult in the case of acids because it would not be a case of packing in bags and it could at once be seen whether it was acid made here or imported, unless it was taken into jars out of drums in Bombay and redistributed.

*President.*—Does that often happen?

*Mr. Smith-Wright.*—It has happened occasionally. Dealers distribute them. In things like Epsom salt or Glauber's we simply pack in bags and

I don't see how any railway taking the goods are to know whether the goods are made in the country or imported unless you insist upon its being railed from the factory. If we do that many of our bazar dealers may not care to effect sales for despatch from the works.

*President.*—What would happen is they would get higher freight rates.

*Mr. Smith-Wright.*—Then they won't be able to compete with the imported article.

*President.*—Then somebody else will. You will make arrangements to take full benefit of this concession.

*Mr. Sinclair.*—What is to prevent the Eastern Chemical Company from importing these salts to their works and thus getting the benefit of these rates?

*President.*—That would be going too far.

*Mr. Sinclair.*—With our Company it is all right but this might happen.

*President.*—Things do happen as regards the customs where very few people have any conscience! But taking a reasonable view of it the Customs authorities wouldn't say that you are going to import sulphuric acid and then claim a refund. There is not very much margin left.

*Mr. Sinclair.*—There again in doing that, how are you going to differentiate between the products that we are now making and those we may be able to make at a later date? Take something we are not making now: you don't give any concession rate on that, but later if we erect a plant or someone else starts making it, what will happen then?

*President.*—We don't provide for evils which may arise hereafter. In that way nothing can be done at all. We take steps when occasion arises and we don't take steps before they are due. The whole thing, under given conditions as they exist to-day, is, something be done or not? If your view is that it can't be done, I have nothing to say.

*Mr. Sinclair.*—We would rather pin our faith on something more tangible.

*President.*—Experience teaches us to take however little we get and then ask for more.

#### *Epsom Salts.*

*President.*—As regards railway freight, could you really suggest Rs. 7 per ton on magnesite?

*Mr. Smith-Wright.*—I don't think so. In fact I mentioned this to the railways.

*Mr. Sinclair.*—In any case the tonnage is not so very great during the course of the year. Even if we got full production and made all the Epsom that is used we should not require more than a few hundred tons of magnesite.

*President.*—In that case if there is a special freight it might benefit the people on the Madras side where they make sulphuric acid. The distance is about 70 miles.

*Mr. Sinclair.*—The freight on Epsom is about Rs. 3-9-3 from Madras to Bombay and the selling price is Rs. 2-12-0. You have got to pay Rs. 3-9-3 for freight alone.

*President.*—The whole point is that it would be cheaper.

*Mr. Sinclair.*—Yes, to bring the magnesite to the acid rather than take the acid to the magnesite.

*President.*—Acid is not taken to the magnesite.

*Mr. Smith-Wright.*—It would be cheaper to bring the raw material here and turn it into Epsom.

*Mr. Sinclair.*—It would be cheaper to bring the magnesite from Salem to the acid at Madras than to take the acid to the magnesite and there finish the product.

*President.*—From Ranipet where they manufacture acid to Salem is only 70 miles. (No, 139 miles, P. C. C. note.)

*Mr. Sinclair.*—The present freight is Rs. 3-9-3 per cwt.

*President.*—Supposing they have got the same freight for Epsom as for magnesite now.

*Mr. Sinclair.*—That is an assumption.

*President.*—Rs. 28 one can understand for this long distance for Epsom Salts as well as magnesite but Rs. 7 one can't, and that is what you want.

*Mr. Sinclair.*—Epsom comes under Class IV.

*President.*—Supposing it was reduced to the same rate as for magnesite they stand a better chance.

*Mr. Smith-Wright.*—If you reduce it right down to Rs. 7 a ton on magnesite.

*President.*—Even with Rs. 7 a ton you cannot do.

*Mr. Smith-Wright.*—The business will not be attractive for the railway company if it was Rs. 7 on magnesite.

*President.*—Reducing freight from Rs. 28 to Rs. 7 is not the same thing as reducing from Rs. 60 to Rs. 28. There is 75 per cent. reduction there and Rs. 7 for all this distance may not be very economical whereas Rs. 28 may be for Epsom. That is Re. 1 per cwt.

*Mr. Sinclair.*—That does not leave a big margin if the selling price is Rs. 2-12-0.

*President.*—I am looking at it from the railway's point of view. They may say Rs. 7 may easily pay them on a ton mile basis but they may not be able to dispute that even at Rs. 20 they may be making something. I am discussing the question of railway freights whether it would pay a man, but to suggest to the railway company that the freight should be reduced from Rs. 28 to Rs. 7 is a very difficult proposition because Rs. 7 on the face of it might appear uneconomic to them whereas Rs. 25, Rs. 20 or even Rs. 15 for a packed article may not be so when the finished product can bear more than the raw material in proportion to the price.

*Mr. Sinclair.*—It comes to about 33 per cent. of your total selling price on freight alone. That is a lot.

*Dr. Matthai.*—The selling price of Epsom is somewhere about Rs. 65, and the freight on magnesite that you pay is Rs. 28 per ton?

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—That is to say per ton of Epsom it would be Rs. 14.

*Mr. Smith-Wright.*—Yes, approximately.

*President.*—How is it imported?

*Mr. Smith-Wright.*—In 2-cwt. bags.

*President.*—What does the bag cost.

*Mr. Smith-Wright.*—8 annas, that is 4 annas per cwt.

*President.*—I take it that the price of Rs. 65 is the wholesale price?

*Mr. Smith-Wright.*—That is the price at which the local merchants will sell to the Bombay mills.

*Dr. Matthai.*—If the price of Epsom is going to remain at about that limit, is there any scope to the Indian industry for making it?

*Mr. Sinclair.*—Yes, if you put a sufficient bounty on sulphuric acid.

*Mr. Smith-Wright.*—A bounty on sulphuric acid will do much more good than concessional freight on magnesite.

*Dr. Matthai.*—That must be a sufficiently generous bounty!

*President.*—You say that the rate is Rs. 3-9-3 from Madras. What class is it?

*Mr. Sinclair.*—Class IV.

*President.*—The distance from Bombay to Madras is 800 miles?

*Mr. Sinclair.*—Yes.

*President.*—What was the pre-war price of epsom salt?

*Mr. Gupta.*—Rs. 4-12-0. (Statement handed in.)

*Dr. Matthai.*—In 1913 the price was Rs. 2-14-0. It is about the same price as now, if you don't take into account the difference in general price levels.

*Mr. Sinclair.*—Yes. Really it should be somewhere about 40 per cent. higher.

*President.*—Where do you get this from?

*Mr. Gupta.*—From Morarji Mills and Sholapur Mill.

*President.*—In 1913 it was Rs. 2-14-0 and in 1914 the price went up to Rs. 4-12-0.

*Mr. Sinclair.*—It is a very funny market. It goes up and down in the course of a day.

*Mr. Gupta.*—Here are actual dates (handed in).

*Dr. Matthai.*—What do you mean by 1913-14?

*Mr. Gupta.*—They have actually given the dates.

*Dr. Matthai.*—Immediately after the outbreak of the war, it went up to Rs. 4-12-0. In February it was Rs. 2-6-0 and in October Rs. 8-8-0. Therefore it is really after the war the price went up to Rs. 4-12-0.

*President.*—You have not manufactured any epsom salt for some time.

*Mr. Gupta.*—This year we have not manufactured any. Last year we did.

*President.*—Really it is not the raw materials which form the bulk of the costs. We are getting away from the point. The whole point arises as to whether really your other costs are not too high. 50 per cent. is raw materials, so that it may be that there is something to be looked into.

*Mr. Sinclair.*—71 per cent. of the costs.

*President.*—Not according to Dharamsi's figures.

*Mr. Sinclair.*—Ours is 70·91.

*President.*—Your figures are altogether too high compared to theirs. Your figures are much higher than any other figures that we have got.

*Dr. Matthai.*—It is very little use comparing the figures until they are made comparable.

*President.*—If you take the sulphuric acid and magnesite of 8 cwts. each and compare with your final cost, they don't make 75 per cent. As I say, there is something there which requires explanation.

*Mr. Sinclair.*—We take these three items as 100 per cent. in all. I am talking of 71 per cent.

*President.*—I am talking of the total cost. Take 8½ cwts of sulphuric acid and 8½ cwts. of magnesite even at your works. Your total cost is Rs. 108.

*Mr. Smith-Wright.*—Rs. 129.

*President.*—Take your raw material, 8½ cwts.

*Mr. Smith-Wright.*—It comes to 54·8 per cent.

*President.*—Of course you have taken sulphuric acid at the figure at which we are now examining.

*Mr. Smith-Wright.*—It is a big percentage. It all depends upon the price.

*President.*—Take it in round figures—50 per cent. Supposing we allow 50 per cent. for the raw materials, the other figure does seem to me to be very largely responsible for the very high costs. It may be because you are manufacturing very small quantities or due to something else. You will have to look for your high costs in things other than the raw material. The

question of freight and other things arise only after you satisfy us that your other costs are not too high.

*Mr. Smith-Wright.*—

Works labour . . . . .	11 per cent.
Power and fuel . . . . .	11 „
Repairs . . . . .	9 „
General services . . . . .	9 „
Miscellaneous . . . . .	4 „

as against 54 per cent.

*Dr. Matthai.*—What was your output of epsom in 1927-28?

*Mr. Sharpe.*—45 tons.

*President.*—What is the rupee figure for the raw materials?

*Mr. Sharpe.*—Rs. 70.

*President.*—I am trying to suggest that this Rs. 59 above the cost of the material is a very high figure assuming that your raw material cost is correct and the stuff sells in the market at Rs. 65.

*Mr. Sinclair.*—Our power is fairly a big item.

*President.*—With Rs. 59 above the cost of the material, you cannot expect to compete against anybody. We shall go into it when we look at the costs, so that it is no use emphasising the cost of the materials too much.

*Mr. Sinclair.*—There is a lot of difference. The raw materials may cost you very little and your labour may be very high. It may be out of all proportion. Take a piece of jewellery where your labour is low compared with cost of material.

*President.*—It comes to this then that this country cannot really manufacture this stuff.

*Mr. Sinclair.*—Our policy is that anything which shows any profit at all, after raw materials, power and direct labour have been paid, we reckon we can manufacture.

*President.*—I daresay that if you could secure such a high figure as would cover these costs, then you ought to produce this article—that is if epsom salt can bear Rs. 59 above the cost of the material. I am talking of the materials—magnesite and sulphuric acid. How much is that?

*Mr. Sinclair.*—About Rs. 71 out of Rs. 129.

*President.*—The balance is Rs. 59. That does seem to me to be a very heavy figure whatever view you may take of it.

*President.*—As regards the English prices that you have given in Statement M, you must add other charges to compare them with the Bombay selling prices.

*Mr. Smith-Wright.*—That is our point. A reasonable amount has to be added on to the English prices for freight to Bombay. In every case, the Bombay selling price should be higher.

*President.*—You have given the rupee equivalents but you have not added anything for freight and other things.

*Mr. Smith-Wright.*—We have not added anything for freight, insurance, etc. We have only given the rupee equivalents of English prices taking exchange at 1s. 6d. to the rupee. In the case of alkalis, which we do not manufacture, there is a reasonable difference between the English prices and the Indian prices, whereas in the case of other things which we do manufacture, they are sold at lower prices in India than in England, thus establishing the contention that there is dumping.

*Dr. Matthai.*—That simply shows that they know their business.

*President.*—These prices are really higher than they should be.

*Mr. Smith-Wright.*—Because there is no competition from us or from any one else.

*President.*—Can they sell like this—at £6-2-6 in England and at Rs. 140 in India?

*Mr. Sharpe.*—If you look into the English Trade Commissioner's report, it will be seen that they take definite steps to prevent competition. The Imperial Chemical Industries say that they eliminate competition, but it is not said how they do it.

*Mr. Smith-Wright.*—Directly any one appears on the market, they bring their prices down.

*Dr. Matthai.*—If we decided to give you protection for 10 years, the Imperial Chemical Industries might start their works in India.

*Mr. Smith-Wright.*—They might. They have works in other countries.

**THE EASTERN CHEMICAL COMPANY, LIMITED, AND MESSRS.  
DHARAMSI MORARJI CHEMICAL COMPANY, LIMITED.**

**Oral Evidence of Messrs. SMITH-WRIGHT, SINCLAIR, SHARPE, L.  
GUPTA, DONGARSINGH, RAMSINGH, recorded at Bombay  
on Friday, the 21st December 1928.**

*Production of sulphuric acid.*

*President.*—There is one point I wish to be cleared up before we proceed with the examination to-day and that is as regards the quantity of sulphuric acid manufactured in India. I think your estimate is about 23,000 tons all told?

*Mr. Sharpe.*—That would be including Tata's.

*President.*—What would be the quantity excluding the sulphate of ammonia people?

*Mr. Smith-Wright.*—That possibly includes sulphate of ammonia.

*President.*—On the question of bounties I think you say the total is 22,000 tons.

*Mr. Smith-Wright.*—Including sulphate of ammonia.

*President.*—But the amount of sulphur imported is 50,000 tons, a very wide divergence.

*Mr. Ramsingh.*—A lot of sulphur is used in fire works and other things.

*President.*—The sulphate of ammonia manufactured in the country is 17 thousand tons, which represent 8,000 tons of chamber acid?

*Mr. Sinclair.*—A lot of sulphur is used for sugar refining and fireworks manufacture. We do a fairly big business in raw sulphur which we do not turn into sulphuric acid.

*Dr. Matthai.*—How do you get your estimate of 22,000 tons?

*Mr. Smith-Wright.*—The Tata Iron and Steel Company and other steel companies manufacture the bulk of it and 5,000 to 6,000 is all that we chemical industries manufacture.

*Dr. Matthai.*—Then what happens to all this sulphur?

*Mr. Sinclair.*—Much of it goes to sugar refineries, gun powder, fire works and other industries, such as fungicides, etc.

*President.*—Not much for gun powder because for cordite at Aravankadu they use only about 1,000 tons of sulphuric acid. This is the largest quantity they have produced.

*Mr. Smith-Wright.*—I don't think there will be much more than 20,000 tons excluding Tata's. 8,000 tons of sulphate of ammonia and then take our own production and that of Dharamsi's and an approximate estimate of Messrs. D. Waldie's and Parry's and I think if you add these up, the total will come to about 15,000 tons a year excluding Tata's.

*President.*—To-day we are going into the question of costs a little more fully and we propose to take the sulphuric acid first, really speaking the price at which other industries can afford to use sulphuric acid and the price at which you can afford to sell it for that purpose. That is the point we wish to ascertain and we shall take the fair selling price at the works, of sulphuric acid naked. The idea is at present at any rate, that sulphuric acid should be manufactured in the same place as the other products, because the total market in this part of India does not exceed 7,000 tons of sulphuric acid all told. That is about the present figure. I have taken the imports, I have taken your production and the total of the two together is about 7,000 tons, and therefore it is quite obvious that really speaking

there is not any room for more than one works representing a fairly economic unit and it is on that footing that we proceed to examine the costs. Before we consider any question of protection we must be satisfied that the business is not done on an uneconomic scale. We shall assume for the sake of this investigation—we have not made up our minds about it—that the total amount of sulphuric acid which ought to be manufactured in this part of India is within 7,000 tons to be made at one factory, where also other products are manufactured. That does not necessarily mean that you do all these in the same premises; it is the question of extra freight, extra overhead and so on which should not come in to burden the final cost of production. You can manufacture in five different places provided you do not claim separate overheads and so on.

*Mr. Smith-Wright.*—Yes.

*President.*—Or incur an abnormal amount of freight for the transport of sulphuric acid or the other products, because it does seem to me that about 8,000 tons is about the smallest economic unit that would pay.

*Mr. Sinclair.*—I don't think there is a market for that yet.

*President.*—I don't say that there is a market for that just now but I say that would be about the unit which you ought to aim at in order to get good results. I am not suggesting for a moment that there is that output yet. We shall have to take an intermediate figure between 8,000 and 2,000: it may be 4,000 or 5,000 tons. Eventually, supposing the industry is established in the country, the unit should not be less than 8,000 tons. I think you will agree with me that that is not a high figure to take?

*Mr. Sinclair.*—No, eventually.

*President.*—As to what figure we should take during the interval is a matter for consideration. You have got three or four different sets of costs. I propose to convert these figures into 100 per cent. chamber acid in every case.

#### *Costs of sulphuric acid.*

*Dr. Matthai.*—The figures of the Eastern Chemical Company are based on 95 per cent. are they not?

*President.*—For purposes of calculation it would be simpler to take at 100 per cent.

*Dr. Matthai.*—Simply for purposes of calculation if we take chamber acid, which is 65 per cent., on the basis of 100 per cent. that would be more convenient.

*Mr. Sinclair.*—Yes.

*Dr. Matthai.*—If the main point is to get the cost of the various Companies on the same comparable basis, don't you think it would be more convenient to take the chamber acid in every case at 100 per cent.

*Mr. Sinclair.*—Yes.

*President.*—It is an arbitrary proportion that we are taking. It does not represent the additional cost of plant for its manufacture.

*Mr. Sinclair.*—No.

*President.*—We want to compare your fair selling prices with the British selling prices. The British selling price is £3-2-0. That is for 140 Tw. That is 77 per cent.

*Mr. Sinclair.*—Yes.

*President.*—Therefore we will have to convert it into 100 per cent. in the same way.

*Mr. Smith-Wright.*—That will be right.

*President.*—That is concentrated.

*Mr. Sharpe.*—Yes. It is fairly easy to take it at 95 for purposes of comparison.



*Dr. Matthai.*—Then again there is this difficulty. When you speak of Chamber acid 65 per cent. and converting it into 100, there is no question of concentration, whereas if you are taking 77 per cent., it means not merely the chamber acid, but it means also the additional cost of concentrating the chamber acid.

*Mr. Smith-Wright.*—Yes, but we have not included anything for the cost of concentration.

*Dr. Matthai.*—You have taken 95 per cent. If you are taking it on a theoretical basis, why not take 100 per cent.

*Mr. Sinclair.*—This would mean a tremendous amount of Book-keeping.

*Mr. Smith-Wright.*—That would be quite all right so far as this enquiry is concerned.

*President.*—To get the corresponding price of the British sulphuric acid, we should convert 77 per cent. into 100 and it would give us the same result.

*Mr. Sinclair.*—I think so.

*President.*—There is a certain amount of concentration in that from 65 per cent. to 77 per cent.

*Mr. Sharpe.*—There is no extra concentration. A fair amount of acid is withdrawn from the Chamber at 144° Tw.

*Dr. Matthai.*—Without any further cost?

*Mr. Sharpe.*—Yes.

*President.*—We have got several sets of costs. We have got the Tata Iron and Steel Company's costs on a 65 per cent. basis.

*Mr. Sinclair.*—It is 68.3 per cent.

*Dr. Matthai.*—You have worked it up from sulphur.

*Mr. Sinclair.*—Yes, from the yield. They give the tons produced per ton of sulphur. Therefore it struck me that their figure could not be for 95 per cent. acid.

*Dr. Matthai.*—It is just possible that a certain amount of sulphur may be wasted.

*Mr. Sharpe.*—They don't mention what strength it is.

*President.*—They claim it to be 65 per cent.

*Mr. Sinclair.*—Theoretically it should be 68 per cent. We are giving a practical efficiency.

*Mr. Smith-Wright.*—We have taken it at 68 and compared it with 95 per cent. You asked us to work it out on 4,000 tons. Therefore we have taken it at 68 per cent. instead of 65 and brought it up to 95 instead of 100 per cent.

*Dr. Matthai.*—Taking that as 65 per cent. and raising it to 100 per cent. it comes to 95 per cent. yield.

*Mr. Smith-Wright.*—It makes a better comparison.

*President.*—Let us agree that we convert everything into 100 per cent. and we take Tata's at 65 per cent.

*Mr. Smith-Wright.*—Yes.

*President.*—We will convert yours into 100 per cent.

*Dr. Matthai.*—Which year did you take for Tatas?

*Mr. Smith-Wright.*—We have taken 1925-26 which is their best year.

*President.*—It is merely a matter of calculation. Let us agree first as regards the main principles.

You must not run away with the impression that Tata's costs are entirely to be aimed at by you, because I think if you read our report you will find that we don't consider Tata's costs as low as they ought to be considering the output.

*Mr. Smith-Wright.*—They don't really compare favourably with our own estimated costs on less than half their production.

*President.*—We have stated in our first report that their labour charges are far too high and secondly owing to the system of allocation, the costs are allocated in a way which may or may not enable them to get the right results. But so far as the materials are concerned, probably their costs would be reliable, because they do business on a larger scale than you do. In your case most of the labour and other charges are direct.

*Mr. Smith-Wright.*—That is true.

*President.*—In their case they are direct charges, but there are a lot of men employed who may be doing other work.

*Mr. Smith-Wright.*—In their case as far as we can see they make no allowance for fuel.

*President.*—I think that is not wrong. I don't think much fuel is used in the manufacture of Chamber acid.

*Mr. Sinclair.*—We require fuel when we manufacture.

*Mr. Smith-Wright.*—Even when we make 5,400 tons, we reckon the cost of fuel at Rs. 5 per ton.

*President.*—Let us go into that presently. Tata's sulphur on a 100 per cent. basis would come to 37.57 (?) The Eastern Chemicals is Rs. 31.88 on a 100 per cent. basis and Dharamsi's is Rs. 41.60. They are very different figures. I can understand the difference between the Tata Iron and Steel Company and Dharamsi's, because their purchases would be on a much smaller scale, but I don't see how your sulphur comes to Rs. 31.88.

*Mr. Gupta,* you take it at Rs. 116.

*Mr. Gupta.*—Yes, but it has gone down this year to Rs. 105.

*Dr. Matthai.*—This you have based at Rs. 116. Your costs for 1926-27 and your revised estimates are both based on Rs. 116. At present you say it is Rs. 105.

*Mr. Gupta.*—Yes.

*Mr. Smith-Wright.*—When we are comparing with Dharamsi's, we find that their costs are higher than ours.

*President.*—Tata's cost is Rs. 98-6-0, but apparently they use more sulphur than any of you do.

*Mr. Gupta.*—Yes.

*President.*—At present Tata's sulphur is Rs. 104 which is precisely yours. What do you pay as freight from Bombay to Ambernath?

*Mr. Gupta.*—Rs. 4-2-0.

*President.*—They pay Rs. 10-13-0.

*Dr. Matthai.*—Probably they get a lower c.i.f. price because of the larger purchases.

*Mr. Gupta.*—Yes. Only a fortnight ago it was Rs. 92 c.i.f.

*President.*—What I don't understand in your revised estimate is that you give the cost of sulphur per ton of sulphuric acid as Rs. 41.6.

*Mr. Gupta.*—We don't know what is going to be the price hereafter.

*President.*—What price have you taken?

*Mr. Gupta.*—We have taken Rs. 116.

*President.*—We must assume that prices will remain what they are. We are not making any estimate just now as regards what is going to happen in future.

*Dr. Matthai.*—We can take Rs. 105 which is the latest price we have.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Rs. 105 is a good average.

*Mr. Gupta.*—Yes. I think it is a very fair average.

*President.*—Tatas use 566 lbs. of sulphur per ton for 65 per cent. That is equal to about 850 lbs. for 100 per cent. That is a higher figure than yours.

*Mr. Sinclair.*—We are working on the same basis. Their efficiency must be much lower than ours. They are getting 95 per cent. efficiency on 98 per cent. sulphur. I have credited them with 68·3 per cent. acid whereas they only get 65 per cent. acid, so that their efficiency must be very low.

*President.*—Dharamsi's use 770 lbs.

*Mr. Gupta.*—As against 850 lbs.

*President.*—Yours I have not been able to find.

*Mr. Sinclair.*—763 lbs.

*President.*—That is very much like Dharamsi's.

*Mr. Sinclair.*—Yes, we have given it in our Statement L.

*Dr. Matthai.*—That is very close to the theoretical figure.

*Mr. Sinclair.*—Yes.

*President.*—Shall we take 770 lbs. in making our calculation?

*Mr. Sinclair.*—Yes.

*Dr. Matthai.*—Do you agree to that, Mr. Gupta?

*Mr. Gupta.*—Yes.

*Mr. Smith-Wright.*—That is per ton of 100 per cent.

*President.*—Can we take sulphur at Rs. 105 for purposes of calculation?

*Mr. Smith-Wright.*—Yes, delivered at the works.

*President.*—How much does that come to?

*Mr. Ramsingh.*—Rs. 38·1.

*President.*—This figure of Rs. 30·48, how is that arrived at?

*Mr. Sinclair.*—That is on 95 per cent.

*President.*—What price have you taken for sulphur?

*Mr. Sinclair.*—Rs. 95 delivered at the works.

*Mr. Smith-Wright.*—These are all worked on the last quarter's costs.

*President.*—That would be about right because Tata's c.i.f. price was Rs. 32.

*Dr. Matthai.*—They don't pay any freight.

*President.*—Even at Rs. 95 taking it at 770 lbs. would you get Rs. 30? You cannot work it so low as that, can you?

*Dr. Matthai.*—I think that that would be roughly all right. If we take Rs. 95 as being the price of sulphur delivered at the works, and if we take 770 lbs., we get somewhere about Rs. 32.

*Mr. Smith-Wright.*—Yes.

*Mr. Sinclair.*—The figure that we have given in our sulphuric acid table is from our actual costs.

*President.*—We have received some information from the Geological Survey of India about gypsum. Do you know the process by which they get sulphuric acid out of gypsum?

*Mr. Sharpe.*—I don't know the exact process, but I think that if you refer to the last year's Times Supplement which we gave you, you will find that the process is dying out.

*Dr. Matthai.*—In the new Times Supplement which I received this morning it is said that the process is beginning to thrive.

*President.*—You do not know anything about the process?

*Mr. Sharpe.*—If you want I can find it out for you.

*President.*—I think that it is chiefly done in Germany. Is there any book fairly recent which describes the process?

*Mr. Sharpe.*—I do not know of any book which describes it.

*Dr. Matthai.*—Mr. Gupta, have you any information about that?

*Mr. Gupta.*—It is worked by the Nitrogen Syndicate in Germany.

*Dr. Matthai.*—We were referred to Volume XXIV, No. 9, of the Chemical and Metallurgical Engineering.

*President.*—Can gypsum be a substitute for sulphur, that is the point.

*Mr. Gupta.*—It can be.

*Mr. Sharpe.*—It is a possible substitute which has been used.

*Dr. Matthai.*—What is being done is that it is being used at the spelter works in England. Can you let us have a copy of the Chemical and Metallurgical Engineering, Volume 24, No. IX?

*Mr. Gupta.*—We will try to get a copy for you.

*President.*—This information is very important from the point of view of this enquiry and we shall be glad to have any information we can on the point.

*Mr. Gupta.*—Yes.

*President.*—For purposes of calculation we will take Rs. 105 and 770 lbs.?

*Mr. Gupta.*—That would be right.

*President.*—The next raw material is the nitrate of soda. How many pounds do you require of this?

*Mr. Gupta.*—20 to 22 lbs.

*Mr. Smith-Wright.*—2.083 per cent., that is on 95 per cent. acid. That is the figure we give in Statement L.

*President.*—Per one ton of sulphuric acid how much is that, that is what I want to know.

*Mr. Gupta.*—If it is continuous working 2 per cent. is all right.

*President.*—We are taking continuous working.

*Mr. Gupta.*—Then we can safely take 2½ per cent. on the sulphur burnt.

*President.*—2½ per cent. of 770 lbs., that would be 20 lbs. That would represent good practice, would it not?

*Mr. Sinclair.*—Yes.

*President.*—As regards the price, what price do you take for nitrate of soda?

*Mr. Gupta.*—Rs. 180 delivered at the works including losses.

*President.*—That is equal to how much?

*Mr. Ramsingh.*—1.6.

*President.*—Some of you also use a certain quantity of sulphuric acid with it. Parry's use nitric acid.

*Mr. Sharpe.*—Nitrate of soda has to be decomposed into nitric acid.

*President.*—But you don't show it in your costs.

*Mr. Sharpe.*—No, because it is not recovered. It is taken out of the yield.

*President.*—But then it might add to the costs. Parry's use a certain quantity of nitric acid. They also use sulphuric acid: they also use nitrate of soda.

*Mr. Gupta.*—We use nitric acid also but it is converted into nitrate of soda.

*Mr. Sharpe.*—When we make our calculations of the amount of acid that has been used with the nitrate of soda, the loss is debited to the plant.

*President.*—Is it shown under any heading?

*Dr. Matthai.*—In your case it would mean a corresponding reduction in the production of sulphuric acid.

*President.*—We are taking 100 per cent. acid.

*Mr. Smith-Wright.*—If you agree with 93 per cent. efficiency, that will, we maintain, cover the amount of acid used for nitrate of soda.

*President.*—You will add 7 per cent. wastage, won't you?

*Dr. Matthai.*—Supposing we took it at 95 per cent.?

*Mr. Smith-Wright.*—You are reckoning so much sulphur per ton of sulphuric acid as we are doing now on the assumption that we are getting 95 per cent. efficiency. If you are going to take sulphuric acid separately it will have to be worked on a lower efficiency than 95 per cent.

*President.*—If we are taking it on 100 per cent. basis, we have got to enter in your case the charge against sulphuric acid.

*Mr. Smith-Wright.*—We are only reducing it to 100 per cent. strength. But we are assuming that we are working on 100 per cent. efficiency.

*President.*—Then it is 93 per cent. efficiency.

*Mr. Smith-Wright.*—Yes. That covers the loss of this acid.

*President.*—Then we have again to convert it into 100 per cent. efficiency to get the correct costs.

*Mr. Smith-Wright.*—You cannot take it at 100 per cent. efficiency.

*Dr. Matthai.*—We have taken 770 lbs. of sulphur: that is an absolutely theoretical figure.

*Mr. Gupta.*—No.

*Dr. Matthai.*—That is 93 per cent.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—If we take 770 lbs. it is not necessary to make any charge for the sulphuric acid.

*Mr. Sinclair.*—That is quite right.

*President.*—These figures have to be corrected. You have got a certain amount of sulphuric acid.

*Mr. Gupta.*—Our efficiency has varied.

*President.*—Now if we take 770 lbs.?

*Mr. Gupta.*—We have to give up the sulphuric acid.

*President.*—That is what I mean.

*Dr. Matthai.*—It is only .4 in their case.

*President.*—That gives the cost of the materials as Rs. 37.7.

*Mr. Smith-Wright.*—Yes.

*President.*—Now we go on to labour. These labour charges are I take it actual direct labour charges.

*Mr. Sharpe.*—They are actual.

*President.*—In your case, it will come to Rs. 2.2 or Rs. 2.1. Is that about right?

*Mr. Sharpe.*—Yes.

*President.*—Now let us see how much it will be if the output goes up to 4,000 or 5,000 tons?

*Mr. Sharpe.*—Labour will come down to 8 annas 11 pies on a production of 5,000 tons.

*President.*—Dharamsi's estimate is I think based on 4,000 tons.

*Mr. Gupta.*—Yes.

*Mr. Smith-Wright.*—What figure do they give?

*Mr. Gupta.*—We give 12 annas.

*President.*—Do you think that there may be a reduction in the price of sulphur if you manufacture more?

*Mr. Smith-Wright.*—I doubt it.

*President.*—They get Rs. 88 c.i.f. Does this refer to sulphur?

*Mr. Sinclair.*—They may be getting a lower grade of sulphur. I don't think it would make a great deal of difference.

*President.*—This question of fuel is important. Tatas do not show any fuel at all.

*Mr. Sinclair.*—It may be included in the service costs.

*President.*—Probably they have pumps driven by electricity, but you use steam spray.

*Mr. Sinclair.*—Yes.

*President.*—It is for that reason that your fuel charges are high. Dharamsi's present cost is Rs. 1.45.

*Mr. Sinclair.*—I don't see how they get that figure. They spend much more on fuel than we do per year. Here are the actual figures (handed in).

*President.*—Let us be quite clear about it. The only place where you require fuel is pumping and in the chambers but when there is a continuous manufacture, you cannot have any initial charges. It is only because your production is interrupted that you must use a certain quantity of fuel before you get on to sulphur. There is always a certain loss that you have to account for when you cease working, but when you have a continuous manufacture, then you require a small quantity of fuel at the beginning for pumping which is almost negligible.

*Mr. Sinclair.*—When you are lighting up boilers, you always require a certain amount of extra fuel.

*Dr. Matthai.*—Dharamsi's figure is 1.45 as against your 125. But I think we have to add their extras 56. Even if you add 5.6, this difference of Rs. 6 remains.

*Mr. Smith-Wright.*—They are not turning out the large quantities that we are turning out.

*President.*—We have got to add fuel charges for pumping.

*Mr. Sinclair.*—It is all right when we make copperas or glauber's salt, spare steam goes to the sulphate plant. Very little is taken for the chamber plant.

*President.*—We are assuming now that the whole thing is going to be manufactured simultaneously. In that case what do you think is a fair charge for fuel?

*Mr. Smith-Wright.*—Between Rs. 5 and Rs. 6.

*Dr. Matthai.*—Supposing you did not have this steam business, what difference would that make? You would still have to get the water up: would pumping cost you as high as that?

*Mr. Smith-Wright.*—Not quite so high.

*Dr. Matthai.*—What difference would it make if you had water spray?

*Mr. Smith-Wright.*—I don't think it would make a great deal of difference, because you have got to have good water. In this fuel I have included water.

*Mr. Gupta.*—Per ton of acid made in chamber 65 per cent. is acid and 33 or 34 per cent. is water, but generally this 34 to 40 per cent. of steam or water we require is included in the amount of power spent. That accounts for the difference. We pay for 1,000 gallons of water only 4 annas and on 40 per cent. of a ton it comes to about an anna and odd. That is the amount of water used to-day. Now consider what charges will be incurred to produce an equivalent amount of steam.

*President.*—They give 2d. for fuel. (In England.)

*Mr. Sinclair.*—What we have done here is we have assumed that there are no plants working at all, except the chamber plant.

*President.*—But if you had a properly equipped plant and if you were working continuously and there was no interruption of any kind then it does seem to me that Dharamsi's figure of 1.45, which is their actual cost, is not very low. They have given that for continuous working.

*Mr. Sinclair.*—We will take fuel and water together as Rs. 1-8-0, that is 1.5.

*President.*—Would you tell me what you actually spent last year on maintenance and repairs, general services and rent?

*Mr. Gupta.*—We have supplied that under each head.

*President.*—We want the total.

*Mr. Smith-Wright.*—We did not take our last year's expenditure. We took the current cost sheets for the present quarter when we are making all products and there was nothing shut down and we copied the total amount of maintenance for all those plants and then re-allocated them in the way you wanted.

*President.*—Will you let me have the figures on which you arrived at the costs?

*Dr. Matthai.*—When you estimated for an output of 4,000 tons you estimated for an increase in these aggregate figures, did you not?

*Mr. Gupta.*—Repairs and renewals, that was an approximation only.

*Dr. Matthai.*—Did you take the same figure for 4,000 tons as you did for 1926-27?

*Mr. Gupta.*—For 4,000 tons we have taken Rs. 10,000; for 1,185 tons we have taken quite a lot, as much as Rs. 5,000.

*President.*—Will you please give us the actual production on which you have taken it?

*Mr. Gupta.*—Yes.

*President.*—And then say on what footing you have made your estimates as regards the future?

*Mr. Gupta.*—We will let you have the figure.

*Mr. Smith-Wright.*—I will have to look into the cost sheets and take the figures.

*President.*—The idea is first of all to get the total expenditure on the plant.

*Mr. Smith-Wright.*—You mean the total amount spent on stores issued for the last five years?

*President.*—So long as you give us the figures on which you have actually worked these out, it will serve our purpose.

*Mr. Sinclair.*—We will extract the figures for this particular plant and send the figures to you.

*President.*—We have got your actual figures here but we have got to make an estimate as regards the future when your output reaches 4,000 to 5,000 tons and we want to know what figures you have taken for this purpose.

*Mr. Gupta.*—We have given the figures in answer to question 76 of your questionnaire.

*President.*—You have given us an answer to question 76 in Form I, Mr. Smith-Wright, have you not?

*Mr. Smith-Wright.*—We have.

*President.*—Are the answers you have given in Form I correct?

*Mr. Smith-Wright.*—Yes.

*President.*—Does that include the production of every article?

*Mr. Smith-Wright.*—Yes.

*President.*—Can we accept these figures as more or less correct?

*Mr. Smith-Wright.*—Yes. We have worked it out at Rs. 30 a day for 4,000 tons and at Rs. 35 a day on 5,400 tons.

*President.*—The total amount of expenditure given in Form I, under Ordinary current repairs, etc., General Services, supervision and local office charges and miscellaneous comes to Rs. 50,000. It is not a very big sum.

*Mr. Sinclair.*—No.

*President.*—Even if the allocation is arbitrary, I don't think it would make very great difference.

*Mr. Sinclair.*—No. I don't think you would be far wrong if you take these figures. They have given Rs. 2.5. We have given Rs. 2.4-0.

*President.*—I want the figures on which you obtained those results.

*Mr. Smith-Wright.*—To get those figures I have taken the latest costs of what we spent on maintenance and repairs.

*President.*—You have worked it out on a day basis. I am trying to see how you have worked it out in July/September costing. I take it that you took your actual cost under repairs and renewals and worked it out to Rs. 30 a day.

*Mr. Smith-Wright.*—On the July/September figures we had already allocated for maintenance and repairs so much for each product. You wanted them to be allocated on a different system. We took out those figures, totalled them and reallocated them in the way you wanted. We estimated Rs. 35 a day if we were to produce 5,400 tons.

*President.*—How did you arrive at the estimate of Rs. 35 a day?

*Mr. Sinclair.*—It is a hypothetical figure. Rs. 11,000 would cover depreciation—on all our chamber plant.

*President.*—Maintenance and repairs would come to Rs. 2.5.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—General Services and rent are Rs. 2.9. Messrs. Dharamsi Morarji Chemical Company make a separate entry under rent and taxes and so on. That is 4. The total comes to Rs. 2.9. In round figures may we take it as Rs. 3.

*Mr. Smith-Wright.*—Yes.

*President.*—

	Rs.
Sulphur . . . . .	37.7
Labour . . . . .	.87
Fuel and power . . . . .	1.5
Repairs and renewals . . . . .	2.5
General services and rent . . . . .	3
	<hr/>
TOTAL	45.57

Rs. 45.57 are your works cost.

*Mr. Gupta.*—Yes.

*President.*—The cost above material is Rs. 7.87. That is not a bad figure.

*Mr. Smith-Wright.*—That is about what we estimated.

*President.*—Then we will take the other charges. We have got to arrive at the replacement value. We don't go by the actual block value. Dharamsis have spent on the sulphuric acid plant about Rs. 6 lakhs. The whole factory is about Rs. 11 lakhs.

*Mr. Gupta.*—That would be about right.

*President.*—The point is how much should we allow for the sulphuric acid plant. Tatas give the value of their plant at Rs. 12 lakhs. We always cut it down to 60 per cent.

*Mr. Smith-Wright.*—They have many more Chambers.

*President.*—They have four chambers, but we don't accept that.

*Mr. Smith-Wright.*—We would say that the fair amount would be Rs. 3 lakhs on plant and Rs. 3½ lakhs on the building.



*President.*—Supposing we said in your case taking the sulphuric acid plant and building, that the present replacement cost would be somewhere about Rs. 6 lakhs, would that be right?

*Mr. Gupta.*—Yes.

*President.*—Depreciation at 6½ per cent. would be about Rs. 31,250 or Rs. 31.25.

*Mr. Gupta.*—Yes, for 4,000 tons.

*President.*—

	Rs.
Depreciation at 6½ per cent. on 5,00,000 . . . . .	31,250
Interest on working capital on one lakh at 7½ per cent. . . . .	7,500
Head Office and Agent's commission . . . . .	25,000
Profit on block at 10 per cent. . . . .	50,000
	<hr/>
TOTAL . . . . .	113,750
	<hr/>
i.e., per ton . . . . .	28.43

If you divide that by 4,000 tons, that gives you Rs. 28. If we add to this Rs. 45.57 which is the works cost it comes to Rs. 73.57 or Rs. 74. Of course if you were to sell it to an outsider, it would be more than that, but if you are going to use it for your other products, this is the price at which you would charge the other products.

*Mr. Smith-Wright.*—Surely in charging it to other products, you have to take out 10 per cent., because you have to make profit on this.

*President.*—That is the average we are taking. If you take it on an 8,000 ton basis, the overhead will come down by Rs. 14. The variable items would then be depreciation and profit. The items that would come down in exact proportion would be depreciation and profit on 8,000 tons. The working capital per ton would remain more or less the same. Head Office expenses also would remain the same.

*Mr. Smith-Wright.*—There would be bigger staff and so on.

*President.*—What is the Agent's Commission?

*Mr. Smith-Wright.*—If you sell 3,000 tons out of that the Agents are expected to provide the necessary staff and so on. If we push up to 8,000 tons, they would require a considerable addition to their staff.

*Mr. Ramsingh.*—In our case our agents' charges come to 10 per cent. on the profits.

*President.*—However that is a small matter. The main difference would be in depreciation and profit. It would come down by about Rs. 10. It would bring down the total to Rs. 64.

*Mr. Gupta.*—About that.

*President.*—How does it compare with the British price? I have taken £32-0 for 77 per cent. Converting it at 1s. 6d., it comes to Rs. 54, so that there will be a difference of about Rs. 10 between your selling price and theirs. It is quite possible that they work on less profit and probably your sulphur may be costing a little more than theirs.

*Mr. Smith-Wright.*—Probably the plant in India would cost a little more because of the duty and also on account of higher erection cost.

*President.*—These might account for the difference.

*Mr. Sinclair.*—This is a very fair comparison.

*President.*—This difference must remain. It is a constant difference, is it not?

*Mr. Smith-Wright.*—Yes.

*Cost of other chemicals.*

*President.*—Then we have got to work out the cost of the other articles as far as possible. We will have to take Rs. 74 as the figure for sulphuric acid.

*Mr. Sinclair.*—Yes, for the Chamber acid:

*President.*—Before we go on to other products, we have got to consider one more important point, namely what production should we take?

*Mr. Smith-Wright.*—We should take the highest market figure.

*President.*—I think that that would be the figure we should take.

*Mr. Smith-Wright.*—Yes, I should think so, because they have been pretty carefully prepared.

*Dr. Matthai.*—There are some inaccuracies in your figures. You give for example a figure of 2,819 tons for epsom. I think that Bombay will not give you so high a figure. I have taken the average for the last five years which comes to about 2,000 tons (Bombay and Sind 1,600 tons and the average local production 400 tons). You have given 2,819 tons which I find is the total import figure for the whole of India.

*President.*—Last year's figure was 47,300 cwts. We shall take that in round figures as about 2,500 tons and the local production has been under 100 tons.

*Mr. Sinclair.*—That is about right.

*Dr. Matthai.*—The only difference is that I took 5 years beginning with 1927-28 whereas you took it beginning with 1926-27. That makes the difference.

On this question of alum you give 2,631 tons. I find that nearly half the imports are in Karachi. The point that I want to raise is this. Alum is produced also in places like Cawnpore and so on and therefore supposing we protected it, there is the difficulty that the Indian markets in those places would be captured rather by Northern India factories, because they get their imports *via* Karachi. They may not come to the Bombay factories. Bombay imports 1,300 tons and Sind 2,040, so I don't think it is safe to take such a big figure as 2,631 for Bombay.

*Mr. Sinclair.*—Our figures include Sind.

*Dr. Matthai.*—I think perhaps the best thing to do would be to omit Sind, because as regards the other salts very little is imported into Sind and probably this alum would really be captured by other factories than the Bombay factories. So if you restrict yourselves to the imports into Bombay, you will be safer.

*Mr. Sinclair.*—Yes.

*Dr. Matthai.*—You have not included zinc chloride, glauber's salt, etc.

*President.*—Glauber's salt is chiefly used in the textile industry, is it not?

*Mr. Gupta.*—Yes.

*President.*—You ought to be able to get an approximate figure. It must be used along with other salts, epsom probably, is it not?

*Mr. Gupta.*—It is used for dyeing purposes and epsom is used for finishing. Epsom is also used for medical purposes.

*Mr. Smith-Wright.*—More epsom is used than glauber's salt.

*President.*—If we get the quantity of epsom salt and say one-third of that is glauber's salt, that would be the only thing to do, would it not?

*Mr. Smith-Wright.*—I should say it is not more than 300 to 400 tons a year maximum.

*President.*—Sulphuric acid as such does not enter into its manufacture, does it?

*Mr. Gupta.*—No.

*President.*—Then there is this difficulty if you take sodium sulphide and glauber's salt, that in both these cases you have salt cake. Salt cake is a

by-product of hydrochloric acid. Now, if you want to produce sodium sulphide, if there is a total consumption of 4,200, you want a corresponding amount of hydrochloric acid.

*Mr. Gupta.*—Yes. That is how we have worked that.

*President.*—How much salt cake do you get out of hydrochloric acid?

*Mr. Gupta.*—One ton of hydrochloric acid would give one ton of salt cake.

*Dr. Matthai.*—You probably have to look at it this way. You are also producing zinc chloride. The total imports of that are 1,100 tons in Bombay. For that you want hydrochloric acid; in the production of that hydrochloric acid you get salt cake which can be used for sodium sulphide and glauber's salt. Therefore taking these three things, sodium sulphide, zinc chloride and glauber's salt, we take about 1,000 tons of hydrochloric acid which would mean 1,000 tons of sulphuric acid, so that for the three products together you take an extra amount of 1,000 tons of sulphuric acid.

*Mr. Gupta.*—1,000 tons of hydrochloric acid won't give 1,000 tons of zinc chloride.

*President.*—You want about  $1\frac{1}{2}$ ?

*Mr. Gupta.*—Yes.

*President.*—Your production of sulphuric acid is say about 1,200 tons of chamber acid and 1,000 tons of concentrated. Does it mean that so much chamber acid was produced and 1,000 tons of concentrated or altogether 1,200 tons of chamber acid was produced?

*Mr. Smith-Wright.*—We produced 1,000 tons concentrated acid from 1,200 tons of chamber acid as 95 per cent.

*Dr. Matthai.*—You produced so much concentrated acid out of this chamber acid?

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—The same thing applies to you, Mr. Gupta?

*Mr. Gupta.*—Yes, that is the total production.

*President.*—So that really speaking one ought to take 1,274 tons for your chamber acid?

*Mr. Gupta.*—Yes.

*President.*—But the concentrated sulphuric acid is what you sell as such?

*Mr. Gupta.*—Yes.

*President.*—You have not manufactured any epsom salts for sometime, Mr. Smith-Wright?

*Mr. Smith-Wright.*—Not since last year.

*President.*—And you, Mr. Gupta?

*Mr. Gupta.*—Last year we did not manufacture any.

#### *Cost of epsom salts.*

*President.*—What about your cost of epsom salts. You have not given us any costs in these revised statements.

*Mr. Smith-Wright.*—No, because we have not made any. None of our costs up to 1927 were so devised that we could separate them. Then again in preparing a hypothetical one we did not know what production to take so we did not work it out.

*President.*—As regards their production, it was 130 tons last year and you have assumed your future production at 700 tons, Mr. Gupta.

*Mr. Gupta.*—Yes.

*President.*—We are not going to take 700; we must consider all Bombay as a single unit, nearly 2,000 tons. Last year it was 47,000 cwts.

*Dr. Matthai.*—If you take the average including the local production, it would be about 2,000 tons.

*Mr. Gupta.*—2,000 tons would be all right.

*President.*—As regards magnesite it is about 8 cwts. per one ton.

*Mr. Smith-Wright.*—Yes.

*President.*—The cost of magnesite is given as Rs. 45 a ton delivered at the works.

*Mr. Smith-Wright.*—Our last lot cost us Rs. 41 to Rs. 42 including loss in transit.

*President.*—I understood magnesite was sold at the mine head at Salem at about Rs. 8 a ton.

*Mr. Smith-Wright.*—Yes.

*President.*—But you give it as Rs. 15 at the mine head, Mr. Gupta?

*Mr. Gupta.*—Perhaps the Mysore people calculate the shorter distance and raised their price accordingly.

*President.*—What is the distance from Salem to Bombay?

*Mr. Smith-Wright.*—It is about 300 miles from Madras . . .

*Dr. Matthai.*—I calculated the distance to Bombay as 970 miles.

*President.*—It comes on three railway systems?

*Mr. Smith-Wright.*—Yes.

*President.*—You don't get a telescopic rate at all really speaking?

*Mr. Smith-Wright.*—We do.

*President.*—You do but it is split up into three sections. If you take the magnesite at Rs. 7-8-0 or Rs. 8 at Salem then the freight is Rs. 32 according to your figures. What is the freight exactly?

*Mr. Smith-Wright.*—The actual freight is about Rs. 32.

*President.*—So that on each ton of epsom salt the freight alone amounts to 2/5ths of Rs. 32 or about Rs. 13.

*Mr. Smith-Wright.*—Yes.

*President.*—What class of freight is it?

*Mr. Smith-Wright.*—Class I, I believe. It is the minimum.

*President.*—38 of a pie per mile.

*Mr. Sinclair.*—Yes.

*President.*—Then your figure of Rs. 45 is rather high.

*Mr. Gupta.*—We get delivery at Ambernath at Rs. 42.

*Mr. Smith-Wright.*—Our figure is Rs. 42 even allowing for losses. We may get our magnesite a little cheaper, because we have an arrangement with the Syndicate.

*Mr. Ramsingh.*—The Eastern Chemical have made an agreement with the Syndicate that they should not supply to anyone else in Bombay.

*President.*—In any case we must take the lowest price at which anyone can get it. Rs. 8 at the mine head plus Rs. 32-8 would come to Rs. 48-8-0.

Magnesite is . . . . .	16
Sulphuric acid 8 cwts. at Rs. 75 . . . . .	30

Raw materials . . . . .	46
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Labour is given as Rs. 4-62. Is that the actual figure?

*Mr. Gupta.*—That is the direct charge.

*President.*—You expect to reduce it to Rs. 3-5.

*Mr. Gupta.*—Yes, because we have not made full production. The plant can make more.

*Dr. Matthai.*—If you are to produce 2,000 tons instead of 700, you have to allow more for labour.

*Mr. Gupta.*—Yes, we must allow some amount for extra labour.

*Dr. Matthai.*—What do you consider reasonable?  
*Mr. Gupta.*—Rs. 3.  
*President.*—Power and fuel you have given Rs. 6. Where will you use fuel?  
*Mr. Gupta.*—On Boiler plant for Steam Supply.  
*President.*—That is equal to about 1/3rd of a ton of coal.  
*Mr. Smith-Wright.*—A little more than that.  
*Dr. Matthai.*—You don't contemplate any reduction in power and fuel.  
*Mr. Gupta.*—Yes.  
*President.*—Repairs and replacement you have given 6.10. Why are there such heavy repairs?  
*Mr. Gupta.*—It is due to the constant soldering of lead coils. The heavy repairs are also due to small production. When we increase the production, it won't be more than Rs. 2-8-0.  
*President.*—We will take this Rs. 2.5 which you have given in your estimate.  
*Mr. Gupta.*—It is a little lower.  
*President.*—Rs. 10.50 have to be added. It comes to Rs. 16.  
*Dr. Matthai.*—Do you expect on the full production to bring it down from Rs. 16 to Rs. 2.5? At present it is actually Rs. 16 including your non-working charges of Rs. 10.50. By increasing your production you expect to bring it down from Rs. 16 to 2.5.  
*Mr. Gupta.*—That is the assumption. You can take it at Rs. 8.  
*President.*—What do you consider, Mr. Sinclair, would be a reasonable figure?  
*Mr. Sinclair.*—I consider that Rs. 8 is the minimum.  
*President.*—General supervision you have given as Rs. 5.93. That comes down to Rs. 2. Is that about right?  
*Mr. Gupta.*—Yes.  
*Dr. Matthai.*—Rs. 6 is on the present output. On 700 tons the estimate will come down to 1.5.  
*Mr. Gupta.*—When we turned out 400 tons, it was Rs. 10.  
*Mr. Ramsingh.*—That included experimental charges.  
*Dr. Matthai.*—Your supervision charges are higher than theirs.  
*Mr. Smith-Wright.*—Possibly a little more. On some things we pay a little less, and on some thing they pay a little less.  
*President.*—We will take it at Rs. 2.  
*Mr. Sinclair.*—Yes.  
*President.*—As regards rent you don't show any.  
*Mr. Sinclair.*—No.  
*President.*—Dharamsi's include .5 and then there are extras Rs. 10.5.

	Rs.
<i>Raw materials—</i>	
Magnesite . . . . .	16
Sulphuric acid . . . . .	30
	46
<i>Cost above materials—</i>	
Labour . . . . .	3
Power and fuel . . . . .	7.5
Repairs, etc. . . . .	2.5
Supervision . . . . .	2.0
Rents . . . . .	.5
	61.5
Total works cost . . . . .	61.5

Selling charges are Rs. 22·8 just now and they would come down to Rs. 2-8-0, but with an output of 2,000 tons, it will be still less.

*Mr. Gupta.*—It would be very much less.

*Dr. Matthai.*—As regards your statement showing the items of expenditure on selling organisation, the aggregate in 1927 was Rs. 73,000. Out of that I find about Rs. 17,000 was for propaganda purposes for fertilisers.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—That doesn't come into epsom or other salts.

*Mr. Gupta.*—No.

*Dr. Matthai.*—So that it is a smaller aggregate than Rs. 73,000 that you have taken into account.

*Dr. Matthai.*—Selling charges also include freight.

*Mr. Gupta.*—Yes.

*President.*—Your selling charges won't amount to Rs. 12,000 on 2,000 tons.

*Mr. Gupta.*—No. Half of that we can take. It comes to about Rs. 2-8-0 a ton.

*Dr. Matthai.*—When you speak of selling organisation, do you mean *ex-godown* in Bombay?

*Mr. Gupta.*—Delivery at the mills.

*Dr. Matthai.*—Do you include distribution charges?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—What do you mean by distribution charges?

*Mr. Gupta.*—Lorry charges from the godown to the mills.

*Dr. Matthai.*—We shall take it *ex-godown*. I think Rs. 4 would be sufficient.

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—How much do you allow for packing?

*Mr. Gupta.*—As. 8 a bag. 10 bags to a ton. The price of bags will vary between As. 8 and As. 10.

*Dr. Matthai.*—Actually as things stand at present Rs. 5 would be a fair estimate.

*Mr. Sinclair.*—Yes.

*President.*—Rs. 61·5 is the total works cost.

	Rs.
Works cost . . . . .	61·5
Selling charges . . . . .	4·0
Packing . . . . .	5·0
	<hr/>
<i>Ex-godown</i> . . . . .	70·5
	<hr/>

Now we have got to estimate the plant. You have given the value of your plant and machinery as Rs. 15,000, but I find nothing for the buildings in this statement. Epsom plant requires what machineries.

*Mr. Sharpe.*—Hydro-extractors and compressors, Felter presses and crushers.

*President.*—What space would they occupy?

*Mr. Smith-Wright.*—That is the biggest building we have got. Rs. 95,000 on present day valuation.

*President.*—For 2,000 tons?

*Mr. Smith-Wright.*—That is the cost of the building.

*Dr. Matthai.*—Is it the cost of epsom building?

*Mr. Smith-Wright.*—That is all our evaporators for soda crystals, epsom and glauber's, because they are interchangeable. The cost of the building is Rs. 95,000.

*President.*—What would be the cost of the building for a capacity of 2,000 to 2,500 tons?

*Mr. Smith-Wright.*—It would be about half.

*President.*—About Rs. 50,000.

*Mr. Smith-Wright.*—Yes. Then you have to take coolers for which we would require about half a lakh of rupees. Then, we require hydro-extractors, presses, evaporators, settlers, dissolvers, etc. In all, it will come to about Rs. 1½ lakhs. We need a lot of space. The buildings alone cost about Rs. 50,000.

*President.*—What floor area do you require for this?

*Mr. Smith-Wright.*—The whole thing is 125' x 160', and we want about half that—that is 125' x 80'.

*President.*—That is about 10,000 sq. ft.

*Mr. Smith-Wright.*—Yes.

*President.*—It comes to Rs. 5 per sq. ft.

*Mr. Smith-Wright.*—Yes.

*Mr. Ramsingh.*—I think that Rs. 2 per sq. ft. should suffice.

*President.*—Rs. 5 per sq. ft. is rather high. It has only a single floor.

*Mr. Smith-Wright.*—You must take into account the foundations also.

*President.*—What is the first process in the manufacture of epsom?

*Mr. Smith-Wright.*—Crushing the magnesite.

*Mr. Sinclair.*—We require a grinding plant for that. We need two crushers used in stages.

*President.*—Give me your full capacity for your 3,600 tons.

*Mr. Smith-Wright.*—The cost of buildings is Rs. 95,931.

*President.*—We will make it Rs. 1 lakh.

*Mr. Sinclair.*—Yes, and for machinery we require about Rs. 90,000.

*Dr. Matthai.*—What is your total?

*Mr. Sinclair.*—Rs. 1,90,000.

*President.*—The machinery is about Rs. 90,000.

*Mr. Sinclair.*—Yes, excluding the boiler.

*President.*—What does the boiler cost?

*Mr. Ramsingh.*—Rs. 11,000.

*President.*—The capitalisation cost comes to about Rs. 50 per ton.

*Mr. Sinclair.*—Yes.

*Dr. Matthai.*—Actually whether you were making 2,600 or 3,000 tons would it make much difference to the kind of plant?

*Mr. Sinclair.*—No.

*Dr. Matthai.*—It would be much the same kind of plant.

*Mr. Sinclair.*—The plant will be the same; only the number of coolers will be less.

*President.*—Supposing you wanted to construct a plant for 100 tons only, could you take it in the same proportion?

*Mr. Sinclair.*—No.

*Dr. Matthai.*—If you spent Rs. 1,90,000 on plant and buildings, for an output of 3,600 tons roughly let us say about Rs. 1½ lakhs would be required for 2,000 tons?

*Mr. Sinclair.*—Yes. Your building size would be reduced and your coolers would be reduced, but the other items would remain practically the same.

*President.*—The building would be smaller.

*Mr. Sinclair.*—Yes, and possibly the number of coolers would be less.

*President.*—We are only exploring the thing now.

*Dr. Matthai.*—Mr. Ramsingh, do you consider an estimate of Rs. 1½ lakhs excessive?

*Mr. Ramsingh.*—I think that Rs. 1 lakh would be reasonable.

*President.*—Who has made this estimate?

*Mr. Sinclair.*—Those are actual invoice costs.

*Mr. Smith-Wright.*—The buildings are as per measurement.

*Mr. Sinclair.*—We regard all crystals under one heading—soda crystals, glauber's or epsom salts.

*Dr. Matthai.*—Do you think that Rs. 1 lakh would be reasonable?

*Mr. Smith-Wright.*—Rs. 1,20,000 would be a fair figure to take.

*President.*—6½ per cent. on that would be Rs. 7,500.

*Mr. Smith-Wright.*—Yes.

*President.*—The working capital would be Rs. 70,000 taking the six months turnover.

*Mr. Smith-Wright.*—Yes.

*President.*—The interest at 7½ per cent. on that would be Rs. 5,250.

*Mr. Smith-Wright.*—Yes.

*President.*—As regards head office charges and other things, including the agents' commission, what figure did we take in the previous instance?

*Dr. Matthai.*—For sulphuric acid we took Rs. 25,000.

*Mr. Sharpe.*—Yes.

*President.*—That is Rs. 25,000 on a turnover of Rs. 2 lakhs; that is 8 per cent. If we take it on the same basis, that is 8 per cent. on a turnover of Rs. 1,40,000, it would be Rs. 11,200.

*Mr. Smith-Wright.*—Yes.

*President.*—As regards profit, if you take it at 10 per cent. on Rs. 1,20,000 it would be Rs. 12,000.

*Mr. Smith-Wright.*—Yes.

*President.*—If you divide the total (Rs. 35,950) by the total tonnage (2,000), it would come to roughly about Rs. 18 per ton.

*Mr. Smith-Wright.*—Yes.

*President.*—That gives you a price of Rs. 70 plus Rs. 18=Rs. 88.

*Mr. Smith-Wright.*—Yes.

*President.*—You are getting Rs. 65 as the current price?

*Mr. Gupta.*—Rs. 65 to Rs. 70.

*Mr. Ramsingh.*—We expect at least Rs. 23 for protection.

*President.*—Yes, but how are you going to show that you can do without protection eventually? We have made every reduction possible. As regards the railway rate even if you take the lowest rate, 1/10th of a pie, that means Rs. 13 instead of Rs. 32. But that would only give you about Rs. 9, still leaving you Rs. 14 short.

*Mr. Ramsingh.*—As regards the costs of plant and building the estimates are not quite correct as given by the Eastern Chemical Company.

*President.*—Supposing we cut it down to a lakh of rupees.

*Mr. Ramsingh.*—There are the automatic crystallisers; they don't require much space and say if two machines are put and the crystals are formed there, and on that basis we calculated the price even below a lakh of rupees.

*Mr. Sinclair.*—I don't think they would be suitable for Bombay.

*Dr. Matthai.*—You cannot anticipate any increase in the output of epsom, can you?

*Mr. Sinclair.*—No.

*Mr. Smith-Wright.*—We are up against a very difficult problem in the case of epsom (hands in a letter from one of the directors of the Company in England).



*President.*—That is the position at present; you are short by about Rs. 23 per ton.

*Mr. Sinclair.*—But there again the question of putting the profit on the chamber acid comes in. We are willing to sell epsom without profit, if we recover all working costs.

*President.*—The point is that if we are going to make any recommendation the recommendation should be adequate. Each product must pay on the whole.

*Dr. Matthai.*—Supposing on an output of 2,000 tons you still have got to make up Rs. 23, is there any stage in your development when you would be able to dispense with protection or would epsom have to depend always on a subsidy from the State?

*President.*—Even if we give you a bounty, supposing it took that form at present, can this difference be made good eventually when the bounty is removed? That is the point we are considering. How do you expect to get over that?

*Mr. Sinclair.*—Epsom has been sold at as much as Rs. 6 per cwt.

*President.*—The c.i.f. landed price is Rs. 52 a ton.

*Mr. Smith-Wright.*—At present it pays a duty of 15 per cent.

*Dr. Matthai.*—You can answer it this way. Supposing you get a railway freight corresponding to 1/10th of a pie that would mean a reduction of Rs. 9. That brings down the margin to Rs. 14. You cannot anticipate an increase in the output of epsom but you can increase your output of sulphuric acid as industries increase in this country, and when that happens your cost of chamber acid goes down, and along that line you may possibly find that epsom salt stands on its own legs.

*Mr. Ramsingh.*—By and by as we go on our depreciation and reserve fund will increase out of the profits . . .

*Dr. Matthai.*—You are suggesting a raid on the depreciation fund!

*President.*—That won't do.

*Mr. Ramsingh.*—We may in time be able to cut these rather heavy interest charges on working capital of 7 per cent.

*President.*—That will give you very little.

*Mr. Ramsingh.*—If we get a reduction in freight.

*President.*—If you cut out the profit and got a reduction in freight that would only give you Rs. 6.

*Mr. Smith-Wright.*—We would be content to sell it without profit and get a profit on the chamber acid.

#### *Copperas.*

*President.*—We will now go on to copperas. The market for copperas is not a very big one.

*Dr. Matthai.*—You give 720 tons. I take the average of Bombay to be about 150 tons and the average of the local production of the two companies about 300 tons, that is altogether 450 tons.

*Mr. Smith-Wright.*—And the balance Sind.

*Mr. Sinclair.*—We have ourselves shipped a lot to Karachi and Bagdad.

*President.*—At present copperas is not made anywhere in India except in Bombay.

*Mr. Smith-Wright.*—I don't think so.

*President.*—Your production was 262 tons.

*Dr. Matthai.*—Taking five years average if you exclude Sind I should put it at 500 to 600 tons?

*Mr. Smith-Wright.*—Yes.

*President.*—Iron scrap, Dharamsi's figure is Rs. 10 per ton. Do you require quarter of a ton?

*Mr. Gupta.*—Yes.

*President.*—You require 5½ cwts. at about Rs. 3 per ton, Mr. Smith-Wright.

*Mr. Smith-Wright.*—Yes.

*President.*—Where do you get it from?

*Mr. Sharpe.*—In fact we don't buy it at all. Merchants ask us to remove it from their compounds. We pay the lorry delivery charges only.

*President.*—You pay Rs. 10 per ton?

*Mr. Gupta.*—We have to buy a certain quantity and that is our rate.

*President.*—In the case of the Eastern Chemicals their charge for it is very little, but you have to pay for it.

*Mr. Gupta.*—We use some of our own also, but we have to buy a lot and for that Rs. 10 is the rate delivered at the works.

*President.*—We must take some figure and Rs. 10 seems to be the commercial value for it, and we cannot assume that everybody will get it for nothing.

*Mr. Smith-Wright.*—I quite agree. That comes to Rs. 2-8-0 roughly, or 2-5.

*President.*—Then let us take sulphuric acid.

*Mr. Gupta.*—That is Rs. 30.

*President.*—8 cwts. at Rs. 75, or Rs. 30 in round figures. That gives you 32-5 for the raw materials. You say Rs. 36 Mr. Gupta. That is just about that. Then your labour is Rs. 4-8-0, Mr. Smith-Wright whereas Dharamsi's is 1-63? What do you do in the copperas. You simply put the scrap in the sulphuric acid, don't you?

*Mr. Sinclair.*—Scrap is put into dissolvers, sulphuric acid is added, they are steam heated, the liquor is settled, evaporated and crystallized. It is a very simple process.

*President.*—Then why this Rs. 4-8-0 in your case and Rs. 1-63 in theirs?

*Dr. Matthai.*—What was your output in 1927-28 for which you give these costs? You have taken July to September 1928, haven't you?

*Mr. Sinclair.*—Our production last year was 224 tons. July and August were bad months and we did not make much copperas and probably the charges are excessive.

*Dr. Matthai.*—Dharamsi's was based on an output of 215 tons.

*Mr. Sinclair.*—July to September we did not make much copperas and that perhaps accounts for the difference.

*President.*—Then this figure of 1-5 they have given is reasonable?

*Mr. Smith-Wright.*—Yes, on a market of 500 tons.

*President.*—Power and fuel also differ, they give 5-75 plus this extra 5-60. That comes to Rs. 11 against your 19-15; that is nearly double.

*Mr. Sharpe.*—That again is due to the suspension period. What we estimated before was on a basis of 2 tons a day.

*Dr. Matthai.*—There is this difficulty. They estimate for the future Rs. 5-75 on a full output.

*Mr. Smith-Wright.*—We reckoned Rs. 11 on 600 tons.

*Mr. Sinclair.*—I am afraid there is a mistake there.

*Mr. Sharpe.*—Fuel is one of those charges which will not go down. It is a direct charge. I don't think there is much chance of reducing the fuel.

*Dr. Matthai.*—If you doubled your output, your fuel charges would come down.

*Mr. Gupta.*—It will be between Rs. 6 and Rs. 11.

*President.*—This extra that you have added is mostly fuel.

*Mr. Gupta.*—Yes.

*President.*—That Rs. 11 is about  $\frac{1}{3}$ th of a ton of coal.

*Mr. Sinclair.*—Yes.

*President.*—It seems to be a high figure.

*Mr. Sinclair.*—I don't think so. We have got dissolvers and evaporators. I should say that Rs. 11 is a very fair figure.

*President.*—We will have to consider later on whether it is high or not. Fuel is required for what?

*Mr. Sinclair.*—For dissolving and evaporating.

*President.*—In the original estimate for copperas under maintenance and repairs you have given Rs. 2.70. In the revised estimate you have given Rs. 6 under maintenance and repairs. There again your charges have gone up by Rs. 3.3. Why have you increased that? The Eastern Chemicals have given Rs. 5 for maintenance and repairs.

*Mr. Smith-Wright.*—Yes. There is very little depreciation except on the coil.

*President.*—The coil depreciation we have got separately.

*Mr. Smith-Wright.*—It is a question of stores and repairs.

*President.*—General supervision is nearly Rs. 13 to Rs. 14.

*Mr. Smith-Wright.*—That is on a small production.

*President.*—Dharamsi's give Rs. 6 under repairs and renewals. That is an increase over the actual figures.

*Dr. Matthai.*—In your costs on copperas you have not charged anything for packing and things of that kind.

*Mr. Sinclair.*—It is just the naked cost. The type of packing varies. Some take it in bags and some in casks. If it is in bags it comes to Rs. 5 a ton and if it is in casks, it comes to almost Rs. 15 a ton.

*Dr. Matthai.*—If you added Rs. 5 on packing yours would be Rs. 69.

*Mr. Sinclair.*—Yes.

*President.*—General supervision is nearly Rs. 14. This is rather high.

*Mr. Smith-Wright.*—That is on a small production.

*Dr. Matthai.*—Why did you estimate an increase Mr. Gupta on an increased output?

*Mr. Gupta.*—It is not allocated as other charges. There could not be much increase.

*Dr. Matthai.*—In all the other cases when you estimate an increase in the output, you generally estimate a reduction per ton, but in this particular case under repairs and renewals, it has gone up. Is there any special reason for this?

*Mr. Gupta.*—No.

*President.*—We are not accepting these figures as correct. We have to consider every figure afterwards.

*Mr. Smith-Wright.*—They are allocated so much on tonnage and they have not been charged in our original costs.

*Dr. Matthai.*—They also have done similar to yours, but there is a difference.

*Mr. Smith-Wright.*—In this particular quarter the charges were rather heavy.

*Dr. Matthai.*—General supervision charges could also be explained by the difference in output.

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—You had a very small output in this particular quarter.

*Mr. Smith-Wright.*—That is quite true. Under the head maintenance and repairs we had very heavy repairs in this quarter.

*Mr. Sharpe.*—That is based on an output of 45 tons.

*President.*—In the sulphuric acid plant we took 2·5 for general services.

*Mr. Smith-Wright.*—I think that is quite enough.

*Mr. Ramsingh.*—There is a typographical mistake. It should be 500 instead of 1,500.

*President.*—How does that alter the figures?

*Mr. Gupta.*—It comes to Rs. 2 instead of Rs. 6.

*President.*—We will take Rs. 2 under repairs and renewals.

*Mr. Smith-Wright.*—That is quite sufficient.

*President.*—General supervision we took Rs. 2·5 in the case of sulphuric acid plant. It should not be more here.

*Mr. Smith-Wright.*—The production of sulphuric acid is much bigger.

*President.*—It is a good deal more.

*Mr. Smith-Wright.*—4,000 tons as against 500 tons.

*Mr. Gupta.*—There is not much of supervision. Nobody is actually required.

*Dr. Matthai.*—On an output of 215 tons your figure for supervision is Rs. 2·6 per ton. When the output increases from 215 tons to 250 tons, you estimate Rs. 8 per ton. How do you account for that?

*Mr. Ramsingh.*—Because other products have gone up.

*President.*—Rs. 2·5 would be a reasonable figure.

*Mr. Sinclair.*—Yes.

*President.*—Let me see what the works costs are:—

Materials . . . . .	32·5
Cost above materials . . . . .	17
	TOTAL 49·5

To that we have to add selling and packing charges. How does the foreign copperas come?

*Mr. Sinclair.*—In bags and casks.

*President.*—How much do you sell in casks and how much in bags?

*Mr. Sinclair.*—80 per cent. in bags.

*President.*—We will take Rs. 5 for packing charge and selling charges as Rs. 2·5.

*Mr. Sinclair.*—Yes.

*President.*—It comes to Rs. 57 *ex-godown*. Now let us take the plant. Your plant is Rs. 5,000 and building is Rs. 5,000.

*Mr. Gupta.*—Yes.

*Mr. Sinclair.*—Our figure for plant is Rs. 15,000. We utilise the bottoms of the Chambers as a building.

*Dr. Matthai.*—Do you accept that?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Depreciation at 6½ per cent. on Rs. 15,000 would come to Rs. 937.

*Mr. Smith-Wright.*—Yes.

*President.*—The interest on working capital at 7½ per cent. would be about Rs. 1,000.

*Mr. Smith-Wright.*—Yes.

*President.*—The profit at the rate of 10 per cent. would be Rs. 1,500, and head office and other charges at the rate of 8 per cent. would come to

Rs. 2,240. Thus, the total comes to Rs. 5,677. If you divide this amount by the total tonnage (500), it comes to roughly Rs. 11 per ton.

*Mr. Ramsingh.*—Yes.

*President.*—So, the fair selling price would be (Rs. 57 plus Rs. 11) Rs. 68, whereas you get Rs. 81.

*Mr. Ramsingh.*—That is only recently we get that price.

*Mr. Smith-Wright.*—We are getting that on a very much smaller production.

*Dr. Matthai.*—Nothing has been imported last year.

*President.*—The c.i.f. price which Messrs. Brunner Mond and Company gave us was £4-18-0 which is equal to roughly Rs. 65. But I do not know how you got Rs. 81 when the c.i.f. price plus duty was only Rs. 69-8-0.

*Mr. Gupta.*—That is only recently after the formation of the Copperas Syndicate, about four or five months ago.

*President.*—How did you manage to get more than the c.i.f. price?

*Mr. Sinclair.*—They buy from us 10 or 15 bags as they require.

*President.*—On these figures there is no case for protection.

*Mr. Gupta.*—Yes, on the assumption that we make so many tons of acid.

*President.*—That is true. This is when you reach full production and when you manufacture sulphuric acid to your capacity.

*Mr. Smith-Wright.*—And 500 tons of copperas.

*Mr. Ramsingh.*—If the Copperas Syndicate breaks, the price will become lower.

*Dr. Matthai.*—If the Syndicate breaks, I don't think that the Chemical industry will ever organise itself.

*Mr. Ramsingh.*—The average price was about Rs. 60.

*Dr. Matthai.*—I find that according to the Trade Returns the average figure is Rs. 98.

*Mr. Gupta.*—That includes copperas for medical purposes, where the price is even Rs. 100 and more.

#### Potash alum.

*President.*—Now let us take Potash Alum.

*Dr. Matthai.*—You are not at all interested in that.

*Mr. Sinclair.*—No.

*President.*—You have never manufactured this at all.

*Mr. Smith-Wright.*—No.

*President.*—You have given us an estimate on a production of 1,500 tons when the market is only 1,000 tons.

*Dr. Matthai.*—The average of the past five years is about 1,000 tons excluding Sind and the local production is 300 tons. So, I think that 1,500 tons is a fair figure to take.

*Mr. Gupta.*—Why should you exclude Sind? We are better situated to supply that market.

*Dr. Matthai.*—For supplying the markets in Northern India, I think that Messrs. D. Waldie and Company are better situated at Cawnpore. They have a freight advantage over you.

*Mr. Gupta.*—At Cawnpore they do not manufacture Alum; at least that is my information. They make mostly spirits, acids and alcohols. I may be wrong, but that is my information.

*Dr. Matthai.*—How would you compare with Calcutta with regard to the Upper India markets?

*Mr. Gupta.*—We have actually sold up to Cawnpore when the price has been favourable.

*Dr. Matthai.*—In any case we may take it that the Punjab and the United Provinces will be divided between you and Calcutta.

*Mr. Gupta.*—The distance from Cawnpore to Calcutta and from Cawnpore to Bombay is about the same, if anything, it will be in favour of Bombay.

*Dr. Matthai.*—Are you suggesting that we may take a production of 2,000 tons?

*Mr. Gupta.*—Yes.

*President.*—In this you use bauxite first.

*Mr. Gupta.*—Yes.

*President.*—How much do you use?

*Mr. Gupta.*—For 1,500 tons we have used 435 tons. In reply to question 14 of the questionnaire we say that we require .29 ton of bauxite per ton of potash alum. We can take roughly the quantity of bauxite required as .3 of a ton.

*President.*—What is the price of bauxite?

*Mr. Gupta.*—Rs. 23 per ton delivered at the works.

*President.*—At the mine head how much is it?

*Mr. Gupta.*—Rs. 7 per ton, and the freight is Rs. 16.

*President.*—The price of .3 of a ton of bauxite is about Rs. 6.9.

*Mr. Gupta.*—Yes.

*President.*—What about sulphuric acid?

*Mr. Gupta.*—We require .38 ton at Rs. 75 per ton.

*President.*—That is how much?

*Mr. Gupta.*—Rs. 28.5.

*President.*—Do you use potash sulphate also?

*Mr. Gupta.*—Yes.

*President.*—Is it imported?

*Mr. Gupta.*—For the present, it is imported. We require .23 ton of potash sulphate.

*President.*—What is the price of potash sulphate?

*Mr. Gupta.*—Rs. 165 per ton. For .23 ton, it is about Rs. 37.95.

*President.*—What is the total?

*Mr. Gupta.*—Rs. 73.35.

*President.*—Labour is Rs. 24.57 now. You cut it down to Rs. 10.

*Mr. Gupta.*—Yes.

*President.*—What is the process in this?

*Mr. Gupta.*—First the rock bauxite is ground; then the ground material is dissolved and then the solution is treated with potash sulphate. Next the first crystallisation takes place. After the first crystallisation, they are washed and then they are again melted down and put into moulds. The mother liquor from the moulds comes back for fresh charge. Really speaking there are three steam charges and handling charges also come to a lot.

*President.*—This Rs. 24.57 was it your actual cost?

*Mr. Gupta.*—Yes, for the last year.

*Dr. Matthai.*—That is on an output of 350 tons.

*Mr. Gupta.*—Yes. We do not anticipate much difference in labour.

*President.*—But you have cut it down to Rs. 10.

*Mr. Gupta.*—Yes. What I mean is that we don't anticipate any more increase in labour charges.

*President.*—That is to say, you would use practically your present labour.

*Mr. Gupta.*—Yes.

*President.*—What is the total labour charge to-day?

*Mr. Gupta.*—It was Rs. 8,500 for potash alum last year, and we have practically nearly doubled it and made it Rs. 15,000.

*President.*—That comes to Rs. 10.

*Mr. Gupta.*—Yes.

*President.*—These men are paid daily wages.

*Mr. Gupta.*—Yes, they are paid on the basis of daily wages, though they are paid monthly.

*President.*—Your power and fuel comes to Rs. 17-38?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Do you expect a reduction in that? For an output of 1,500 tons have you also estimated 17-38?

*Mr. Gupta.*—We have kept that figure, but it may be a bit lower.

*President.*—17-38 plus 14-60, that comes to nearly Rs. 32.

*Mr. Gupta.*—17-38 is the total charge per ton last year.

*President.*—But you have got extras?

*Mr. Gupta.*—We have added the extras.

*Dr. Matthai.*—Non-working charges extra is 14. If you add that to 17-38, it comes to about Rs. 32; that gives your total charge now. Can you reduce it from Rs. 32 to Rs. 14?

*Mr. Gupta.*—We can reduce it to Rs. 17. I think Rs. 18 would be reasonable.

*President.*—Then let us take repairs and maintenance. You have brought it down from 9-02 to 5. That is an arbitrary figure. Let us take that. Then general services and supervision.

*Dr. Matthai.*—That ought to go down because we are taking an output of 2,000 tons.

*Mr. Gupta.*—You can take it at Rs. 2.

*President.*—Rent. That is .66, so that we get a figure of 35-66 above materials and the total is Rs. 109-01. Then your selling organization.

*Mr. Gupta.*—That is 4.

*President.*—Packing?

*Mr. Gupta.*—Rs. 5.

*President.*—That brings the total to Rs. 118-01 or let us say Rs. 120. Now let us take the plant. The block value of your plant is Rs. 42,000 and you want to reduce it to Rs. 21,000, but nothing for the building.

*Mr. Gupta.*—Rs. 20,000 for the building. It would be similar to the storage shed.

*President.*—And the plant?

*Mr. Gupta.*—Rs. 45,000.

*President.*—What is the replacement value of the plant?

*Mr. Gupta.*—75 per cent. of 45,000, that is Rs. 30,000.

*President.*—For plant and building Rs. 50,000?

*Mr. Gupta.*—Yes.

*President.*—What is your block value?

*Mr. Gupta.*—Rs. 30,000 for the plant.

*President.*—And the building.

*Mr. Gupta.*—Rs. 20,000.

*Dr. Matthai.*—Your present capacity is 600 tons?

*Mr. Gupta.*—Yes.

*President.*—Rs. 50,000 for 600 tons. What do you say for 2,000 tons?

*Mr. Gupta.*—About a lakh of rupees.

*President.*—Depreciation comes to 6.25. Then interest on working capital on six months output, Rs. 1,20,000, at  $7\frac{1}{2}$  per cent., that is 9,000. Then head office and agent's commission 8 per cent. on the turnover of 240,000.

*Mr. Gupta.*—That is about 20,000.

*President.*—Profit?

*Mr. Gupta.*—Rs. 10,000.

*President.*—That is Rs. 22 plus 120, or Rs. 142 per ton.\* What is the realized price?

*Mr. Gupta.*—Rs. 7-4-0 per cwt. or Rs. 145 per ton.

*Dr. Matthai.*—The trade return average is Rs. 135 for the past six months.

*Mr. Smith-Wright.*—There are the selling charges, agents commission, godown charges, carrying charges to be added on to that. Then there is the duty.

*Dr. Matthai.*—I was trying to take the duty free price and see how much duty is required. We cannot take into account the duty at this stage, because we want to see how you stand as regards protection.

*President.*—For potash alum Messrs. Brunner Mond and Company gives a price of £8-12-6 c.i.f.

*Mr. Gupta.*—Here is Brunner Mond's quotation (hands in a statement).

*President.*—We want the c.i.f. price.

*Mr. Gupta.*—The c.i.f. landed price without duty is Rs. 126.

*President.*—And you want Rs. 142 on your figures.



**MESSRS. DHARAMSI MORARJI CHEMICAL COMPANY, LIMITED,  
AND THE EASTERN CHEMICAL COMPANY, LIMITED.**

**Continued on 22nd December, 1928.**

*Alumina sulphate.*

*President.*—This morning we will take alumina sulphate.

*Dr. Matthai.*—There is just a point about potash alum. Alum is a thing about which we can make this supposition that the total output may increase.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—It is used not merely for textiles, but for various general purposes.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—So that it would not be unreasonable to suppose that in course of ten years if the industry were protected, it might get not merely the existing market on the Bombay side but something more than that.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—That would be a correct assumption.

*Mr. Gupta.*—Yes. We expect a bigger market.

*President.*—It is the same as alumina ferric.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Is it absolutely the same?

*Mr. Gupta.*—There is a pure variety for dyeing purposes which we don't manufacture. All that we make can go to paper manufacturers and for water purification.

*President.*—Why do you call it alumina ferric?

*Mr. Gupta.*—Because it contains .5 iron oxide.

*Dr. Matthai.*—May we take that alumina sulphate you manufacture is alumina ferric?

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—And on that basis we can consider the cost.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Can we take all the imports of alumina sulphate as corresponding to your alumina ferric?

*Mr. Gupta.*—No.

*Dr. Matthai.*—Can we take all the imports of alumina sulphate as corresponding to your alumina ferric?

*Mr. Gupta.*—It is very difficult to get at a correct figure except from the Municipalities and paper manufacturers. Paper manufacturers consume about half the quantity.

*President.*—The municipalities use alum.

*Mr. Gupta.*—They use alumina sulphate.

*President.*—But also alum for filtration.

*Mr. Gupta.*—Some people use it but the bulk goes as alumina sulphate.

*President.*—That is for removing the mechanical impurities.

*Mr. Gupta.*—Yes for removing mud and suspended matter.

*President.*—For that I think they generally use alum.

*Mr. Gupta.*—Big Municipalities use alumina sulphate.

*President.*—Alum is used for what.

*Mr. Gupta.*—More for dyeing.

*President.*—There is no separate heading as alumina ferric.

*Dr. Matthai.*—There is only a general heading as alumina sulphate. Total imports would come to 700 tons a year. That is taking the whole of the alumina sulphate as alumina ferric.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—How much of that corresponds to your alumina ferric, I don't know. I should say the average for the last five years is about 500 tons in Bombay, 25 tons in Sind and local production about 160 tons. That is what I get. Your figure was almost exactly correct.

*Mr. Smith-Wright.*—Yes.

*President.*—The difference between potash alum and alumina sulphate is that you have potash sulphate in the alum.

*Mr. Gupta.*—Yes.

*President.*—But the quantity used would be about the same '36 bauxite.

*Mr. Gupta.*—A little lower.

*President.*—What is this alumina sulphate that is imported?

*Mr. Gupta.*—It goes to other parts of the Bombay Presidency, Nizam's State and Mysore. In fact we supplied some to them, but they insisted on a whiter variety.

*President.*—What is the difference between alumina sulphate and alumina ferric?

*Mr. Gupta.*—There is practically no iron in the former.

*Dr. Matthai.*—What difference does that make in the actual use of it?

*Mr. Gupta.*—It affects the dyeing process.

*Dr. Matthai.*—You mean alumina ferric is not used for dyeing purposes, but it is used entirely for water purification purposes.

*Mr. Gupta.*—Yes and for sizing papers.

*President.*—How much iron does it contain?

*Mr. Gupta.*—About 5 per cent. I can give you the actual consumption. Hyderabad State 150 tons. Mysore about the same quantity. These two Municipalities take between them 300 tons. Poona Municipality has been buying about 80 to 90 tons. Municipalities like Hubli, Nasik buy some quantity also.

*President.*—What about Corporation here?

*Mr. Gupta.*—They say that they get rain water and for that they don't want it.

*President.*—It is only where they use the river water, that they use this.

*Mr. Gupta.*—Yes, but the proposition is that it is not a difficult thing to manufacture alumina sulphate at all—I mean the purer variety.

*President.*—Would you get rid of the iron?

*Mr. Gupta.*—By the caustic method. Instead of dissolving the bauxite first in sulphuric acid, it has first to be treated with soda ash in a furnace. Aluminate of soda is made first and that is converted into aluminium-hydroxide, this hydroxide is finally dissolved in sulphuric acid, alumina sulphate thus made gives a purer variety of product.

*President.*—That would cost more.

*Mr. Gupta.*—That fetches a better price—Rs. 20 to Rs. 30 more than ferric.

*President.*—The process would not cost more than that.

*Mr. Gupta.*—No.

*President.*—There is no difficulty in manufacturing.

*Mr. Gupta.*—No.

*President.*—Then let us take about 500 tons.

*Mr. Gupta.*—We can even make alumina sulphate buying the hydroxide, but it won't pay at present.

*Mr. Sharpe.*—If you have a copy of the "Chemical Trade Journal", you find the difference in price between alumina ferric and alumina sulphate.

*President.*—That will give some indication of the cost of converting.

*Dr. Matthai.*—The difference is roughly about £2.

*Mr. Gupta.*—Yes.

*President.*—In this also bauxite is the raw material.

*Mr. Gupta.*—Yes, we have given the proportion.

*President.*—It is about '3.

*Mr. Gupta.*—It is more. It is '36.

*President.*—Let us see how the figures work out—

Bauxite '36 at Rs. 23 . . . . .	Rs. 8-28
Sulphuric acid '47 at Rs. 75 . . . . .	35-25
	<hr/>
	43-53
Labour . . . . .	10
Power and fuel . . . . .	11
Repairs and maintenance . . . . .	3-50
General services . . . . .	1
Rents . . . . .	-20
	<hr/>
	25-70
	<hr/>
	Works costs 69-23
Packing . . . . .	1-00
Selling organization . . . . .	2-50
	<hr/>
	ex-godown . 72-73
	or . 73
	<hr/>

*President.*—What about plant?

*Mr. Gupta.*—Plant is Rs. 5,000 and building is Rs. 1,500. But part of the same plant is used for potash alum. For dissolving alum in alumina ferric the same plant is used.

*President.*—Is it worth while calculating on that?

*Mr. Gupta.*—Yes, when we are increasing the capacity.

*Dr. Matthai.*—You are practically putting the whole thing on alum.

*Mr. Gupta.*—Yes, except the moulds.

*Dr. Matthai.*—What precisely is the figure for alum?

*Mr. Gupta.*—Rs. 5,000.

*President.*—Shall we take 50 per cent. of that?

*Mr. Gupta.*—Yes, then it will be Rs. 2,500.

*President.*—What about buildings?

*Mr. Gupta.*—We have shewn that the book value is Rs. 1,500.

*President.*—It comes to Rs. 4,000; that is on an output of 200 tons. When you increase the output, is there any increase in plant?

*Mr. Gupta.*—Moulds will have to be increased.

*President.*—Therefore if we take Rs. 5,000 for plant and buildings, it would be all right.

*Mr. Gupta.*—Yes.

*President.*—6½ per cent. on that would be how much?

*Mr. Gupta.*—Rs. 312-5.

*President.*—

	Rs.
Dépreciation on 5,000 at 6½ per cent. would be .	312 50
Interest on working capital at 7½ per cent. on Rs. 18,000 (72 × 250) . . . . .	1,350-00
Head office at 8 per cent. on the turnover of Rs. 36,000 . . . . .	2,880-00
Profit at the rate of 10 per cent. on Rs. 5,000 .	500-00
<b>TOTAL</b> .	<b>5,042-50</b>

*Mr. Gupta.*—Yes.

*President.*—If you divide the total by 500, it will come to about Rs. 10.

*Mr. Smith-Wright.*—That is about right.

*President.*—Then the fair selling price will be Rs. 83 (Rs. 73 plus Rs. 10).

*Mr. Gupta.*—Yes.

*President.*—What is the import price?

*Mr. Gupta.*—This year's selling price is Rs. 90.

*President.*—What is the c.i.f. price? Mr. Smith-Wright, you gave us some British price. How much was that?

*Mr. Smith-Wright.*—£4-12-6.

*President.*—You gave the market price for alumina sulphate as Rs. 100.

*Mr. Smith-Wright.*—That was for last year.

*President.*—Not for last year but for 1928?

*Mr. Gupta.*—That must be for 1927. For 1928 it would be Rs. 85 to Rs. 90. Consequently we could not get any order.

*President.*—We want to know what the c.i.f. price is.

*Mr. Gupta.*—The c.i.f. price for alumina sulphate is £7-2-6—please see our answer to question 46.

*President.*—Did you sell alumina ferric?

*Mr. Gupta.*—We sold a small quantity at Rs. 105.

*Mr. Smith-Wright.*—The c.i.f. price was £6-2-0 for alumina sulphate. I think that if you took the c.i.f. price as £6 it would be reasonable (showed a letter).

*President.*—Who quoted this?

*Mr. Smith-Wright.*—One of the oldest works.

*President.*—What is the British price?

*Mr. Smith-Wright.*—£4-12-6.

*President.*—What would be the freight?

*Mr. Smith-Wright.*—30 shillings.

*Mr. Sinclair.*—It would be reasonable to take £6 as the c.i.f. for ferric quality.

*Mr. Gupta.*—The consumption of alumina ferric is most likely to increase.

*Dr. Matthai.*—You ought to do quite well on it.

*Mr. Gupta.*—If we make 500 tons surely we will make something out of it provided of course the cost of sulphuric acid is Rs. 75.

*President.*—In most of the products you have a freight advantage. The only disadvantage is freight on sulphur.

*Mr. Gupta.*—Our difficulty lies in the cost of acid.

*President.*—That is comparatively small. You have got a difference of Rs. 7 between your price of sulphuric acid and the British price of sulphuric acid. In this is used only about half a ton of acid.

*Mr. Gupta.*—That is all true when we are in a position of making that much quantity as you are assuming; but at present we are not.

*Copper sulphate.*

*President.*—We are assuming that you will be in a position to make it. Now let us take Copper Sulphate. What is the market for copper sulphate?

*Mr. Gupta.*—About 250 tons in Bombay.

*President.*—Whenever you have got to use scrap, it is an uncertain factor—I mean the price of scrap is always an uncertain factor.

*Mr. Gupta.*—It bears some relation to pure copper.

*President.*—What is the price of pure copper?

*Mr. Gupta.*—£63 c.i.f.

*President.*—Where did you get that price from?

*Mr. Gupta.*—From the "Chemical Trade Journal".

*President.*—If that is so, would the scrap cost you Rs. 800?

*Mr. Gupta.*—It is good scrap. We sometimes buy it at as low a figure as Rs. 700. But we have put in here a price which we are likely to pay on an average.

*Mr. Sinclair.*—£64-3-9 is the price given in the "Chemical Trade Journal" for copper ingots. It is a very variable market.

*President.*—It is between £60 to 70: we don't know exactly what it is. Where do you get the copper filings from?

*Mr. Smith-Wright.*—The Great Indian Peninsula Railway, or the B., B. & C. I. Railway.

*President.*—How much copper scrap is required per ton?

*Mr. Smith-Wright.*—0-27.

*President.*—What is the price that you have actually paid?

*Mr. Gupta.*—For one lot we paid Rs. 800. We find that the G. I. P. always gives us at Rs. 100 less than market price for scrap.

*President.*—If you were to manufacture 250 tons, you would require about 80 tons of copper scrap.

*Mr. Smith-Wright.*—We would require 67-5 tons.

*President.*—What price do you assume?

*Mr. Smith-Wright.*—Rs. 800.

*Mr. Sharpe.*—The point is that the sulphuric acid used here is concentrated.

*Rectified oil of vitriol.*

*President.*—Then we had better leave it over till we come to that. We will now take the concentrated sulphuric acid. That is R. O. V.?

*Mr. Smith-Wright.*—Yes.

*President.*—This will be sold as such, I take it.

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—Except the small quantity that you use for copper sulphate?

*Mr. Gupta.*—Yes.

*President.*—Your full production is 700 tons. What is your actual production, Mr. Smith-Wright?

*Mr. Smith-Wright.*—1,019 tons in 1927-28. The average is over a thousand tons.

*President.*—Let us take 1,500 tons. We will proceed on that basis.

*Mr. Smith-Wright.*—Yes.

*President.*—In this process you take the chamber acid and pass it through the cascade. It is a very simple process.

*Mr. Sharpe.*—Yes, it is quite a simple process.

*President.*—The main thing there I take it is sort of boiling.

*Mr. Sharpe.*—It is evaporation.

*President.*—Distillation takes place to a certain extent, does it not?

*Mr. Sinclair.*—A little distillation takes place, which is collected by means of a scrupper, the scrupper acid recovered is dilute and used in process.

*President.*—And the residue practically is pure sulphuric acid and that you again mix with the distillate?

*Mr. Sinclair.*—The scrupper acid is dilute and goes to other processes.

*Mr. Smith-Wright.*—There is the extra cost of fuel and so on.

*President.*—How much chamber acid do you want for this?

*Mr. Gupta.*—We take an efficiency of 90 per cent. That would be 1·1 at Rs. 75.

*Mr. Sharpe.*—That is Rs. 82·5.

*President.*—That is the only raw material?

*Mr. Sharpe.*—Yes.

*President.*—Then you have the labour. What labour do you want in this?

*Mr. Sinclair.*—Labour for filling containers and one man for firing. We need 6 men per day, *i.e.*, 2 men per shift.

*President.*—That is about how much?

*Mr. Smith-Wright.*—Labour works out at Rs. 4·3-11 with our production. Taking a production of 1,500 tons it should be Rs. 3.

*President.*—Power and fuel, how much would that come to? You will have continuous production in this case.

*Mr. Smith-Wright.*—Rs. 6·5 for power and fuel.

*President.*—You have put down 14·69 Mr. Gupta?

*Mr. Gupta.*—That is not for full production. We have put that after allowing for the non-working period. You can take 6·5 for continuous production.

*President.*—Repairs and renewals, you have put down Rs. 8.

*Mr. Smith-Wright.*—That is rather heavy. On my present working it is 3 rupees and odd annas. We might take it at Rs. 5.

*President.*—Then general services and supervision. What did we allow in the case of sulphuric acid?

*Mr. Smith-Wright.*—You allowed Rs. 3 for that.

*President.*—Rs. 3 including rents and taxes. This brings the total to exactly Rs. 100. But we have got to take the packing charges into account.

*Mr. Sinclair.*—That is a variable. We have jars, carboys, etc.

*Mr. Smith-Wright.*—It is sold at the naked price.

*President.*—If we were to compare it with imported sulphuric acid we must take the containers into account.

*Mr. Smith-Wright.*—You are then comparing drums with different sorts of packing here.

*President.*—We have got to take two things which would be comparable.

*Mr. Smith-Wright.*—I would suggest that you just take a little extra in what we call selling organization charges.

*Dr. Matthai.*—You could give us your realized price for naked *ex-works*.

*Mr. Smith-Wright.*—We calculate all our costs for the naked acid; we do not take into account containers.

*President.*—In any case as regards the foreign sulphuric acid we will take the price of the drums to the manufacturer and will allow for the second hand value of the drums.

*President.*—Take the selling organisation. We have no selling organisation in the sulphuric acid.

*Mr. Gupta.*—In cascade we have.

*President.*—You have got your actual selling organisation just now.

*Mr. Gupta.*—You mean the Syndicate.

*President.*—Yes.

*Mr. Gupta.*—That is only a proportion of the off-take.

*President.*—We must take some average. What do you do just now? How does it work out.

*Mr. Smith-Wright.*—We as agents are responsible for selling the whole of it, and for anything we sell direct to public bodies and so on we get the same selling commission of 4 per cent.

*President.*—You know what it costs. We must allow the same thing.

*Mr. Ramsingh.*—Yes.

*Dr. Matthai.*—The price realised by the Syndicate includes not merely what you call selling organisation, but it includes also a certain amount of commission for the Syndicate.

*Mr. Ramsingh.*—Yes.

*Dr. Matthai.*—It also includes part of the cost of packing the container, am I right?

*Mr. Ramsingh.*—Yes.

*Dr. Matthai.*—In the case of the acid that you sell to the Syndicate you have to incur these packing charges.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—Does it include the cost of the container?

*Mr. Gupta.*—No, labour only.

*President.*—Let us take Rs. 10 for packing excluding containers.

*Mr. Smith-Wright.*—Yes.

*President.*—How much should we take for selling organisation?

*Mr. Smith-Wright.*—5 per cent. at least.

*President.*—5 per cent. on Rs. 110 comes to Rs. 5.5.

Let us take the overhead. Have you got the valuation of the plant?

*Mr. Sinclair.*—For plant and building Rs. 1,00,000.

*Dr. Matthai.*—That could be taken for a capacity of roughly 2,000 tons.

*Mr. Sinclair.*—We have two units having a capacity of 1,500 tons. We need two units, because if one is shut down for any reason we need the other to maintain production.

*President.*—Plant and building Rs. 1,00,000.

	Rs.
Depreciation at 6½ per cent. on Rs. 1,00,000 . . . . .	6,250
Working capital at 7½ per cent. on Rs. 87,625 . . . . .	6,572
Head Office, etc., at 8 per cent. on the total turnover of Rs. 1,75,000 . . . . .	14,000
Profit . . . . .	10,000

36,822 ÷ by 1,500 tons.

Adding this Rs. 24 to the Rs. 115.5 that we previously arrived at it comes to Rs. 139.5 or Rs. 140. The average realised price is Rs. 211-12-0. Out of

that you have got to deduct your commission of 5 per cent. and Rs. 5 for delivery charges. It comes to Rs. 196.5. It is Rs. 56 a ton after covering all the profit. For copper sulphate we will take Rs. 115. You make a profit on the sulphuric acid. You make Rs. 56 extra.

*Mr. Smith-Wright.*—Yes.

*Copper sulphate.*

*President.*—For copper sulphate we will have to take Rs. 100, plus depreciation and profit. You don't want packing and the selling organisation.

*Mr. Smith-Wright.*—No. Rs. 125 would be about the right figure to take for sulphuric acid.

	Rs.
<i>President.</i> —Copper scrap—27 per ton at Rs. 800 . . . . .	216
R. O. V. 87 at Rs. 125 . . . . .	108.75
	224.75
Total materials . . . . .	324.75

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—You use some quantity of nitric acid.

*Mr. Gupta.*—We use about half a per cent.

*Dr. Matthai.*—That might be omitted.

*Mr. Gupta.*—Yes.

*President.*—Nitric acid would be Rs. 5.3.

*Dr. Matthai.*—What do you want this for?

*Mr. Gupta.*—Just to start the reaction.

*President.*—Including Rs. 5.3 it comes to Rs. 330.05.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—What do you call leaching?

*Mr. Gupta.*—It is simply dissolving in water and removing the solution. We take the dissolved stuff which is almost semi-solid and crystallise the liquor after dissolving.

*President.*—You have not manufactured this, have you?

*Mr. Smith-Wright.*—No.

*President.*—We are taking a production of 250 tons. As regards labour, how many men do you require in this case?

*Mr. Gupta.*—We require 4 men.

*President.*—Four men a day?

*Mr. Gupta.*—Yes.

*President.*—That is for a production of 150 tons.

*Mr. Gupta.*—Yes.

*President.*—We are now taking a production of 250 tons.

*Mr. Gupta.*—Instead of Rs. 8, it ought to be Rs. 10.

*President.*—I must explain to you that we are not accepting these figures as correct.

*Dr. Matthai.*—Why does your power and fuel go up?

*Mr. Gupta.*—It will go down now. We have explained to you that we cannot let our process out.

*Dr. Matthai.*—For repairs and renewals, we might take Rs. 3.5.

*Mr. Gupta.*—Yes.

*President.*—As regards general services and supervision, Rs. 7.8 is a very big charge.



*Mr. Gupta.*—That is because of allocation. But it will be reduced when production goes up to 250 tons.

*President.*—It ought to bear more no doubt because it is so expensive. I think that it should be Rs. 5.

*Mr. Gupta.*—Yes.

*President.*—As regards rent also, it should bear a proportionate share.

*Mr. Gupta.*—Yes, we may take rent as Rs. 1.5.

*President.*—What does the total cost above material come to?

*Mr. Gupta.*—About Rs. 30.

*President.*—What about the selling organisation?

*Mr. Gupta.*—We may take Rs. 20.

*President.*—As regards packing, how is it packed? Is it packed in gunny bags?

*Mr. Gupta.*—Both in bags and casks.

*President.*—We might take that as Rs. 5.

*Mr. Gupta.*—Yes.

*President.*—That makes it Rs. 385.05 *ex-godown*.

*Mr. Gupta.*—Yes.

*President.*—What about plant?

*Mr. Gupta.*—Plant is Rs. 14,000.

*President.*—6½ per cent. on that is how much?

*Mr. Gupta.*—

	Rs. in thousand
Depreciation . . . . .	.875
Interest on working capital at 7½ per cent. on Rs. 48,125 . . . . .	3.609
Head office charges at 8 per cent. . . . .	7.7
Profit . . . . .	1.4
<b>TOTAL</b>	<b>13.584</b>

*President.*—If you divide that by 250, it will come to about Rs. 55 per ton.

*Mr. Gupta.*—Yes.

*President.*—The fair selling price then is (Rs. 385 plus 55) Rs. 440.

*Mr. Gupta.*—Yes.

*President.*—What is the c.i.f. price?

*Mr. Gupta.*—£28.5.0 or roughly Rs. 375.6.

*President.*—The duty at 15 per cent. comes to how much?

*Mr. Gupta.*—Rs. 56.

*President.*—Landing and other charges will be Rs. 5.5.

*Mr. Gupta.*—Yes.

*President.*—The total comes to about Rs. 437.

*Mr. Gupta.*—Yes.

*President.*—And the average realised price is how much?

*Mr. Gupta.*—About Rs. 420.

#### *Nitric and hydrochloric acid.*

*President.*—Now let us take nitric and hydro-chloric acids. I may explain to you how I am going to deal with hydro-chloric acid. We shall take these three salts also glauber's salt, sodium sulphide and zinc chloride. Let us take the total market for these three salts. What we want to see is this

whether if these salts were produced, you would produce sufficient hydrochloric acid to get the salt cake.

*Mr. Gupta.*—In the manufacture of zinc chloride, we have to use a good quantity of hydrochloric acid—about 3 tons of 33 per cent. acid.

*President.*—The market for zinc chloride is about 1,000 tons. So you want 3,000 tons of hydrochloric acid. It is a large quantity. You have not got the plant for it. At present the main argument urged against India is that in the matter of sodium sulphide and zinc chloride, there is not enough salt cake in the country and that you don't have hydrochloric acid.

*Mr. Sharpe.*—To be economic we must make all the four.

*President.*—All the four go together. We shall dispose of nitric acid first and then we shall take hydrochloric acid and then fertilisers.

*President.*—Now let us take nitric acid.

*Dr. Matthai.*—In the first place are we speaking of the same kind of nitric acid?

*Mr. Smith-Wright.*—Our costs are on a 100 per cent. basis.

*Dr. Matthai.*—And yours, Mr. Gupta?

*Mr. Gupta.*—On 70 per cent.

*President.*—Let us take nitric acid on 100 per cent. basis. What is the demand for it? You produce about 100 tons, Mr. Smith-Wright?

*Mr. Smith-Wright.*—We have given the consumption as 243 tons excluding the mint contract which is three times the Bombay contracts.

*Dr. Matthai.*—Is this demand by the mint annual?

*Mr. Smith-Wright.*—Yes, we understand that it will be.

*President.*—What is the normal consumption?

*Mr. Sharpe.*—100 tons of 100 per cent. acid.

*President.*—Let us take 100 tons production and then let us take the 400 tons.

*Dr. Matthai.*—What was your production in 1926-27?

*Mr. Sharpe.*—Just over 80 tons.

*Dr. Matthai.*—And Dharamsy's made 100 tons?

*Mr. Gupta.*—100 reduced to 70 on 100 per cent. that will be 130 tons for total. Our actual production in 1926-27 was 76·7 tons.

*President.*—Eastern Chemical Company 80 tons, and Dharamsi Morarji Chemical Company, 70 tons. That is equal to 150 tons. Let us take 150 tons as the production. Then nitrate of soda, what is the amount per ton?

	Rs.
<i>Mr. Sinclair.</i> —1·35 at Rs. 180 . . . . .	243
<i>President.</i> —Sulphuric acid?	
<i>Mr. Smith-Wright.</i> —1·6 at Rs. 75 . . . . .	120

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*President.*—What is the process of manufacture of nitric acid?

*Mr. Sinclair.*—You take nitrate of soda, add sulphuric acid to it, heat it, and the nitric acid comes off as a gas which is condensed. It means very careful working. It has to be handled very carefully. The process sounds very simple but it is not quite so simple in operation.

*President.*—Is there a synthetic process for this?

*Mr. Sinclair.*—There is a synthetic process of getting nitrogen from the air. By the arc process, the nitrogen and oxygen of the air are combined to form oxides, which are converted to nitric acid. That is one method and then there is another one, the Haberlein.

*Mr. Sharpe.*—We think the German acid now coming in is synthetic.

*Dr. Matthai.*—It is out of the question for us on an output of 150 tons to think of a synthetic process.

*Mr. Sharpe.*—Yes. It is impossible to put up a plant for such small scale production.

*President.*—As a matter of fact we don't require so much nitric acid at all in this country at present.

*Mr. Sharpe.*—No.

*President.*—Your labour is Rs. 28-14-0 and Dharamsi's 14-85 and their revised figure is Rs. 12.

*Dr. Matthai.*—What was your output during the period for which these costs were framed?

*Mr. Sharpe.*—80 tons.

*Dr. Matthai.*—That is practically the same output as Dharamsi's.

*Mr. Sharpe.*—Yes.

*President.*—Let us take their actual figure which is Rs. 14-85.

*Mr. Smith-Wright.*—You can make it 22.

*President.*—Your power and fuel is Rs. 29-8 against theirs Rs. 8-06. I think we must accept their figure and then make an addition for increased production. At your figure of Rs. 29-8-0 you use about two tons of fuel.

*Mr. Sinclair.*—It is not only for distillation. We have a vacuum pump which requires a lot of steam.

*President.*—Don't you expect any reduction?

*Mr. Sinclair.*—A little.

*President.*—There is such a lot of difference between your figures and Dharamsi's. Anyhow in this nitric acid there is no competition apart from the German competition involved, is there?

*Mr. Sinclair.*—I don't think there is.

*President.*—We will put it at Rs. 25 and see how it works. Then repairs and maintenance. Yours is Rs. 45 against theirs Rs. 6. I take it in the nitric acid plant there must be intermittent working?

*Mr. Sinclair.*—Yes.

*Dr. Matthai.*—You estimate your total capacity of nitric acid as 540 tons?

*Mr. Sinclair.*—Yes, working two units in two shifts.

*Dr. Matthai.*—But you don't use even one?

*Mr. Sinclair.*—We do only part of the time.

*Dr. Matthai.*—As a matter of fact if you make 150 tons that would keep one unit continuously occupied.

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—When you increase your output from 100 tons to, say, 200 tons how do you expect your repairs would come down from Rs. 32 to Rs. 6.

*Mr. Sinclair.*—150 tons we can produce in 150 days.

*Dr. Matthai.*—If you make your allocation in proportion to the raw materials there comes the trouble.

*Mr. Sinclair.*—That is simply to show how it is allocated. We told you that we would have to make adjustments.

*Mr. Smith-Wright.*—You can compare it with the English price naked.

*Dr. Matthai.*—You don't get c.i.f. landed price for the naked.

*President.*—You have given a figure of Rs. 124 for general supervision, local office charges, etc. How did you get this figure? Have you excluded head office charges, etc.?

*Mr. Smith-Wright.*—Yes, and all the works wages, chemists' wages, rents, taxes and so on. That is allocated on a small production.

*Dr. Matthai.*—Supposing we assume that you are going to produce besides epsoms and copperas, alum and alumina sulphate and all these other things. . . . .

*Mr. Smith-Wright.*—Then that would be all right, but we are not producing then.

*Dr. Matthai.*—That is true, but we are proceeding on that basis so that you ought to reduce it.

*Mr. Smith-Wright.*—In that case it would be all right.

*President.*—Let us take it at Rs. 60. We are taking it only as a single unit.

*Mr. Smith-Wright.*—Yes, but then you should allow for the extra supervision that is necessary.

*Dr. Matthai.*—Messrs. Dharamsi Morarji Chemical Company, Limited, make a reduction for nitre cake which apparently you don't.

*Mr. Ramsingh.*—I think that is a mistake.

*Mr. Sinclair.*—In my opinion nitre cake should not be given any credit at all.

*Dr. Matthai.*—The only way in which you can use nitre cake is that you can make sodium sulphide.

*Mr. Sharpe.*—We can make glauber's salt.

*Mr. Sinclair.*—We don't credit anything for nitre cake or for salt cake.

*Mr. Smith-Wright.*—It is better to take it free.

*Dr. Matthai.*—In any case we must not make any allowance for nitre cake, because if you are making sodium sulphide, you will really be using salt cake and not nitre cake, because there will be far more salt cake available than nitre cake.

*Mr. Sinclair.*—We should not make any allowance for nitre cake.

*Dr. Matthai.*—We have allowed Rs. 10 for packing in the case of sulphuric acid and here it is Rs. 13.

*Mr. Smith-Wright.*—Yes.

*President.*—Selling organisation would be Rs. 5.5. The total comes to Rs. 518.5 *ex-godown*.

*Mr. Smith-Wright.*—Yes.

*President.*—Let us take plant and building.

	Rs.
Depreciation at 6½ per cent. on Rs. 45,000 . . . . .	2,812
Interest on working capital at 7½ per cent. . . . .	2,885
Head Office at 8 per cent. . . . .	6,160
Profit . . . . .	4,500
	16,357

If you divide it by 150, it will be Rs. 109. *Ex-godown* will be Rs. 513.5. If you add Rs. 109 being depreciation, interest, head office charges and profit, it comes to Rs. 622.5. The fair selling price would be Rs. 623.

*President.*—How many gallons make one ton in the case of nitric acid?

*Mr. Smith-Wright.*—We sell by the pound.

*President.*—What would be the selling price?

*Mr. Smith-Wright.*—For 100 per cent. acid it would be about Rs. 840.

*President.*—How much will be selling commission at 5 per cent?

*Mr. Smith-Wright.*—Rs. 42.

*Dr. Matthai.*—Delivery charges would not be different. It would be only Rs. 5 I think.

*Mr. Smith-Wright.*—It would be about Rs. 8. It comes to (514 plus 109 plus 50) Rs. 673.

*President.*—The difference between Rs. 840 and Rs. 673 is Rs. 167; that is what would be left to you.

*Mr. Smith-Wright.*—Yes.

*President.*—What alterations per ton have you got to make for the extra 150 tons?

*Mr. Smith-Wright.*—The plant will be more or less the same. The raw materials won't vary; labour per ton will be the same; repairs and renewals also will be the same. Only supervision will be about half.

*Dr. Matthai.*—General supervision will come to Rs. 30; that is all.

*Mr. Ramsingh.*—Yes.

*President.*—Interest on working capital per ton will not go up, but will come down. Depreciation and selling charges would be about half.

*Mr. Smith-Wright.*—Yes and also profit will be half.

*Dr. Matthai.*—The point is that on that 150 tons they would be making Rs. 315.

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—It would be about As. 2-3 pies per lb.

*Mr. Smith-Wright.*—Yes.

*Dr. Matthai.*—That is you lose about Rs. 370.

*Mr. Smith-Wright.*—Yes.

*President.*—It is an incurable difficulty.

*Mr. Smith-Wright.*—Yes, that is on 100 per cent. acid.

*President.*—Including containers.

*Mr. Smith-Wright.*—Including returnable containers.

*President.*—Then certainly it cannot be this ordinary process anyhow, because it does not cover the materials.

*Mr. Sinclair.*—It doesn't cover the cost of our raw materials.

*President.*—It might just cover them because the freight might be less. It must be synthetic. What is the price of nitric acid.

*Mr. Smith-Wright.*—For 65 per cent. acid the price is £21 and for 100 per cent. acid £32-3 or about Rs. 430.

*President.*—What will be the c.i.f. price?

*Mr. Smith-Wright.*—£35 or Rs. 476.

*President.*—You must add to that the duty of Rs. 71-4-0, landing charges Rs. 3 and Rs. 5 for mukkadamage.

*Mr. Smith-Wright.*—Then it will be (Rs. 476 plus Rs. 71-4-0 plus Rs. 3 plus Rs. 5) roughly Rs. 555.

*President.*—If you got Rs. 555 it would not be so bad.

*Mr. Smith-Wright.*—But we find Rs. 673, is the price arrived at.

*President.*—This would cover your *ex-godown* cost.

*Mr. Smith-Wright.*—Yes.

*President.*—It would also cover your depreciation.

*Mr. Smith-Wright.*—Yes.

*President.*—We do not know whether this is synthetic or not. Is there any difference between the synthetic and the other acid.

*Mr. Sharpe.*—No.

*Mr. Ramsingh.*—In England they don't make nitric acid by the synthetic process.

*President.*—Where is it stated that this is for English nitric acid. This is only a market price. Nobody would buy it at this price if the price of synthetic acid is very much less.

*Mr. Sinclair.*—The price of synthetic nitric acid will be regulated by the price of acid produced from nitrate of soda, and synthetic acid makers will try to get this price.

*Mr. Smith-Wright.*—My feeling is, that if these people secured the mint contract they may not be making much on it, but the effect of that, will be, that they will be throwing us out of the market. That will also affect the bazaar. We will not only lose the potential market to start with, but if these people go into the bazaar trade they may sell to the mint without any profit in order to eliminate us from the market, and the bazaar people will then send their gold to be refined at the mint. In 10 years we shall not be selling any nitric acid at all. I don't think we can assume that we shall always get our 150 tons.

*Dr. Matthai.*—But a certain amount of refining must be done by the bazaar people themselves.

*Mr. Smith-Wright.*—But the market will possibly tend to diminish.

*Dr. Matthai.*—The real point is that you are able to dispose of the small quantity of 100 or 150 tons of nitric acid, because there is a certain amount of demand for urgent requirements.

*Mr. Smith-Wright.*—There is a demand at present, but there is very much competition from imports.

*Dr. Matthai.*—That urgent market is a small market that will remain to you.

*Mr. Smith-Wright.*—These people may carry stocks; in that case they may supply the urgent demand.

*President.*—This price of Rs. 673 includes also profit on your sulphuric acid.

*Mr. Smith-Wright.*—Yes. You can work it down to ex-works cost; then it will be Rs. 495.

*President.*—Price of Rs. 495 will leave you some profit on sulphuric acid.

*Mr. Smith-Wright.*—Only Rs. 10.

*President.*—It may be more than that. The whole point is this according to these figures even if you get the market you apparently need protection. Rs. 555 is the English import price (c.i.f.) according to the figures that we have now got.

*Mr. Smith-Wright.*—Yes. Even at Rs. 555 we could manufacture and sell it with some profit on the acid.

*Dr. Matthai.*—Is the statement about the mint quotation perfectly reliable?

*Mr. Smith-Wright.*—Positively reliable. I got it from Col. Stare himself.

#### *Hydrochloric acid.*

*President.*—We will now take up the hydrochloric acid group. I think we must first of all determine how much hydrochloric acid is required and how much salt cake you get out of it and then how much of this sodium sulphide you can make and how much zinc chloride from that. We will take first of all hydrochloric acid as such and then see about this salt cake.

*Dr. Matthai.*—Your estimate of the local demand is 238 tons?

*Mr. Paranjpe.*—Yes.

*President.*—Imports are negligible, I think?

*Mr. Paranjpe.*—Yes.

*Dr. Matthai.*—How much have you manufactured on an average, Mr. Smith-Wright?

*Mr. Smith-Wright.*—We have done as much as 70 tons of 100 per cent.

*President.*—We will take 50 tons for you and 20 for Dharamsy.

*Mr. Smith-Wright.*—Yes.

*President.*—That will give you how much salt cake?

*Mr. Smith-Wright.*—175 tons.

*President.*—We will begin with zinc chloride. According to my figures zinc chloride is 28,000 cwts. last year.

*Dr. Matthai.*—I take the average to be 1,100 tons. Let us take it at 1,000 tons.

*Mr. Sharpe.*—Yes.

*Dr. Matthai.*—How much hydrochloric acid is required for it?

*Mr. Sharpe.*—560 tons.

*Dr. Matthai.*—What is the salt cake resulting from it?

*Mr. Sharpe.*—1,400 tons.

*President.*—You want to make Glauber's salt. Glauber's salt uses no hydrochloric acid and the sodium sulphide uses no hydrochloric acid?

*Mr. Sharpe.*—No.

*President.*—So that the salt cake available for sodium sulphide and Glauber's salt is 1,575 tons. The market for sodium sulphide is 1,400 tons.

*Dr. Matthai.*—For Glauber's salt what figure do you give of the average consumption in Bombay?

*Mr. Sharpe.*—There are a number of small manufacturers who collect the waste product from the mineral water machines and convert that into Glauber's salt.

*Mr. Smith-Wright.*—We have sold as much as 200 tons.

*Mr. Paranjpe.*—Ours is about 90 tons.

*President.*—We will take it at 300 tons.

*Mr. Sharpe.*—Yes.

*President.*—Salt cake required for sodium sulphide is 1 ton pretty nearly?

*Mr. Paranjpe.*—Yes.

*President.*—It also requires nitre cake.

*Dr. Matthai.*—You use either nitre cake or salt cake or both so between these two you require somewhere about 25 tons for 12 tons.

*Mr. Paranjpe.*—We should require 1.2 tons of salt cake for a ton of sodium sulphide.

*President.*—That is 1,680 tons, and Glauber's salt, how much does that require?

*Mr. Sharpe.*—That requires about half, 150 tons of salt cake. That brings the total to 1,830 tons of salt cake.

*Mr. Sinclair.*—We have got available 1,575 tons, for the remaining balance we can use nitre cake.

*President.*—Nitre cake how much do you get per ton of nitric acid?

*Mr. Sinclair.*—About 2 tons per ton of 100 per cent. nitric acid produces.

*President.*—300 tons available: that just balances the thing if these figures are correct.

*Mr. Ramsingh.*—The figures are correct.

*President.*—630 tons of hydrochloric acid, that is equal to how much sulphuric acid?

*Mr. Ramsingh.*—This is 100 per cent.

*Mr. Sinclair.*—1.75 of sulphuric acid 100 per cent. per ton of hydrochloric 100 per cent.

*Dr. Matthai.*—Dharams give a different figure, 1.00?

*Mr. Sinclair.*—Their hydrochloric acid is based on 33 per cent. and the sulphuric acid they have taken, is as far as I know, probably either pure acid or chamber acid which has to be converted again, so that it will come to 1.75.

*President.*—That would mean another 1,000 tons of sulphuric acid.

*Mr. Sharpe.*—Yes.

*President.*—On these figures we ought to have the raw materials for all these four products. You have got to take the hydrochloric acid on the basis of 630 tons.

*Mr. Sharpe.*—Yes.

*President.*—And theirs is 900 tons on the basis of 33 per cent.

*Mr. Paranjpe.*—That is 300 tons of 100 per cent. acid.

*Mr. Sinclair.*—Their plant at present is not satisfactory for commercial hydrochloric acid, that is for selling purposes. It is a salt cake plant.

*President.*—You can work one plant for commercial purposes and one plant for salt cake.

*Mr. Sharpe.*—From the business point of view at present our hydrochloric acid is preferred to that of Messrs. Dharamsys. When they are using hydrochloric acid for the manufacture of zinc chloride then that prejudice does not matter.

*President.*—That is comparatively a small matter. We must proceed on the basis of 600 tons.

*Mr. Sinclair.*—Yes.

*President.*—Salt per ton required is 2.2 tons at Rs. 12. There is a point here.

*Mr. Paranjpe.*—The Eastern Chemical Works get it directly from the salt works. We pay railway freight from Thana to Ambarnath.

*Mr. Sinclair.*—That is the lowest grade we are buying. If we were going to make sodium sulphide we would require cleaner salt so that Rs. 18 would be a fair figure. A low grade salt suffices.

	Rs.
<i>President.</i> —We will take salt at . . . . .	18
<i>Mr. Sharpe.</i> —Salt . . . . .	39.6
<i>President.</i> —Sulphuric acid 1.75 at Rs. 75 . . . . .	131.85

Total raw materials . . . 170.85

As regards labour yours is Rs. 75 as against Rs. 25 of Dharamsy's.

*Mr. Paranjpe.*—Ours is on the 33 per cent. basis.

*President.*—That is near enough. But on 600 tons basis what will it be? Would this plant for 600 tons of hydrochloric acid be too big?

*Mr. Sharpe.*—No.

*President.*—Supposing there was one complete plant?

*Mr. Sharpe.*—One complete absorption plant could deal with 600 tons.

*President.*—Would it not be too small a unit?

*Mr. Sharpe.*—That would be about the unit for commercial hydrochloric acid.

*President.*—Their capacity is 900 tons at 33 per cent. so that if we take Rs. 7,000 for labour and divide that by 300 on 100 per cent. basis that would be about right?

*Mr. Sharpe.*—Yes.

*Mr. Ramsingh.*—Roughly you can take it at Rs. 25.

*President.*—For power and fuel Dharamsy's have given Rs. 43-12-7. What is your capacity you said just now, Mr. Smith-Wright?

*Mr. Smith-Wright.*—We are turning out about 100 tons.

*Mr. Sinclair.*—We have no experience of their plant. Their plant differs from ours.



*Dr. Matthai.*—Rs. 75 is what they actually incur. That will amount to Rs. 225 for 100 per cent.

*President.*—What fuel is required.

*Mr. Sharpe.*—We will look up the cost of power and fuel and let you know. That will give you the best English practice.

*Mr. Ramsingh.*—For roasting we required more fuel. We have to get up to 900°C to 1000°C.

*Dr. Matthai.*—What do you require that heat for?

*Mr. Ramsingh.*—For roasting. What they make is this. They get bi-sulphate; in our case action takes place in two places. First the preliminary where the temperature is 350° and then the bi-sulphate and salt are pushed in the roaster where a temperature of 900 to 1000° is required and the salt cake comes out.

*President.*—Rs. 55 is nearly the cost of 4 tons of coal.

*Mr. Sharpe.*—Coal will be an expensive item undoubtedly.

*Mr. Smith-Wright.*—In our case coal comes to only 3 tons.

*President.*—We must get some idea of what it ought to be.

*Mr. Gupta.*—I can give you the English cost of power and fuel for a similar plant.

*Dr. Matthai.*—How does your practice compare with the English practice?

*Mr. Gupta.*—It will necessarily be more because we have to raise the temperature every time we work up the furnace that takes about 5 to 7 tons of oil each time we start.

*Dr. Matthai.*—If you have estimated Rs. 55 for 300 tons it could probably be brought down to Rs. 45 when full production is attained.

*Mr. Gupta.*—Yes, the fuel charge would go down.

*President.*—We are taking 600 tons at 100 per cent. That is equal to about 6 times this production.

*Mr. Gupta.*—You can take a reduction of 25 per cent. on the fuel quite easily because we have not got to shut down.

*Dr. Matthai.*—Say Rs. 40 for 100 per cent.?

*Mr. Gupta.*—No, it will be about twice as much.

*Mr. Sharpe.*—Hydrochloric acid is comparatively light compared with the raw materials.

*President.*—There is nothing in the process except these two things?

*Mr. Sharpe.*—A ton of hydrochloric acid means nearly 4 tons of raw materials, that is to say in heating 4 tons of raw materials we get only one ton of hydrochloric acid.

*Mr. Gupta.*—The amount of coal burnt is considerable.

*President.*—Then it is worse than steel?

*Mr. Gupta.*—It is.

*President.*—That is because I suppose you have to use this coal in crude form. That is what it means.

*Mr. Ramsingh.*—We use oil in all our furnaces.

*President.*—You don't require as much heat as you do in steel making.

*Mr. Gupta.*—In steel making blast furnace the heat required is 770°C.

*President.*—It is merely a question of heating 4 tons of material and it does seem to me that this fuel is excessive. There is some defect in the way in which fuel is used.

*Mr. Sharpe.*—Might we take an arbitrary figure for the moment and then look up the figures?

*President.*—Yes. This is not anything like the smelting of ore. You will have to give me some more evidence on this before we accept this figure of Rs. 100.

*Mr. Gupta.*—We will give you the English practice in terms of coal. We will give you the maker's guarantee.

*President.*—If you will give us those figures and give the quantity of coal required, that will be useful.

*Mr. Gupta.*—Yes.

*President.*—Rs. 100 means more than 6 tons of coal.

*Mr. Sinclair.*—6½ tons.

*President.*—As regards repairs and maintenance you give Rs. 3 for 33 per cent. acid, Mr. Gupta. That comes to Rs. 9 for 100 per cent.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—When you increase the output to 600 tons of 100 per cent., will that make any difference?

*Mr. Gupta.*—Repairs will be higher. The furnace would have to be repaired twice or thrice in a year.

*President.*—For nitric acid we took Rs. 25.

*Mr. Sharpe.*—This will be quite as much. It is more corrosive than nitric acid and we are dealing with higher temperatures.

*President.*—We will take Rs. 25. Dharamsy's give for General Services and supervision 3-60.

*Mr. Sharpe.*—That is 10-8 for 100 per cent.

*Mr. Gupta.*—The maximum capacity of the plant is 300 tons. We can't reduce it proportionately.

*President.*—In the sulphuric acid really speaking we allowed for general services and supervision. It is only on the hydrochloric acid plant now and it should not be very much.

*Mr. Sinclair.*—It is going to be a very important item with a plant of this size. We can take a little off the supervision of the chambers and put it on this plant.

*Mr. Smith-Wright.*—We might take it at Rs. 5. That should be a fair figure.

*President.*—We will have to treat it in the same way as chamber acid. What I mean is, we don't want packing and other things in this. In dealing with the products we will have to take the works cost plus depreciation as we did in the case of R. O. V. That gives you cost above materials Rs. 155.

*Mr. Gupta.*—Yes.

*Dr. Matthai.*—What about the credit for salt cake?

*Mr. Sharpe.*—We cannot do that until you work back on the sodium sulphide and get the market price for sulphide.

*Dr. Matthai.*—That is perfectly true. In any case you have to make an allowance for salt cake. The only question is, on what basis you should do it.

*President.*—Let us see how it works with no credit for salt cake at this stage. Have you got any estimate of the new plant?

*Mr. Smith-Wright.*—No.

*Mr. Ramsingh.*—We have got it. We have spent Rs. 1,87,000 on that plant. At that time the price of the plant was high.

*President.*—The book value of the hydrochloric acid plant is Rs. 1,51,000. 60 per cent. of that is Rs. 90,000. You have got a separate building also?

*Mr. Gupta.*—Yes, that is Rs. 36,000. 60 per cent. of that is Rs. 20,000.

*President.*—That gives you Rs. 1,10,000. Is that a plant for 300 tons production?

*Mr. Gupta.*—Yes.

*President.*—Then you double the plant but not the building necessarily to produce 600 tons. You don't have to double everything?

*Mr. Sharpe.*—I should say Rs. 1,50,000 would be about right.

*Mr. Sinclair.*—The absorption plant would be the same and just an extension to the building would be all that is necessary for 600 tons. Will you allow 6½ per cent. for this plant?

*President.*—We always do it. We allow it on buildings, boilers and everything. We allow 6½ per cent. so that you will find it all right. So that we arrive at the following figures:—

	Rs.
Depreciation on plant and buildings at 6½ per cent. on 1,50,000	9,375
Interest on working capital at 7½ per cent. on 1,00,000	7,500
Head office charges, etc.	16,000
Profit	15,000
	47,875

If you divide this by 600 it gives you Rs. 80. Adding this to the figure of Rs. 325.85 we previously arrived at, it comes to Rs. 405.85 or Rs. 405 in round figures.

*Dr. Matthai.*—If you are going to charge hydrochloric acid at Rs. 400 zinc chloride would never come anywhere within measurable distance in price?

*President.*—Supposing we took sodium sulphide and Glauber's salt—we threw in simply the salt cake first of all—and supposing we got them a fair selling price of Rs. 20 for, say, Glauber's salt, but we found that it got Rs. 50 in the market, this Rs. 30 we credit to hydrochloric acid for the salt cake.

*Mr. Sharpe.*—It comes to something less than Rs. 30.

*Mr. Gupta.*—That is the only way it can be done anyhow.

*President.*—I don't know what is the price of salt cake. We charge nothing to sodium sulphide and the Glauber's salt for the salt cake and then we get the fair selling price based on that. Then we get the market price and this difference we hand over to the hydrochloric acid. In that way zinc chloride would be benefited.

*Mr. Gupta.*—That is quite correct.

*President.*—We will take Glauber's salt. You don't manufacture any?

*Mr. Sharpe.*—We do. We have not given the costs and we don't apply for protection on that.

*President.*—Still we ought to have the costs. At present what do you use for the manufacture of Glauber's salt?

*Mr. Sharpe.*—We use either salt cake or nitre cake. We don't put any charge for either of these.

*President.*—We want these other costs. I suppose you have got the costs here?

*Mr. Sharpe.*—I can give you a rough idea.

*President.*—We will take 300 tons as the production for Glauber's salt. How much salt cake is required for this?

*Mr. Sinclair.*—Half a ton per ton of Glauber's salt.

*President.*—You have to use soda ash in it?

*Mr. Sharpe.*—That is for neutralization and precipitating iron.

*President.*—That has to be imported?

*Mr. Sharpe.*—Yes. That is Rs. 7 a cwt.

*President.*—How much do you want of that?

*Mr. Gupta.*—32 tons for 400 tons, that is  $1\frac{1}{2}$  cwt. to a ton, at Rs. 140 ton.

*President.*—That is 10.5.

*Mr. Gupta.*—Labour?

*Mr. Gupta.*—Labour is 4.13.

*President.*—What did we allow in copperas?

*Mr. Gupta.*—Rs. 1-8-0. These two are comparable.

*President.*—We would put Rs. 2 here. Power and fuel how much?

*Mr. Gupta.*—You can take it at Rs. 5.

*President.*—Repairs and renewals?

*Mr. Gupta.*—1 rupee per ton.

*President.*—General services and supervision?

*Mr. Gupta.*—1.5.

*Dr. Matthai.*—You have taken a lower output.

*Mr. Gupta.*—Then the charges will be more.

*President.*—Let it be Rs. 2. Then what about rents and taxes?

*Mr. Gupta.*—They will come to .36.

*President.*—We will leave it at that.

*Dr. Matthai.*—Selling organization?

*Mr. Gupta.*—That will be slightly higher now. You can take it at the same figure as in the case of epsom 2.5 and Rs. 5 for packing.

*President.*—So that ex-godown it comes to 28.36.

*Mr. Gupta.*—Yes.

*President.*—I should think there is not much depreciation in this plant.

*Mr. Sinclair.*—I should say about Rs. 15,000 for the cost of the plant.

*President.*—

At $6\frac{1}{2}$ per cent. that is . . . . .	937.5
Working capital 42,000 at $7\frac{1}{2}$ per cent. . . . .	315
Head office, etc. . . . .	672
Profit . . . . .	1,500
	<hr/>
	3,424.5

If you divide it by 300 it gives you 11.4. Add to this Rs. 28.36 we have previously arrived at and that gives you Rs. 39.76. That is exactly Rs. 40 or Rs. 2 a cwt. What is the market price now?

*Mr. Sinclair.*—Rs. 2-10-0 per cwt. or Rs. 52-8-0 a ton.

*President.*—Glauber's salt is £4 c.i.f., as given by Messrs. Brunner Mond and Company. Adding to that the duty; landing charges, etc., we get a price of Rs. 66.45.

*Mr. Sinclair.*—A mill contract was placed at Rs. 2-10-0 per cwt.

*President.*—If we take Rs. 66, the price supplied by Messrs. Brunner Mond and Company that gives you Rs. 26 for the salt cake.

We will now take sodium sulphide. We have taken the production of sodium sulphide at 1,400 tons. What is the price of sodium sulphide?

*Mr. Gupta.*—The market price is Rs. 8 to 9 a cwt.

*President.*—You have got a cost of Rs. 310 here in your statement?

*Mr. Ramsingh.*—That was only an experiment.

*Dr. Matthai.*—Is yours 62 per cent.?

*Mr. Gupta.*—Yes.

*President.*—I think you had better study Dharamsy's figures and tell us to-morrow about sodium sulphide.

*Mr. Sharpe.*—We have no experience of making it. If they will tell us how much salt cake is necessary per ton and the coal we can work out the necessary figures.

*President.*—Messrs. Brunner Mond and Company told us that the smallest unit is 10,000 tons for sodium sulphide.

*Mr. Ramsingh.*—Mr. Paranjpe has worked in various British plants and also in two English plants and he says their maximum production was two tons a day.

*President.*—Messrs. Brunner Mond and Company are contemplating manufacture on a large scale.

**THE EASTERN CHEMICAL COMPANY, LIMITED, MESSRS. &  
DHARAMSI MORARJI CHEMICAL COMPANY, LIMITED.**

Continued on 23rd December, 1923.

*Sodium sulphide.*

*President.*—Have you been able to gather any light on this question of sodium sulphide?

*Mr. Ramsingh.*—(Hands in costs of production on a large scale).

*Mr. Gupta.*—We have got figures from actual working exactly for a plant of 6 tons capacity a day. That is an American plant where I myself worked. Here are the particulars (handed in).

*President.*—When were you in America?

*Mr. Gupta.*—Last year. I was there in February last. I was on that plant for a fortnight and also on another big plant, viz., that of the Grasselli Chemical Company, who are one of the biggest manufacturers in the United States of America. They have now joined E. I. du Parks de Nemours and make very many varieties of heavy chemicals. They do not make more than 8 to 9 tons a day at one plant.

*President.*—When you say "efficiency" in what sense do you use the term?

*Mr. Sharpe.*—Efficiency of the plant.

*President.*—You mean the yield?

*Mr. Sinclair.*—Yes, the actual yield as compared with the amount which one could theoretically obtain.

*Dr. Matthai.*—That is to say, if you are able to get, in the case of sulphuric acid, one ton out of 33 per cent. sulphur, that is 100 per cent. efficiency?

*Mr. Sinclair.*—It is about 97 per cent.

*President.*—What is the formula for sodium sulphide?

*Mr. Gupta.*— $\text{Na}_2\text{S}$  and that for salt cake  $\text{Na}_2\text{SO}_4$ . The (O.) oxygen goes away. That is what we call reduction. Oxygen is taken up by the coal and forms carbon monoxide and dioxide.

*President.*—This is no good. We want quantities of the various materials used.

*Mr. Gupta.*—We have given that, each charge consists of how much of the various materials.

*President.*—8 per cent. ash, we don't know of any coal in India with that amount of ash. We shall have to make allowance for that.

*President.*—16 to 20 per cent. is considered good in India. That means how much coal?

*Mr. Gupta.*—We have taken one ton instead of three-fourths. I have further correspondence with the party which I can give you. These people will be very pleased to give any information the Board wants. They are manufacturing for the last 20 years.

*President.*—You get 40 to 46 per cent. of sodium sulphide out of this?

*Mr. Gupta.*—66 to 67 per cent. is the efficiency.

*President.*—I don't understand what you have given here. 44 to 46 per cent. is  $\text{Na}_2\text{S}$ .

*Mr. Gupta.*—That is the melt which is to be leached; or the sulphide which comes out of the furnace.

*President.*—What happens in the leaching?

*Mr. Gupta.*—In the melt it is 44 to 46 per cent. Na<sub>2</sub>S. When we boil down in water the undecomposed coal is precipitated but the soda sulphide remains in solution at that temperature. Then that is taken out. We get 62 to 64 when it is boiled down concentrated and cooled for solidification and break into lumps. The melt is the raw soda sulphide taken out of the furnace. That is put in big iron tank containing water for dissolving as indicated.

*President.*—What exactly do you mean by leaching?

*Mr. Gupta.*—Putting in the dry mass from the furnace into water. That is what we call leaching, and then taking out the soluble portion of the material from the solid.

*President.*—If you have to use as much fuel as this it may be more economical to manufacture this in Bengal.

*Mr. Gupta.*—No doubt, but Bengal cannot use so much soda sulphide nor zinc chloride.

*President.*—There is no reason why they should not take up the manufacture of these, if there is so much coal to be used at Rs. 15 a ton. It is obviously very high even according to the figures you give.

*Mr. Gupta.*—But the market is here.

*President.*—Five tons of coal would cost you much to transport. They also have a market there for zinc chloride.

*Mr. Gupta.*—Very little. Then what about salt?

*President.*—On salt of course they will have to pay a certain amount of freight, but that is comparatively very small.

*Mr. Gupta.*—The freight on the finished product is quite a lot.

*Dr. Matthai.*—The market for soda sulphide is, apart from textiles, in rubber?

*Mr. Gupta.*—Some goes to the leather works and tanneries.

*Dr. Matthai.*—Messrs. Brunner Mond & Co. told us that the increase in the demand for soda sulphide is due really to an increased demand from rubber plantations.

*President.*—The whole point is this: where, having regard to the market and raw materials, a particular article ought to be manufactured? I don't know what the market is as regards zinc chloride.

*Dr. Matthai.*—1,200 tons practically the whole of which goes to Bombay. Therefore when you make zinc chloride here, you get the salt cake.

*Mr. Gupta.*—Exactly. The same is the case with alum. The bulk of it comes here. 4,000 is for the whole of India and 2,000 in Bombay.

*Dr. Matthai.*—1,400 in Bombay, 1,000 in Sind and the rest goes to the Punjab and other places. The moment we grant protection Messrs. D. Waldie & Co. may think of manufacturing it at Cawnpore.

*Mr. Gupta.*—We are not far off from Karachi than what they are.

*Dr. Matthai.*—In any case you won't get the whole of the market.

*Mr. Gupta.*—That is why we have taken only 2,000 tons.

*President.*—Will you please supply the Board with a copy of this report of yours. I will examine you on these figures later. Nobody has really produced this on a commercial scale.

*Mr. Gupta.*—We will let you have it. When we use rotary furnace fuel charges will come down. This is also to be considered. Our plant will require modification if we manufacture the whole requirement of this presidency.

*President.*—Let us take soda sulphide. In this case we will take a production of 1,400 tons and see how it works out.

	Rs.
Salt cake 1·3 tons . . . . .	free.
Coal dust one ton . . . . .	12
Labour . . . . .	12
Power and fuel . . . . .	50
Repairs and renewals . . . . .	4
General services, etc. . . . .	5
Packing . . . . .	15
Selling . . . . .	2
<b>TOTAL</b>	<b>100</b>

What about the plant and building?

*Mr. Gupta.*—Plant and building will cost Rs. 1½ lakhs.

*Dr. Mathai.*—What would be the figure in American currency?

*Mr. Gupta.*—\$27,000 for the furnace and equipment. In round figures for the plant it will be about \$30,000.

*President.*—You have got to add freight and other charges.

*Mr. Gupta.*—We have allowed for these, and the cost of the building will be Rs. 50,000.

*President.*—

	Rs.
Depreciation at 6½ per cent. on Rs. 1,50,000 . . . . .	9,375
Interest on working capital . . . . .	5,284
Head Office charges, etc. . . . .	11,200
Profit . . . . .	15,000
	<hr/> 40,859

If you divide Rs. 40,859 by 1,400 tons, it comes to Rs. 30 per ton. The c.i.f. price given by Messrs. Brunner Mond & Co. is Rs. 165. That gives you Rs. 27 for salt cake.

*Mr. Gupta.*—That is enough.

*President.*—You have got 1,820 tons at Rs. 27 and in the Glauber's salt you have got 150 tons at Rs. 50. The average comes to about Rs. 30.

*Mr. Gupta.*—They take it as eleven dollars in the States per ton of salt cake.

*President.*—It is just about Rs. 30 for salt cake. Let us go back to hydrochloric acid.

	Rs.
Works cost . . . . .	405
Less credit at Rs. 30 a ton for 2·2 tons of salt cake . . . . .	66
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What is the price of salt cake in England?

*Mr. Sinclair.*—The latest price is £2-12-6 (hands in the journal).



*President.*—Don't they review the various chemical industries from time to time where they give statistical information, the use of sulphuric acid in the world, output and so on?

*Mr. Sharpe.*—That would be published about March or April.

*President.*—Who publishes that?

*Mr. Sharpe.*—They are mentioned in the annual reports of the Society of Chemical Industry.

*President.*—Can you give me the last one?

*Mr. Sharpe.*—I can let you have the loan of the last edition.

*President.*—I want to know what chemicals are produced in the world and how they are used and so on. Will you kindly lend me a copy? I shall return it to you.

*Mr. Sharpe.*—Yes.

*President.*—Is £2-12-6 which you have given for home consumption?

*Mr. Sharpe.*—Yes.

*President.*—What do they call salt cake?

*Mr. Sinclair.*—In pure sodium sulphate. Probably you will find the consumption figures in the Times Supplement.

*President.*—It is Rs. 34 roughly. If these figures are correct—one doesn't know whether they are correct or not—we ought to get the same result.

*Mr. Sinclair.*—The cost of Indian-made salt cake would be higher than English-made salt cake.

*President.*—This shows that sodium sulphide if properly manufactured can bear the price of the salt cake and that salt cake can be produced in India if the price for hydrochloric acid is the figure that we have got.

We will take zinc chloride and then hydrochloric acid for sale as such. As regards zinc chloride have you got similar information, Mr. Gupta?

*Mr. Gupta.*—I haven't got it here at present, but I will send it to you later on. We have manufactured 12 to 15 tons. (Statement handed in.)

*President.*—Sodium sulphate is 62 per cent. fused.

*Mr. Gupta.*—Yes.

#### *Zinc chloride.*

*President.*—Let us take the production of zinc chloride as 1,000 tons and see how the figures work out.

	Rs.
Zinc scrap at Rs. 300 . . . . .	150
Hydrochloric acid 57 cent per cent. at Rs. 340 . . . . .	193·8
Labour . . . . .	4·5
Power and Fuel . . . . .	5·0
Repairs . . . . .	1
General services, etc. . . . .	2·5
	Works cost . . . . . 356·8
Packing . . . . .	15
Selling organization . . . . .	2
	Ex-godown . . . . . 373·8

How much you have taken for plant and buildings?

*Mr. Gupta.*—We have taken Rs. 1,00,000 for plant and buildings.

*President.*—Let us take for purposes of calculation Rs. 1,00,000.

	Rs.
Depreciation . . . . .	6,250
Interest . . . . .	6,750
Head Office, etc. . . . .	14,400
Profit . . . . .	10,000
	37,400

Divided by 1,000 tons it comes to Rs. 37.4. Add this Rs. 37 to Rs. 373-8-0 we get a total of Rs. 411-2.

*President.*—

	Rs.
The c.i.f. price is £18-10-0 or . . . . .	246
Add 15 per cent. duty . . . . .	36
Landing, etc. . . . .	8
	290

*Dr. Matthai.*—The market price is Rs. 299.

*President.*—Out of Rs. 374 you deduct Rs. 246. That gives you a difference of Rs. 128 on full production. How are you going to do it?

*Mr. Gupta.*—We want to meet it from the soda sulphide.

*President.*—But then you won't have your salt cake unless you make zinc chloride.

*Mr. Gupta.*—Again we have to take into consideration the duty, extra charges borne by the manufacturer of zinc chloride, the amount of sulphuric acid used for making hydrochloric acid and then the charges on sulphuric acid taken twice over.

*Dr. Matthai.*—We will have to make a lot of adjustments. This Rs. 128 is equal to more than 50 per cent.

*President.*—As regards hydrochloric acid we ought to get the selling price. We have not got the realised price for hydrochloric acid.

Zinc chloride is used by what industries?

*Mr. Gupta.*—Mainly textiles.

*President.*—Textiles use only very small quantities, say about 1,000 tons.

*Mr. Ramsingh.*—It is used as an antiseptic also.

*Mr. Gupta.*—In other countries it is used for timber seasoning.

*Dr. Matthai.*—Supposing for argument's sake we decided to impose a duty of 50 per cent. on zinc chloride, that might mean it is not an essential article and people might not use it.

*Mr. Ramsingh.*—It is absolutely necessary for the textiles.

*Dr. Matthai.*—Is there any substitute for it?

*Mr. Ramsingh.*—There might be costly substitutes.

*Dr. Matthai.*—How would it affect your costs if we are to put on a duty of 50 per cent.?

*Mr. Ramsingh.*—Very little. The cost of sizing per pound is about As. 2. It will make a difference of one pie per lb. of cloth.

*President.*—But sizing, I think, adds to the weight.

*Mr. Ramsingh.*—If you are interested, we have a statement (handed in) showing the duties levied in various countries.

*President.*—That will be very interesting. Where did you get this information from?

*Mr. Ramsingh.*—We got this comparative table of import duties mostly from the Consuls of the different countries.

*Dr. Matthai.*—Please give us the percentage figures for each country.

*Mr. Gupta.*—Yes. We will prepare a fuller statement and send you.

*Hydrochloric acid.*

*President.*—We will take hydrochloric acid.

	Rs.
Production 600 tons—	
Salt, 2.2 @ Rs. 18 . . . . .	39.6
Sulphuric acid, 1.75 @ Rs. 75 . . . . .	131.25
Labour . . . . .	25
Power and Fuel . . . . .	100
Repairs and Renewals . . . . .	25
General Supervision . . . . .	5
	325.85
Overhead charges—	
Plant, Rs. 1,50,000 @ 60 per cent. . . . .	90,000
Buildings, Rs. 36,000 @ 60 per cent. . . . .	20,000
	110,000
Allow for 600 tons, Rs. 1,50,000 . . . . .	9,375
Working Capital, 300 × 325 . . . . .	7,500
H. O. and Commission 8 per cent. on 2 lakhs . . . . .	16,000
Profit, 10 per cent. . . . .	15,000
	47,875
	= 80 per ton.
Works cost . . . . .	325.85
Overhead . . . . .	80
	405.85
Less—Credit for salt cake . . . . .	66
	339.85
Packing . . . . .	30
Selling organization . . . . .	2.50
	372.35

The market price is Rs. 1,260.

*Fertilisers.*

*President.*—Now we come to Fertilisers. The Eastern Chemical Company does not make any fertilisers, does it?

*Mr. Smith-Wright.*—No.

*President.*—The point that we have got to consider is this: there is a lot of general evidence taken. We want to consider the question of bounty on these products. It may happen that there may not be such a good case but we want to see whether, if sulphuric acid is cheapened, it would lead to the increased use of fertilisers in which sulphuric acid is used. The fertiliser being used for agricultural purposes, the chances of a bounty are preferred to any other form of relief.

*Mr. Sharpe.*—Yes.

*President.*—It is for that reason that I wish to know whether fertilisers in which sulphuric acid is used are likely to be used on a substantial scale in the future. I mean the general evidence is very unsatisfactory as far as I have been able to follow. They seem to think that in some parts of India any fertiliser which contains sulphuric acid is not suitable except for limited number of crops. I suppose that is due more to the acidity of the soil.

*Mr. Sharpe.*—They are under a mistaken impression. There is no free sulphuric acid in the fertiliser which is used as manure.

*Dr. Matthai.*—The question was definitely put to Dr. Mann by the Agricultural Commission and he said that in rice the use of bone meal has been found to be of some use and then the question was put to him whether bone meal was better than superphosphate. To that he answered that his own experiment with superphosphate showed that superphosphate (if anything) would be less effective than bone meal.

*Mr. Gupta.*—That depends on the particular type of the soil.

*President.*—Where the soil contains a lot of acid any fertiliser which contains sulphuric acid won't do.

*Mr. Gupta.*—In the case of superphosphate, either rock or bone, acidity does not come in.

*Dr. Matthai.*—Whatever may be the theoretical grounds on which you can defend it the point at present is that the Agricultural Department in Bombay, as far as we can judge from the evidence before the Agricultural Commission, do not seem to be satisfied that the use of superphosphate would at any rate be an improvement on the present situation.

*Mr. Gupta.*—To state frankly the Agricultural Department in Bombay have done very little work on superphosphate. If you enquire you will find that they have done only two or three dozens of experiments with superphosphates.

*Dr. Matthai.*—We are concerned with a very practical question. If we are going to give protection for the next ten years the whole question is, what is likely to be the consumption of superphosphate? If the Agricultural Department are not at present satisfied on that point, you can take it for granted that the raiyat is not going to be satisfied.

*Mr. Gupta.*—In other parts of India they are using superphosphates in large quantities, e.g., Madras, Hyderabad, Mysore and so forth.

*Dr. Matthai.*—There it has not put any positive conviction in the minds of the people that superphosphate is likely to result in any considerable improvement.

*Mr. Gupta.*—That is the case in regard to the introduction of fertilisers in all countries. Take the case of sulphate of ammonia. Five years ago Messrs. Brunner Mond & Co. did not sell more than 500 tons; now in the Bombay Presidency alone they are selling 5,000 tons.

*President.*—The import figures do not give superphosphates separately.

*Mr. Sharpe.*—They don't.

*Mr. Gupta.*—In Madras Messrs. Parry & Co. have proved that they are useful and that they are able to sell quite a lot of superphosphates.

*Dr. Matthai.*—As a matter of fact at present Parry's are making not more than 500 tons of superphosphate at Ranipet although there is a lot of rice cultivation in Madras.

*Mr. Gupta.*—Yes, at present, but it is growing every year. Take even Bihar and Bengal. It has been proved that all superphosphates are good.

*Dr. Matthai.*—They use rock phosphate also.

*Mr. Gupta.*—Yes, in powdered form. Messrs. Parry & Co. are contemplating putting up a rock phosphate factory.

*Dr. Matthai.*—At present Parrys are using very little bone. They are using almost entirely Algerian rock superphosphate.

*Mr. Gupta.*—They are contemplating manufacture it on a large scale.

*President.*—One point I wish to consider is this: how does bone superphosphate compare with rock superphosphate.

*Mr. Gupta.*—Bone superphosphate has got 3 per cent. nitrogen. It is nitrogenous manure as well as phosphatic manure. We have to increase the nitrogen content by adding ammonium sulphate or by adding other nitrogenous materials when we supply a complete fertiliser.

*Dr. Matthai.*—Taking your past experience how much of bone superphosphate have you been able to sell in a year?

*Mr. Gupta.*—We have already gone up to 100 tons per year in three years and 400 tons of mixtures. We generally put about 25 per cent. of superphosphates in the mixtures.

*Dr. Matthai.*—What are the other fertilisers?

*Mr. Gupta.*—Ammonia sulphate, bone meal, castor cake and other oil cakes, etc.

*Dr. Matthai.*—Taking all kinds of fertilisers including these mixtures, you are able to dispose of 100 tons of bone superphosphate.

*Mr. Gupta.*—Yes, at the present moment.

*Dr. Matthai.*—Now you are estimating for the next 10 years an increase in consumption to 2,500 tons?

*Mr. Gupta.*—Yes. As we said, the consumption of any phosphate in any country depends also on the consumption of other materials. As consumption of sulphate of ammonia, soda nitrate go up, phosphates also go up because to feed the soil with one kind of material and to leave the others would mean an ultimate shortage of other materials which the soil badly requires.

*Dr. Matthai.*—Most of the ammonia sulphate is used in the tea plantations?

*Mr. Gupta.*—For sugarcane also in Bombay. We are giving them mixtures containing bone superphosphate. Then there are groundnut cultivators they are also using bone superphosphate.

*President.*—We have got no import figures for superphosphates.

*Mr. Gupta.*—It is very difficult to get at the import figures.

*President.*—Bone superphosphate is not imported at all?

*Mr. Gupta.*—I don't think it is.

*Dr. Matthai.*—I suppose if superphosphate is imported at all it would be rock superphosphate.

*Mr. Gupta.*—Mostly.

*Dr. Matthai.*—If you make bone superphosphate here I think the price of it has to compare with the rock superphosphate.

*Mr. Gupta.*—Yes, taking into account 3 per cent. nitrogen that ours contain in addition to phosphate contents, it compares well. Every fertiliser is based on the unit content of phosphate or nitrogen or potash.

*President.*—How much nitrogen does the sulphate of ammonia contain?

*Mr. Gupta.*—20 to 21 per cent. nitrogen.

*Dr. Matthai.*—What is your realized price for bone superphosphate.

*Mr. Gupta.*—About Rs. 110 to Rs. 115 per ton.

*President.*—How does it compare with rock phosphate?

*Dr. Matthai.*—Messrs. Parry & Co.'s price for bone superphosphate f.o.r. Ranipet is Rs. 115 a ton and rock superphosphate is Rs. 85 a ton.

*Mr. Gupta.*—Yes. There is a difference of Rs. 30 which is accounted by the 3 per cent. nitrogen that the bone superphosphate contains.

*Dr. Matthai.*—I was inclined to think from the fact that Messrs. Parry & Co. are making hardly any bone superphosphate, but making only rock superphosphate, the cheapness of that practically displaces bone superphosphate.

*Mr. Gupta.*—It is not exactly so. Most of the bone is going out of the country, which makes the price dearer.

*Dr. Matthai.*—The fact is that your bone as raw material is so expensive at the present moment that the ryot is prepared to take the cheaper form of superphosphate irrespective of the nitrogen content.

*Mr. Gupta.*—Yes, but he pays for the nitrogen content separately.

*Dr. Matthai.*—I do not know whether he bothers about this nitrogen content.

*Mr. Gupta.*—I think he has to sooner or later.

*President.*—Bone meal you have taken at Rs. 77. That is crushed.

*Mr. Gupta.*—Yes.

*President.*—We have got to compare it with the imported rock superphosphate.

*Mr. Gupta.*—Even if we have to go in for rock superphosphate, we can get cheaper rock phosphate than other countries, I mean the Morocco or Egyptian phosphate.

*President.*—Let us take bone meal. What price you have to pay for bones.

*Mr. Gupta.*—We pay Rs. 60 to Rs. 65.

*President.*—Then you crush the bones. You have taken bone meal when giving the price.

*Mr. Gupta.*—We thought that the Board was not much concerned with the crushing of the bone meal. Packing charges will be about Rs. 5 to Rs. 7.

*President.*—How much bone meal do you use for one ton of superphosphate?

*Mr. Gupta.*—0.67 tons of bone meal per ton of superphosphate and acid 0.38.

*President.*—There is very little plant required for this.

*Mr. Gupta.*—Only the plant for mixing the bone in acid and the dens; then there is the building.

*President.*—You give Rs. 100 as the ex-godown price.

*Mr. Gupta.*—Yes.

*President.*—What other charges have you got to add to this ex-godown price.

*Mr. Gupta.*—All our fertilisers go direct from the works. Plant costs are about Rs. 40,000.

*President.*—I will have to go more fully into this later on. At present I want to get a rough idea of what this is. Please give me the value of the plant and the building.

*Mr. Gupta.*—

	Rs.
Book value of the plant . . . . .	35,700
Building . . . . .	18,000
	<hr/>
	53,700
	<hr/>

*President.*—Is there any reduction to be made in this?

*Mr. Gupta.*—Yes, in the building.

*Mr. Ramsingh.*—About 5 per cent. less. You may take Rs. 50,000.

*President.*—

	Rs.
Depreciation . . . . .	3,125
Interest on working capital . . . . .	4,875
Head Office, etc. . . . .	10,400
Profit . . . . .	5,000
	<hr/>
	23,400
	<hr/>

If you divide this by 2,500 it comes to Rs. 9. Adding this Rs. 9 to the *ex-godown* price of Rs. 107 (with sulphuric acid at Rs. 75 a ton) we get Rs. 116.

*Mr. Gupta.*—Yes, we get about Rs. 115.

*President.*—We have not got any figures as regards rock superphosphate.

*Mr. Gupta.*—\$5.5 per ton f.o.b. Casablanca, freight in bulk about 15 shillings per ton to Bombay. We can give you the estimate.

*President.*—We must get the import price of rock superphosphate.

*Dr. Matthai.*—Could you get me the estimate for rock superphosphate and the import price?

*Mr. Gupta.*—Yes. Messrs. Shaw, Wallace will be able to give you the import prices.

*President.*—The whole point is that rock superphosphate might also be manufactured in this country, but the price of bone superphosphate must be such that it should sell in competition against rock superphosphate if it is manufactured in the country.

*Mr. Gupta.*—That is why we want a reduction of freights on bones.

*President.*—There is a market for bones. Where is the market?

*Mr. Gupta.*—For exporting they are crushing round about Thana.

*President.*—If you want to buy bones, where do you buy them?

*Mr. Gupta.*—We buy from Raichur, Akola and so on.

*Dr. Matthai.*—You pay more than the manure rate, do you?

*Mr. Gupta.*—Yes, much more. We tried hard for a reduction, but there has been no reduction whatsoever.

*Dr. Matthai.*—Have you had any assistance from the Agricultural Department in regard to your superphosphates, that is to say, have they been recommending the use of this?

*Mr. Gupta.*—They have been recommended in certain districts, but mainly for horticulture. But, as I said, the experiments carried out by them were not at all decisive.

**THE EASTERN CHEMICAL COMPANY, LIMITED AND THE  
DHARAMSY MORARJI CHEMICAL COMPANY, LIMITED.**

**Oral Evidence of Messrs. DONGARSINGH RAMSINGH, W. S.  
SINCLAIR, H. SHARPE, and G. St. JOHN COWPER,  
recorded at Bombay on Monday, 25th March, 1929.**

*Superphosphate.*

*President.*—Since we last met we have been able to go through the figures that we discussed when we were in Bombay, and you will recollect we then proceeded on a 4,000 ton footing. Of course, you are at liberty to carry on your business as you like, but it is quite obvious that an industry which wishes to make out a case for protection has also to make out that it is reasonably well organized, and we would like you to understand fully that if we are to make any proposals on your present output it will involve an amount of protection which no Government would look at. It is a hopeless position. As you must know yourselves, if we were to make any proposals which would make up the difference between your present costs including your profit and the present import price, the amount of protection might come to 100 or 150 or even 200 per cent. in some cases. The main reason we can give in support of protection is that the industry is well organized, and therefore you must remember that we are now investigating the question as if the industry was fairly well organized, that is to say, it should obtain an average production, not at once but after a time, of 4,000 tons. Another point I would like you to understand is this. We are very seriously considering the question of granting a bounty to sulphuric acid used in the production of superphosphate but you must be able to show that you would produce it at a price which would compare reasonably well with the import price. Superphosphate may either be made from rock phosphate or from bones as the case may be, but as regards the manufacture from bones that may be more expensive than imported rock phosphate. But whatever it is, we must be satisfied before we commit ourselves to any proposal that there is a reasonable prospect of your being able to produce it eventually at a competitive price. We have not received any estimates as regards that.

*Dr. Matthai.*—Mr. Ramsingh, I think you promised to give us some estimate of the cost of manufacturing superphosphate?

*Mr. Ramsingh.*—We have asked for quotations for the price of rock phosphate from abroad but we have not received any reply yet.

*President.*—How long are we to wait then? We must finish our work sometime and mere quotation won't take us very far. It is your business really to get the information for us; it is not our business to work out these proposals in order that you may afterwards do business! When we left Bombay, I think, we explained to you that we wanted these figures.

*Mr. Sinclair.*—We had no practical experience of the manufacture of superphosphate but we did let you have an estimate we had of a plant manufacturing for 100,000 tons per annum. We gave you the file containing this and other superphosphate plant estimates.

*President.*—Even in more recent text books these costs are given. It is well known how much sulphuric acid of what strength is required for one ton of superphosphate made out of phosphate rock. For instance, you know what processes are involved and you ought to be able to make a fair estimate. Of course, you cannot take a unit of 100,000 tons in India. A unit of, say, 10,000 tons would be about the limit.

*Mr. Sinclair.*—At the time the estimates were given us—that was in 1923-24—we were informed that one of 100,000 tons per annum was the only economic unit one could expect any profit from.



*President.*—It would be quite true that under European conditions you might require a unit of 100,000 tons but that does not mean that every country ought to have a unit of 100,000 tons. It all depends upon the conditions of competition and other things.

*Mr. Sinclair.*—We would be only too pleased to go into it, but we left it to the other company, as they said they had experience.

*Mr. Ramsingh.*—We will work it out and let you have the information.

*Dr. Matthai.*—What we want is the cost of superphosphate manufactured either from rock phosphate or from bones on an output of somewhere about 5,000 to 10,000 tons.

*President.*—Let us have one for 5,000 tons and another for 10,000 tons.

*Dr. Matthai.*—Mr. Ramsingh, you have a plant for making superphosphate from bone. Could you use that for making superphosphate from rock phosphate?

*Mr. Ramsingh.*—Yes; we have already used it for rock phosphate. We shall only have to put in a different type of disintegrator. There is no difficulty about that.

*Mr. Mathias.*—Where did you get your rock phosphate from?

*Mr. Ramsingh.*—From Trichinopoly.

*Mr. Mathias.*—It was a mere experiment?

*Mr. Ramsingh.*—Yes.

*Mr. Mathias.*—You did not put any on the market?

*Mr. Ramsingh.*—No.

*President.*—What about the price of imported rock phosphate?

*Mr. Ramsingh.*—We don't know yet.

*President.*—We don't know what the freights are. The price is given in the trade journals. They give the prices per unit. You can take 65 per cent.

*Mr. Ramsingh.*—We will work out on that basis.

*President.*—But we do not know what the freight is: it is only a question of adding the freight. We don't know whether it is cheaper to get it from the Red Sea because the freights would be less from the Mediterranean as there are more ships calling there than at these ports on the Red Sea.

*Dr. Matthai.*—Whom have you asked for the price of rock phosphate?

*Mr. Ramsingh.*—Our London agents.

*President.*—Mr. Sinclair, you can cable to your office in London and you ought to be able to get the price in no time because there are only two or three companies which deal in these.

*Mr. Sinclair.*—We will. We can work out the estimate on the basis of Dharamsi Morarji Chemical Company's figures, having no practical experience ourselves, and in the meantime we will cable to our London office for the figures.

*President.*—As regards this rock phosphate, this would be taken from some centre to Holland which is one of the principal producers and which really exports superphosphate to this country. You ought to be able to get what the freight from that place to Holland is, that is to say, what advantage or disadvantage you have as regards that.

*Mr. Sinclair.*—It is probable that our office will give a c.i.f. quotation Bombay.

*President.*—We want the f.o.b. price.

*Mr. Sinclair.*—We will try to get it for you.

*President.*—Then you would give us the estimate in the usual way and tell us the processes so that we may be able to see whether, if these processes are followed, the costs would amount to what you suggest.

*Mr. Sinclair.*—We will have to rely on information we get from Messrs. Dharamsi's for that.

*Sulphuric Acid.*

*President.*—We took an output of 4,000 tons. Supposing you got protection for five or seven years, that we might take as the average production, but eventually you must run up to a higher figure. Supposing we took Dharamsi's plant which has a capacity of 8,000 tons, as a typical plant you must work it up to full capacity sometimes provided you have got the market for it. If the output reached, eventually, 8,000 tons of sulphuric acid and salts in proportion, then as regards the sulphuric acid there should be a considerable reduction in costs.

*Mr. Sinclair.*—Yes, there will be.

*President.*—That is to say, what we may call permanent charges, e.g., depreciation, head office expenditure and so on, may be halved. You don't incur any additional depreciation: the profit you must earn on the total investment. That will be divided by 8,000 instead of by 4,000.

*Mr. Sinclair.*—Yes.

*President.*—Also as regards general repairs, supervision and all that on the plant itself, these would not increase.

*Mr. Sinclair.*—That is correct.

*President.*—Then again, you may buy your materials yourselves and there may be some slight reduction when you buy sulphur in much bigger quantities. For instance, Tatas buy theirs and there is a difference of 10 shillings a ton. That means a difference of 3 shillings on each ton of sulphuric acid.

*Mr. Sinclair.*—Yes.

*President.*—According to the estimate that we made out of the market, making allowance for your company being able to compete in the interior also to some extent, it will not absorb 8,000 tons at all. It comes to just about 5,000 tons.

*Mr. Ramsingh.*—It would be about 5,700 tons.

*President.*—Yes, that is the limitation to-day. Supposing instead of two plants one plant worked, it won't take very much time to run up to 4,000 tons, but the trouble will come when you want to go up from 4,000 to 8,000 tons.

*Mr. Sinclair.*—That depends on the production of fertilizers. That is the only thing in which an increase can be thought of.

*President.*—Leaving fertilizers out the prospect of your getting up to 8,000 tons is not very brilliant.

*Dr. Matthai.*—On an average 4,000 tons would be about the market for the next few years?

*Mr. Sinclair.*—Yes.

*President.*—You will agree that if the plant worked to full capacity there will be a substantial reduction in the price of sulphuric acid and it will follow that there will be a corresponding reduction in the price of other products?

*Mr. Sharpe.*—Yes.

*President.*—As regards sulphuric acid we have taken it at 100 per cent. Of course it is only a theoretical percentage, and that runs through all the acids. What is the strength of your hydrochloric acid?

*Mr. Ramsingh.*—31½ per cent.

*Dr. Matthai.*—Will you please look at your answer to question 14? There you give certain quantities of materials required for hydrochloric acid, salt 1·1 and sulphuric acid 1·0. Does that refer to 33 per cent.?

*Mr. Ramsingh.*—Yes.

*Dr. Matthai.*—When we examined you on the last occasion, you told us that it is about 70 per cent.

*Mr. Ramsingh.*—I said hydrochloric acid 33 per cent. and nitric acid 70 per cent.

*President.*—Ordinarily nitric acid is supposed to be 65 per cent.

*Mr. Sharpe.*—69.8 per cent.

*President.*—Yours is 70 per cent.

*Mr. Sinclair.*—We have taken 100 per cent. for calculation purposes only.

*President.*—When you say "commercial acid" what do you mean? Is it rectified oil of vitriol?

*Mr. Sharpe.*—That is commercial acid. At the present day no one buys the lower strength.

*President.*—Messrs. Waldie and Company supplied sulphuric acid to the Tinsplate Company. They call it sulphuric acid. It is about 80 per cent.

*Mr. Sharpe.*—That is what we call tower acid. There is practically no sale in Bombay for that acid.

*President.*—We must make these things comparable.

*Mr. Sharpe.*—That is why we took sulphuric acid at 95 per cent. and chamber acid at 100 per cent.

*President.*—Supposing we are to compare your costs with the prices in Europe, what do you suggest we should take your R. O. V.

*Mr. Sharpe.*—95 per cent.

*President.*—Chamber acid is not sold in Europe.

*Mr. Sinclair.*—In some cases it is.

*President.*—You have given us the consumption of sulphuric acid at 1:1 in the R. O. V.

*Mr. Sharpe.*—There is a loss of just under 10 per cent.

*President.*—But that is a lot considering 100 per cent. sulphuric acid. They would not take 100 per cent. chamber acid?

*Mr. Sharpe.*—No.

*President.*—What would they take?

*Mr. Sharpe.*—They would take 59 or 60 per cent. That is then to be concentrated to 95 per cent.

*President.*—If you took 1:1 of that, I could understand.

*Mr. Sharpe.*—No, it would need 1:32.

*President.*—If you had good practice, the ordinary amount of wastage would be 3 or 4 per cent.

*Mr. Sinclair.*—You do get back a certain amount of weak scrubber acid which is no good for sale.

*President.*—If you are manufacturing Epsom salts and other things, I want to know what that means. If you use 1:1 and take no credit for the inferior acid, the cost of R. O. V. will be very much higher.

*Mr. Sharpe.*—Not very much higher.

*President.*—It would make a difference of Rs. 3 or Rs. 4.

*Mr. Sharpe.*—Yes.

*President.*—You have got to deduct from your price Rs. 3 or Rs. 4 in order to get a better comparison.

*Mr. Sharpe.*—Yes.

*Mr. Mathias.*—That would give you 100 per cent. R. O. V. acid.

*Mr. Sharpe.*—The 100 per cent. figures are just the calculated figures. Everything is worked up to 95 per cent.

*Mr. Mathias.*—For the purpose of calculating R. O. V. 100 per cent., the amount of chamber acid taken is 1:1.

*Mr. Sharpe.*—It will be just the same. The quantities used would be the same. What we actually did in this particular case was that we gave the

actual costs of production for 95 per cent. acid. Then the President wanted us to calculate it at 100 per cent. and that was done.

*President.*—With ordinary practice you would expect 1-1.

*Mr. Sharpe.*—Yes.

*President.*—Supposing we took 4,000 tons as the average production for the period, as regards sulphuric acid we can say that would be 4,000 tons, but as regards the salts and the sulphates, really it is impossible to say how your production would go up. Supposing we said that 4,000 tons of sulphuric acid would include a certain proportion of the other salts and the sulphates, would that be a right way of doing it? We take 4,000 tons as the average production of sulphuric acid, but if you are to manufacture all the salts, 2,000 tons of Epsom salt and 500 tons of something else, you would require 6,000 tons of sulphuric acid. Therefore you would have to adjust your production in such a way that your production of the salts and the sulphates would absorb the average of 4,000 tons. Obviously you would manufacture those salts which would pay you most. You will say to yourself "now we have got more sulphuric acid and let us see how we can do it". You will manufacture all salts first which will be more remunerative and then manufacture salts which are less remunerative, but there is no means by which we can say definitely what would be the average production of each of the salts during this period if you are manufacturing 4,000 tons on an average.

*Dr. Matthai.*—The point is rather this: at present you are producing about 2,000 tons of chamber acid. If you are able to cater for the whole of the Bombay market, your output would be 6,000 tons.

*Mr. Sinclair.*—Yes, including acid required for salts.

*Dr. Matthai.*—Including everything. So that during the period of protection you will be gradually increasing your output from 2,000 tons to 6,000 tons. When it comes to the manufacture of salts, you would rather concentrate in the earlier stages on such salts as you can manufacture to full capacity. When you have done that, you pass on to other salts. That would be the economic way of doing it.

*President.*—For instance, take zinc chloride or sodium sulphide. Those are the salts which you would probably touch at the very last. Those are salts which would pay you only when your output of sulphuric acid has exceeded 4,000 tons and touches 6,000 or 8,000 tons. During the interval, as my colleague put it to you just now, you will go on manufacturing as much sulphuric acid as you can sell in the market as such and the remainder you will use in the manufacture of those salts which pay you most and you will manufacture those salts to your full capacity before changing over to others.

*Mr. Sharpe.*—Not necessarily.

*President.*—Not necessarily, but generally that is what you would attempt to do. First of all, you would manufacture the things for which you could find a market and then go on increasing your sulphuric acid in order that you could capture the market for other salts. Therefore, you would be justified in taking each salt as it is produced with the plant working to full capacity.

*Mr. Sinclair.*—Yes.

*Dr. Matthai.*—That is quite clear. During the protective period when we are taking the average production of chamber acid (100 per cent.) at 4,000 tons, we would be justified during that period in basing the cost of Epsom salts not on the average but on the full output.

*President.*—Whichever production you happen to have.

*Mr. Sinclair.*—Epsom salt is most attractive to us.

*President.*—And probably potash alum.

*Mr. Sinclair.*—Yes.

*President.*—So that you at once start working to full capacity in those things. In our earlier discussions that was what we took into account, and your full capacity was equal to the market.

*Mr. Sinclair.*—Yes.

*President.*—Therefore you would be justified in working to full capacity up to that stage. Then you would increase your output of sulphuric acid and go in for the remainder.

*Mr. Sinclair.*—Yes.

*President.*—You will remember that in making that rough estimate for head office and agents commission we took about 8 per cent. When I totalled them up, I got a big figure.

*Mr. Sharpe.*—Have you totalled up all the office charges?

*President.*—Yes. They came to about Rs. 1,32,000 and your selling charges came to about Rs. 32,000. The latter figure appears to be rather inadequate whereas the former appears to be a little excessive. I have redistributed them in such a way that you would probably get when you reach 4,000 tons about Rs. 50,000 for selling charges and something approaching Rs. 1 lakh as regards head office charges and agents' commission. That I thought would be a much fairer way of doing it than this.

*Mr. Sharpe.*—Yes.

*President.*—I would like to put a certain percentage on the works costs which would eventually give that result, which would be less than 8 per cent. The idea is to get a lump sum for these two charges and then fix the percentage in such a way that the aggregate comes to that amount.

*Mr. Sharpe.*—Yes.

*President.*—Of course, I cannot tell the exact figure, but those are the lines in which we ought to proceed. Obviously Rs. 1,30,000 is excessive.

*Mr. Ramsingh.*—Yes, it is.

*President.*—And Rs. 32,000 is not adequate.

*Mr. Ramsingh.*—That is true.

*Mr. Sinclair.*—One of the reasons for our fixing the charges so high is that we have large bank overdrafts.

*President.*—We have already allowed you interest on working capital separately. That has gone in there.

*Mr. Sinclair.*—That does not entirely cover our overdrafts.

*President.*—As you see, working out the results, we cannot justify it.

*Mr. Sinclair.*—Provided we ran on your financial basis, these could be reduced.

*President.*—When we were making those rough estimates we made a reduction—and I think you also agreed that when the output increased there would be a reduction—in the cost of the raw materials also to a certain extent.

*Dr. Matthai.*—By avoiding wastage, etc., you might be able to do with slightly smaller quantities of materials.

#### *Epsom Salt.*

*President.*—For instance, you work the Epsom salt plant for two days and you produce 5 tons of Epsom salt. After six months, you start making another 10 tons.

*Mr. Sharpe.*—The figures we have given are based on 96 per cent. efficiency for Epsom salt and so the quantities of raw materials will not be reduced.

*Dr. Matthai.*—The practical point is this. Taking Dharamsi's costs—I will give you actual figures—they have produced 1,200 tons of sulphuric acid and the actual consumption of sulphur is .37 of a ton. In the future price on an output of 4,000 tons the actual figure that we have decided to take is .33. That reduction is a reduction which we might anticipate consequent on a larger production and better practice as a result of larger production.

*Mr. Mathias.*—In the case of all these chemicals your future estimate of 4,000 tons shows a reduction in materials resulting from continuous working.

*Mr. Sharpe.*—Yes.

*Mr. Mathias.*—Take the case of Epsom salt plant. Dharamsi's give about 10·3 cwt. whereas you have given ·4 of a ton.

*Mr. Sinclair.*—Ours are based on a high efficiency. We could not look for any reduction on these costs at all.

*Mr. Mathias.*—No, unless, of course, you were producing 15,000 tons. The reduction in price will not mean a reduction in practice.

*Mr. Sinclair.*—These would be on the overheads, not on raw materials. The yield would be the same.

*President.*—The only thing that would happen is that there may be a reduction not in the quantity but in the price of raw materials from other countries.

*Mr. Sharpe.*—Yes.

*Mr. Sinclair.*—That might be counter-balanced by more money being locked up if larger quantities of raw materials were bought.

*Mr. Mathias.*—What is the present cost of bauxite? The G. I. P. Railway has reduced the freight and therefore you cannot say that this price of Rs. 23 per ton takes into account the reduction in freight given by the G. I. P. Railway.

*Mr. Sinclair.*—Here is a letter we have, dated 15th March, from Mr. Peston Jamas and he says if the railways reduce the freight the price would come down to Rs. 20 per ton f.o.r. Bombay.

*President.*—We are talking of the Central Provinces bauxite which is delivered in Calcutta at about Rs. 16 and the distance from there to Bombay is about the same and therefore we proposed to cut this price of Rs. 23 to Rs. 16 per ton. It is not necessary that you should buy from Mr. Peston Jamas: you can buy from the cheapest market. Freight from Calcutta to the Central Provinces at present is Rs. 10 per ton and the same is the freight to Bombay.

*Mr. Mathias.*—Did you have any quotation from Katni?

*Mr. Sinclair.*—No.

*President.*—The freight really comes to 0·1 of a pie per maund per mile. That you may take as correct. We examined the railway companies in Calcutta and if the G. I. P. Railway has not done it on this section it is merely a matter of asking for it, otherwise the traffic would go the other way.

*Mr. Sinclair.*—We are making a note of it.

#### Alumina ferric and alumina sulphate.

*President.*—Now, as regards this alumina ferric and alumina sulphate we must try to understand the difference. So far as you are concerned you don't manufacture any alumina sulphate, Mr. Sinclair?

*Mr. Sinclair.*—No.

*President.*—On the Calcutta side they manufacture both and therefore we have got to find out the fair selling price of both.

*Mr. Sharpe.*—I think in Calcutta they make both from the same stuff; in alumina ferric it means that they save the refining cost.

*President.*—You think it is merely a question of purification or using some other material with it?

*Mr. Sharpe.*—I don't think they make use of any other raw material. In the manufacture of pure alumina sulphate it is possible that the bauxite is first fused with soda ash.

*Dr. Matthai.*—They told us that they made alumina sulphate from imported aluminium hydroxide. The point we are concerned with is this: We have got a certain c.i.f. price from leading importers here for alumina

sulphate: we have your alumina ferric and then we find what is the fair selling price for alumina ferric. Are we justified in saying that your fair selling price can be compared with the selling price of imported alumina ferric?

*Mr. Sinclair.*—No, alumina ferric must not be confused with alumina sulphate.

*President.*—In Calcutta for alumina ferric they get about Rs. 70 per ton and for alumina sulphate they get about Rs. 80.

*Mr. Sinclair.*—There is a difference in the home price between the two. The price of alumina sulphate is £6-15-0 and that of alumina ferric £4-12-6 per ton, a difference of £2-2-6.

*Dr. Matthai.*—That is about Rs. 30. The difference that we got in Calcutta was about Rs. 12.

*Mr. Matthai.*—In your average realized price for 1928 you give the realized price for alumina ferric as Rs. 100. That Rs. 100 corresponds to this import price of £6-15-0 for alumina sulphate. What price are we to take? Are we to take your realized price of Rs. 100, Mr. Ramsingh?

*Mr. Ramsingh.*—No.

*President.*—We must do something as regards this. The position is simply this: at Calcutta they are not getting, either owing to competition or something else, the c.i.f. price plus the duty for alumina sulphate. The c.i.f. price of alumina sulphate given by Messrs. Brunner Mond is Rs. 94 and they are selling at Rs. 80 per ton. The price of alumina sulphate is £6-15-0 and that of alumina ferric £4-12-6 according to the trade journals. That is a difference of £2-2-6. Supposing the freight, insurance and other charges are the same in both, if we take away from Rs. 94, £2-2-6 (Rs. 28) we get the c.i.f. landed price of alumina ferric. That would give us about Rs. 70. We have got Rs. 94 as the c.i.f. landed price of alumina sulphate and therefore the c.i.f. landed price of alumina ferric would be Rs. minus £2-2-6 or say Rs. 66 and there in Calcutta they get about Rs. 70.

*Mr. Sinclair.*—Yes.

*President.*—And in that case they are getting more or less the import price plus the duty; in the case of alumina sulphate on the other hand they are getting Rs. 80 which is even below the c.i.f. price.

*Dr. Matthai.*—They are making both. They are getting somewhere about Rs. 70 for alumina ferric and about Rs. 83 for alumina sulphate.

*Mr. Couper.*—Our experience is that buyers come and ask for a certain quality and then take a lower quality, i.e., they would ask for 17—18 per cent. and accept 15—16 per cent.

*President.*—The paper mills wouldn't do that. They would take only the pure white stuff.

*Dr. Matthai.*—They told us that they were selling both and that the difference in the prices realized between the two were about Rs. 12 to Rs. 13 per ton.

#### *Hydrochloric Acid.*

*President.*—In the hydrochloric acid estimate, you have taken 100 per cent.

*Mr. Sharpe.*—Yes.

*President.*—In that there is a very big item, power and fuel which is given at Rs. 100. That means 6 tons of coal.

*Mr. Sharpe.*—Yes.

*President.*—I don't think it is your figure either.

*Mr. Sharpe.*—It is not. Ours is considerably less.

*President.*—It should not exceed 3 tons as a matter of fact.

*Mr. Sharpe.*—I should say 3 tons would be enough.

*President.*—It would be about 2·2 if you had good practice. That would have to come down by about half.

*Mr. Ramsingh.*—Our plant is a combined one—hydrochloric acid plant and salt-cake plant. As the two processes are simultaneously taking place, the consumption of coal has increased.

*President.*—You have already taken credit, for the salt cake. The salt cake must pay for it.

*Mr. Ramsingh.*—Yes.

*President.*—In their case they don't take any credit for salt cake. In your case we have taken credit for salt cake at Rs. 30. Either you take credit for your salt cake and reduce your fuel or allow nothing for your salt cake. You can't have it both ways.

*Mr. Ramsingh.*—That is true.

#### *Zinc chloride.*

*President.*—In that case it will come down to about half. Let us take zinc chloride. I think zinc scrap was taken at Rs. 300 a ton. We examined the Tata Iron and Steel Company in Calcutta and we were told that they have got zinc ashes.

*Mr. Ramsingh.*—Zinc dross.

*President.*—Zinc dross is zinc really. I don't know how much percentage of zinc it contains, but they are exporting it. At present their output of galvanised sheets is very small. Therefore even if you bought the zinc ashes, you would not get very much. According to their programme, the production of galvanised sheets would go up and more zinc ash would be available. In the Iron and Coal Trades Review the price of zinc ash is given as £6 or £7. The point is that you may be using a more expensive material. I am not suggesting that you will be able to get it now. There is no market for zinc ash in this country and therefore they are exporting it.

*Mr. Ramsingh.*—Have you got the analysis of zinc ash?

*President.*—I think Mr. Sawday told us that the zinc ash contains about 40 per cent. of zinc. If you paid them the f.o.b. price that they are getting and brought it up to Bombay eventually you might be able to make your zinc chloride cheaper.

*Mr. Sharpe.*—Yes.

*Dr. Matthai.*—In your cost of zinc chloride for 1925-26, zinc is entered at Rs. 150 a ton. How did you manage to get that?

*Mr. Ramsingh.*—We bought the zinc skimmings from the Tata Iron and Steel Company.

*President.*—Zinc ash 70 per cent. is sold in England at £8-5-0 c.i.f. It is probably £6 f.o.b. If you are able to get that, I don't know how much you would require per ton.

*Mr. Sharpe.*—I would depend upon its zinc content.

*Mr. Mathias.*—Have you made any enquiries from the Tata Iron and Steel Company regarding zinc ash?

*Mr. Ramsingh.*—We purchased once from the Tata Iron and Steel Company.

*President.*—You say zinc dross, but zinc dross is very different from zinc ash.

*Mr. Ramsingh.*—We used zinc skimmings.

*President.*—That is also different from zinc ash.

*Mr. Mathias.*—Mr. Sawday when giving evidence said that he made enquiries in Bombay and that he could not find a market for it. I was wondering whether he approached you or not. Did you make any zinc chloride last year?

*Mr. Ramsingh.*—None.



*Mr. Mathias.*—That would probably account for Tatas not being able to find a market. In the previous year and the year before that, they sold it to you.

*Mr. Ramsingh.*—Yes.

*President.*—At present they have not got enough ash. As I was telling you they produce about 10 tons of 40 per cent. zinc ash. Therefore that 40 per cent., if they are exporting, you would get at their f.o.b. price from Tatas. To that you have to add the freight from Jamshedpur to Bombay. With 40 per cent. you would require 1½ tons. When they are able to give you 40 or 50 tons a month or more you may be able to bring down the average cost of the zinc. Even that won't suffice for 500 tons. It will be worth while enquiring from Tatas what the future prices will be. I think *Mr. Ramsingh*, you must use zinc ash at Rs. 120.

*Mr. Mathias.*—Rs. 120 must include the freight from Jamshedpur.

*President.*—*Mr. Ramsingh*, you are familiar with the Textile Industry.

*Mr. Ramsingh.*—Yes.

*Use of sodium sulphide and zinc chloride in the manufacture of cloth.*

*President.*—Taking an average pound of cloth how much sodium sulphide and zinc chloride will be required?

*Mr. Ramsingh.*—Sodium sulphide is required in connection with dyeing only. One product only can be used in grey cloth and that is zinc chloride.

*President.*—Tell me how much zinc chloride is used in that one lb. of cloth and also how much sodium sulphide and also give me the price of cloth.

*Mr. Ramsingh.*—The average price of, say, black long cloth is about Re. 1 per lb. of cloth. If it is 100 lbs., the price will be about Rs. 100. To dye this 100 lbs. of cloth we require 6 lbs. of sulphur black and 3 lbs. of sodium sulphide. The cost of sodium sulphide will be about one anna per lb. Take the grey long cloth which is heavily sized. The price will be about 15 annas per lb.

*President.*—How much zinc chloride is required in that 100 lbs. of grey cloth?

*Mr. Ramsingh.*—About 3 lbs.

*President.*—Does the weight go up by that?

*Mr. Ramsingh.*—The weight given is the weight of the finished cloth.

*President.*—It includes the weight of zinc chloride.

*Mr. Ramsingh.*—Yes.

*Foreign prices.*

*President.*—Before we go into foreign prices, I dare say you have worked out the figures, and seen what the results show. Did you work out the fair selling prices?

*Mr. Sharpe.*—We took them in some of the cases.

*President.*—You might have found generally speaking, except in regard to Epsom salts, sodium sulphide and zinc chloride, the protection that you require will not be much more than what you are getting now, assuming that you are doing 4,000 tons. That is the position. As regards the others there is some difference.

*Mr. Sharpe.*—Yes.

*Mr. Ramsingh.*—Yes.

*President.*—Now you have got to see what the foreign prices are. First of all, let us take foreign prices as they are to-day. Has there been any substantial alteration in these prices?

*Copper sulphate.*

*Mr. Ramsingh.*—The price of copper sulphate has gone up.

*President.*—Because the price of copper has gone up.

*Mr. Ramsingh.*—Yes.

*President.*—So that the ratio would remain the same.

*Mr. Ramsingh.*—Yes.

*Epsom salt.*

*President.*—We will take these prices one after another. We will take the c.i.f. prices as they have been given to us by Brunner Monds. The c.i.f. price of Epsom salt is £3-17-0. We have agreed that we have to add Rs. 5-8-0 to the c.i.f. prices to bring them to the godown prices. Is that correct?

*Mr. Sharpe.*—Yes, for godowns near the docks.

*President.*—That would apply to all these salts.

*Mr. Sharpe.*—Yes.

*President.*—Is £3-17-0 the right price to be taken? That is the price given to us by the Brunner Monds.

*Mr. Cowper.*—That would be about right.

*Copperas.*

*President.*—The c.i.f. price of copperas is £4-18-0. Is that right?

*Mr. Cowper.*—That would be about correct.

*Potash alum.*

*President.*—For potash alum, the price given to us by Brunner Monds is £8-12-6. Is it the same as alum?

*Mr. Cowper.*—Yes.

*Glauber's salt.*

*President.*—Glauber's salt is £4.

*Mr. Cowper.*—We know the right price for Glauber's salt. Haverro Trading Company sold to one of our mills anhydrous sodium sulphate at Rs. 4-14-0 per cwt. which was 98 per cent. sodium sulphate; whereas our Glauber salt is about 44 per cent. sodium sulphate. Haverro's is concentrated and is nearly double the price of ours.

*President.*—That comes to only Rs. 97-8-0 per ton.

*Mr. Sharpe.*—Yes.

*President.*—That is very much cheaper.

*Mr. Cowper.*—Yes, it is. Consequently we have lost the business from our own mill.

*President.*—Brunner Monds have given us a price of £4. What would that be?

*Mr. Cowper.*—44 per cent. sodium sulphate.

*President.*—Rs. 97-8-0 is the price delivered at the mill. Let us reduce it to c.i.f. Supposing we deducted Rs. 5 for cartage, etc., it would come to Rs. 92-8-0. But it includes the duty. How much is the duty?

*Dr. Matthai.*—On Glauber's salt, it is 15 per cent.

*President.*—That would bring it down to about Rs. 80 without duty.

*President.*—That is 98 per cent., so for 44 per cent. it comes to about Rs. 36. The freight would be about 25 shillings according to what you say.

*Mr. Cowper.*—Freight on Glauber's salt is much less.

*President.*—This is what one of your mills actually bought at?

*Mr. Cowper.*—Yes.

*President.*—This happened since we last met?

*Mr. Cowper.*—Yes, within the last 10 days. The position is this. We have been supplying our mills all along on an average 5 to 6 tons a month. They buy in quantities of two to three tons at a time. Then Haverø quoted and the analysis of the samples showed 98 per cent. sodium sulphate for their quality against 44 per cent. for ours. Our mills, therefore, found it a more economical proposition to purchase Haverø's Glaubers than ours. They purchased a trial lot.

*President.*—Being concentrated they probably paid less freight.

*Mr. Cowper.*—I think so.

*President.*—What is this sodium sulphate (salt cake)?

*Mr. Sharpe.*—That is the crude stuff just as it is taken out of the hydrochloric acid plant.

*President.*—That is £2-10-0.

*Mr. Sharpe.*—That would be comparatively cheap. Glauber's salt is £2-5.

*President.*—Even if we take £2-5-0 that would not give you Rs. 36.

*Mr. Cowper.*—Not with the English freight.

*Mr. Sinclair.*—There are big variations in the price of Glauber's salt. The prices given for February are £3-10-0 to £3-15-0 f.o.b.

*President.*—We were given £4 c.i.f. Glauber's salt is also used in the textile industry?

*Mr. Ramsingh.*—Yes.

*President.*—And Epsom salt?

*Mr. Ramsingh.*—That is used for finishing purposes?

*President.*—You will work out the same thing for Glauber's salt and also for Epsom salt?

*Dr. Matthai.*—Give me a typical kind of cloth.

*Mr. Ramsingh.*—The typical cloth would be what we call Sholapur-coatings. I will bring some samples to-morrow.

*Dr. Matthai.*—What is the price of 100 lbs. of that cloth?

*Mr. Ramsingh.*—Rs. 1-5-0 per lb. and the finishing charges for this would be only 1 anna 8 pies per lb. of cloth.

*Dr. Matthai.*—What would be the Epsom salt in it?

*Mr. Ramsingh.*—About 6 to 7 pies.

*Dr. Matthai.*—Can you tell me how many lbs. of Epsom salt go into this 100 lbs. of coating.

*Mr. Ramsingh.*—I will get you that figure to-morrow.

*Dr. Matthai.*—And also the corresponding figure for Glauber's salt.

*Mr. Ramsingh.*—Yes.

**THE EASTERN CHEMICAL COMPANY, LIMITED, AND THE  
DHARAMSI MORARJI CHEMICAL COMPANY, LIMITED.**

**Continued on 26th March, 1929.**

*Salt used in cloth manufacture.*

*Dr. Matthai.*—Mr. Ramsingh, have you got those figures showing the quantities of salt used per unit of cloth?

*Mr. Ramsingh.*—Yes (hands in).

*Dr. Matthai.*—Kindly let us have the statement in this form: first of all give the kinds of cloth and the quantities of each of the five salts, viz., zinc chloride, magnisium chloride, sodium sulphide, epsom salt and Glauber's salts, used per unit of cloth.

*Mr. Ramsingh.*—I will prepare the statement just now and give it to you.

*Copper sulphate.*

*President.*—Now let us take copper sulphate. Brunner Mond's gave us £28-5-0.

*Mr. Cowper.*—The market has risen since then.

*President.*—But since then the price of copper has risen.

*Mr. Sharpe.*—Yes.

*Mr. Cowper.*—There is one thing to be pointed out here. The English price is 10s. higher than the German per ton.

*President.*—Is that so?

*Mr. Cowper.*—Yes.

*President.*—Where can we find it?

*Mr. Cowper.*—I can bring copies of indents from the bazar to-morrow.

*President.*—That I think would be practically accounted for by the freight from the Continent.

*Mr. Cowper.*—It may be.

*President.*—There is a difference of 10s. a ton on an average.

*Zinc chloride.*

*President.*—Alumina ferric we have already dealt with. The price of zinc chloride given to us by Brunner Mond's is £18-10-0.

*Mr. Mathias.*—The imported chloride would be solid.

*Mr. Sharpe.*—Yes.

*Mr. Mathias.*—Would that be comparable to the local product?

*Mr. Ramsingh.*—Ours also is solid.

*President.*—Sodium sulphide would be concentrated.

*Mr. Sharpe.*—Yes.

*President.*—What per cent. is that?

*Mr. Sharpe.*—62 per cent.

*President.*—Brunner Mond's gave us Rs. 147-8-0 as the price. In England it is about £9-10-0.

*Mr. Ramsingh.*—At present the bazar price is Rs. 7 per cwt.

*Mr. Cowper.*—Bazar dealers must be making money on that themselves.

*Sodium sulphide.*

*President.*—What is the freight on sodium sulphide? Would it be 25 shillings?

*Mr. Cowper.*—30 shillings.\*

*Mr. Mathias.*—It would be about Rs. 20.

*Mr. Cowper.*—About that.

*President.*—The British price is £9-10-0 or Rs. 127 0 0

Freight . . . 20 0 0

Landing, etc. . . 5 8 0

Rs. . 152 8 0

Then, there is the duty.

*Mr. Ramsingh.*—The price that I told you is the German price. We buy from the Haverø Trading Company.

*Mr. Cowper.*—Theirs is the better quality in the bazar and it is also cheaper.

*President.*—The price has fallen since we started enquiring apparently.

*Mr. Cowper.*—I shall endeavour to get prices from actual indents from the bazar.

*President.*—Will you also bring any evidence to suggest whether the price has fallen?

*Mr. Cowper.*—I shall try and get you that too.

*Dr. Matthai.*—Did you say Rs. 7 per cwt.?

*Mr. Ramsingh.*—Yes.

*Dr. Matthai.*—Has there been any change in the price?

*Mr. Ramsingh.*—For the last purchase we made we paid only Rs. 7 per cwt.

*Mr. Mathias.*—When was that?

*Mr. Ramsingh.*—About a fortnight ago.

*Mr. Mathias.*—Would it include the agents' commission?

*Mr. Cowper.*—That is the delivered price. That would include everything.

*Mr. Sinclair.*—I have here a price of Rs. 23-8-0 per cwt. for copper sulphate.

*Dr. Matthai.*—That is Rs. 470 per ton.

*Mr. Sinclair.*—Yes.

*President.*—Whose price is that?

*Mr. Sinclair.*—Brunner Monds.

*President.*—They are supposed to be the principal manufacturers of sodium sulphide because they have an alkali industry.

*Mr. Cowper.*—The German quality is much more popular principally because the Germans sell dye stuffs to the mills and recommend their sodium sulphide along with their dyes. Once the Japanese stuff came into the market but it did not stand long in competition.

*Mr. Ramsingh.*—That was inferior stuff.

*Dr. Matthai.*—Will you please send a list of the latest prices and say whether it is from the United Kingdom or Germany?

*Mr. Cowper.*—I shall try and get you original indents from merchants.

*Mr. Mathias.*—If we stick to the price of copper sulphate in December 1923, would it be all right?

*Mr. Cowper.*—Yes.

#### Nitric Acid.

*President.*—Now let us take the acids. For nitric acid, the Mint's price is Rs. 315 for 65 per cent.; that is equal to Rs. 490 for 100 per cent. That includes the duty also.

*Mr. Sharpe.*—That is delivered at the Mint.

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\* NOTE.—The H. B. I. line quote 27s. 6d. per ton dead weight.

*President.*—In returnable drums?

*Mr. Sinclair.*—Yes.

*President.*—This is the only quantity so far imported.

*Mr. Sinclair.*—Yes. As a matter of fact, the Mint is buying from us.

*President.*—At what price?

*Mr. Sinclair.*—At Re. 0-3-9 per lb. for 69.8 per cent.

*President.*—That works out to how much per ton?

*Mr. Sinclair.*—Rs. 525 per ton.

*President.*—For 100 per cent., how much would it be?

*Mr. Sinclair.*—Rs. 750.

*President.*—Why have they placed the order with you?

*Mr. Sinclair.*—Because we understand they had some trouble with emptying the drums.

*Dr. Matthai.*—Do you mean the aluminium drums?

*Mr. Sinclair.*—Yes. The acid has to be taken to the third floor. These heavy drums have to be taken up and decanted there. We understand there was an accident and a man was burnt. I may tell you that on looking up the official returns for nitric acid, I find that the imports are going up. The value is steadily going up.

*President.*—We do not attach much importance to these returns because we do not know how these are made up.

*Mr. Mathias.*—Do I understand then that the Mint people are not buying any more nitric acid from outside?

*Mr. Sinclair.*—I hope not, but I do not know.

*Mr. Mathias.*—You supply your acid in jars.

*Mr. Sinclair.*—Our acid is supplied in carboys.

*Dr. Matthai.*—Then, this danger of German competition is past.

*Mr. Sinclair.*—No. They (the Mint) have placed a contract.

*Dr. Matthai.*—They have placed a contract for 200 tons. But outside that, they are buying from you. Is that the position.

*Mr. Sinclair.*—Yes.

*Mr. Mathias.*—That is owing to the fact that some men were burnt in handling the drums, orders would be placed in India in future.

*Mr. Sinclair.*—Yes, unless there is improvement either in the drums or in the decanting methods.

*Dr. Matthai.*—Is the trouble due to aluminium casks?

*Mr. Sinclair.*—Yes, due to their size, and the nature of the contents.

*Dr. Matthai.*—What is the alternative to aluminium casks?

*Mr. Sinclair.*—Jars or carboys.

*President.*—We had a case in Calcutta where they tried to import nitric acid but it began to fume and had to be thrown overboard and so they are now buying nitric acid locally.

*Mr. Sinclair.*—When we first started manufacturing nitric acid there would only be imported nitric acid in the bazar.

*President.*—The quantities are negligible. We are only concerned with the big importer. It is not likely that any nitric acid on a large scale will be imported for bazar purposes.

*Mr. Sinclair.*—When we first went into this question Col. Stace told me that our prices were comparable with the imported price he was offered in jars, and our price of 3 annas 9 pies per lb. he regarded as fair, but he did not think we were making an excessive profit out of it as it compared favourably with the English quotation. Comparing this with

the figures we worked out for the Tariff Board we find we don't get anything at all.

*President.*—You are getting Rs. 750 and we work it out at Rs. 840.

*Dr. Matthai.*—If you take Rs. 750 a ton as your price delivered at the Mint what will that mean *ex-works*?

*Mr. Sinclair.*—Rs. 6-8-0 delivery charges to be deducted from that.

*Dr. Matthai.*—That would include packing and freight?

*Mr. Sinclair.*—Yes. I should say it would come altogether to Rs. 9 with the repacking of the carboys when each comes back. Another advantage so far as the Mint is concerned is that they have not got any stocks to finance. What they are doing now is to take ready deliveries of 15 to 18 carboys of 70 lbs. each daily.

*President.*—You deliver them all in carboys?

*Mr. Sinclair.*—Yes. We give them daily as much as they want, which is from 15 to 18 carboys. That is just a lorry load.

*President.*—At present; so far as the bazar prices are concerned there is not much of this imported nitric acid, is there?

*Mr. Sinclair.*—No, there isn't.

*President.*—As regards this German stuff there is this difficulty about the decanting?

*Mr. Sinclair.*—Yes, but that may, of course, be overcome.

*President.*—We don't provide against things which do not happen! According to your figures what did you calculate the import price at?

*Mr. Sharpe.*—Rs. 484 a ton for 100 per cent.

*President.*—That is for big quantities, but we want to know the general average price for imported nitric acid.

*Mr. Cowper.*—We know dealers are selling German Acid an anna lower than ours in the bazar. We don't know the import price.

*President.*—I think there is really no grievance that there will be any serious competition between you and the imported article?

*Mr. Sinclair.*—The position is exactly the same as it was because Col. Stace has instructions to buy in the cheapest market.

*President.*—What is he likely to require?

*Mr. Sinclair.*—Eventually he will require about 250 tons a year.

*President.*—But he has indented for 200 tons already?

*Mr. Sinclair.*—Possibly, I believe he has had delivered only 10 tons; that is not going to be more than his first month's requirements. His consumption will be an increasing one and in about two years' time he will probably have reached full production and will then require more acid.

*President.*—This is synthetic nitric acid I suppose?

*Mr. Sinclair.*—Yes.

*President.*—I suppose the lower price of this product is due to the fact that they manufacture nitrogen for fertilizers and that has made their nitric acid so cheap.

*Mr. Sinclair.*—Yes, but that of course is a very expensive plant. Col. Stace admits that local purchase has many advantages. He won't have to carry stocks, he will not have to fill his yard with empties, and is of advantage to take lorry loads daily and lastly as there is not a great deal of difference in English imported price, there is no question about that.

#### R. O. V.

*President.*—As regards this R. O. V. there is no importation at present, is there?

*Mr. Sinclair.*—The import figures don't suggest very much; for December the value was Rs. 38,000.

*Dr. Matthai.*—The figure for January 1929 is 1,027 cwts. for the whole of India.

*Mr. Cowper.*—That would be mainly Karachi, Okha and Bombay. At Bhavnagar there is a chemical works which manufactures acids. In the bazar there is a monthly average of about 250 jars from Germany. Karachi does not now take any acid from us at all.

*President.*—Talking of the Bombay market you gave us a price of Rs. 136 netf for the R. O. V.

*Mr. Cowper.*—The bazar people tell me that the cost price is Rs. 1-5-0 per gallon or Rs. 159 a ton, for the German acid.

*President.*—That is duty paid?

*Mr. Cowper.*—Yes.

*President.*—That is nearly Rs. 40 above your price?

*Mr. Cowper.*—The mills are not anxious to enter into contracts for German acid, as they say they don't know whether protection is going to be granted in which case the duty will go up.

*President.*—We must take the prices as they exist.

*Mr. Cowper.*—The tendency has been towards a drop in the market.

*President.*—So long as it does not fall below your fair selling price there is no case for an increase in the duty, and if you took Rs. 159 that is well above your fair selling price as we calculated it before.

*Mr. Cowper.*—The position is that we are realizing a little more than that ourselves and these people are taking advantage by selling a little under us in the market to keep their customers.

*President.*—Naturally, when you leave such a big margin and make it profitable for these people to come in.

#### *Hydrochloric Acid.*

*President.*—As regards hydrochloric acid your market price came to Rs. 1,182. You don't wonder that these other people make their own hydrochloric acid! What is the market in other places?

*Mr. Cowper.*—We have had good business from Nagpur recently at 1 anna 9 pies per lb., 32° t.w. f.o.r. Bombay.

*President.*—That is roughly about Rs. 750 a ton.

*Mr. Cowper.*—That applies both to Nagpur and Hyderabad.

*President.*—Rs. 750 a ton is not bad; there is still 150 per cent. left.

*Mr. Mathias.*—You say As. 1-9 per lb. 32° tow. Is that *ex-works*?

*Mr. Cowper.*—That is f.o.r.

*Mr. Mathias.*—Does that include packing charge?

*Mr. Cowper.*—This is for naked acid delivered on rail.

*Dr. Matthai.*—When do you expect to send these things in?

*Mr. Cowper.*—By to-morrow.

*Dr. Matthai.*—When you give the kind of acid, you might say the percentage also.

*Mr. Cowper.*—Yes.

*Dr. Matthai.*—Why is there such a big reduction in the price of hydrochloric acid?

*Mr. Cowper.*—The Bombay average price is about As. 3-6 a lb.

*Mr. Mathias.*—It will be more than that.

*Mr. Cowper.*—I would say As. 3-3 to be more correct.

*Dr. Matthai.*—That is for 33 per cent.

*Mr. Cowper.*—Yes.



*President.*—That is about Rs. 1,365 for 100 lb.

*Mr. Cowper.*—Our manufacturing cost owing to low production was going up and we decided to sell wherever we could to average out the price.

*President.*—The average production of hydrochloric acid is about 70 tons of 100 per cent.

*Mr. Cowper.*—Our recent costs are As. 2 a lb.

*Mr. Sinclair.*—The total sales of hydrochloric acid this year of both the companies are 40 tons of 100 per cent.

*Dr. Matthai.*—That is slightly less than last year.

*Mr. Cowper.*—Yes, about 10 tons and the cost has increased to As. 2 a lb. naked at the works.

*President.*—We took the market at about 60 tons.

*Dr. Matthai.*—That is from your statement.

*Mr. Sinclair.*—Yes. We are trying to get the market back by cutting the price.

*President.*—Have you got any import price for hydrochloric acid?

*Mr. Cowper.*—I have a price for English hydrochloric acid.

*President.*—Has it actually been imported?

*Mr. Cowper.*—The Bombay Dyeing Manufacturing Company wanted a quotation for their requirements. I cabled to our London firm to give us quotations. I have received quotations both for German and English acids.

*President.*—Will you please let us have them?

*Mr. Cowper.*—Yes.

*President.*—How are you getting on with the preparation of the super-phosphate statement?

*Mr. Ramsingh.*—We have cabled this morning and we hope to get it in a few days.

*President.*—That question of sodium sulphate and Glauber's salt comes in the way. Supposing full production is reached—you remember we took credit for the salt cake in the cost of the hydrochloric acid at Rs. 30 a ton,—but if you are able to reduce your cost of hydrochloric acid by reducing the cost of the sulphuric acid and you are able to retain your market, then it would be possible for you practically not to take any credit for salt cake. That would only be possible after you have captured the whole of your market and then you reached your full production. At that stage it would be possible for you not to take any credit for the salt cake and the price of sodium sulphide and Glauber's salt would come down, but it would put up the price of zinc chloride.

*Mr. Sinclair.*—Yes.

*President.*—Then it would be possible for you to charge for hydrochloric acid for zinc chloride at a lower price, because it can still bear it. That is to say you may say "We won't make much profit on hydrochloric acid. We will let part of it go, because we are manufacturing more sulphuric acid in order to produce more hydrochloric acid. That is also possible."

*Mr. Sinclair.*—Yes.

*President.*—But as I said you will have to wait till a very late stage to be able to do that.

*Mr. Sharpe.*—The point we want to be quite clear is this: For zinc chloride we allowed hydrochloric acid at Rs. 340 a ton. It means that half the production of hydrochloric acid has got to be charged to the zinc chloride plant, but nothing allowed for the plant and building and working capital.

*President.*—We will revise those figures. That is perfectly true. We will have to make the necessary adjustments.

*Mr. Sinclair.*—It should be Rs. 410 instead of Rs. 340.

*Dr. Matthai.*—Do you mean from the way in which it was worked out at that sitting, we don't make any allowance for depreciation and working capital in zinc chloride?

*Mr. Sinclair.*—We took the value of Rs. 340, but the *ex-works* cost was Rs. 326. I do not know why that difference of Rs. 14 has been made on the hydrochloric acid. Office charges, agents commission and profit—those are the items which should be cut out.

*President.*—There of course we discussed the thing generally. We have to make alterations in that. In our calculations we have included everything except the working capital which we have excluded in the cost of sulphuric acid, because we have already allowed for that in the sulphuric acid itself, is that not right?

*Mr. Sharpe.*—Yes. We worked out what difference it would make to the cost of all the other products. If we omitted the profit allowed on chamber acid, it is Rs. 12-8-0 per ton. It makes a difference of Rs. 13-12-0 in R. O. V., in copper as Rs. 5 and in Epsom salt Rs. 5.

*President.*—That would be so.

*Mr. Sinclair.*—It is almost negligible really.

*Dr. Matthai.*—But I think we have to revise those figures.

#### *Superphosphate.*

*President.*—Supposing there was a bounty either on superphosphate or on sulphuric acid used in the manufacture of superphosphate, would you make your superphosphate in conjunction with other chemicals or would you reserve one plant for making superphosphate?

*Mr. Sharpe.*—It depends entirely on the output.

*Mr. Sinclair.*—I think that it will have to be a separate plant if it is to be done on a big scale.

*President.*—If you produce sulphuric acid on a large scale, you bring down the cost of sulphuric acid, don't you?

*Mr. Sharpe.*—Yes.

*President.*—Therefore you would bring down the cost of superphosphate. But supposing you made all these chemicals and 2,000 tons of sulphuric acid is left and you made superphosphate which would absorb that acid, the cost of superphosphate would go up.

*Dr. Matthai.*—Supposing the question was this. You are making 5,000 tons of superphosphate. That means you would have to have 2,000 tons of chamber acid of 100 per cent. In that case it won't be worth while to have a separate plant. You would be doing it in conjunction with other chemicals.

*Mr. Sharpe.*—Yes.

*Dr. Matthai.*—Supposing your market is 10,000 tons?

*Mr. Sinclair.*—In those circumstances, it might pay us to have a separate plant.

*President.*—We may have to examine you later in connection with the estimates which we have asked you to prepare. Would you work them out together?

*Mr. Sharpe.*—Yes, but what production are we to take?

*President.*—5,000 and 10,000 tons.

**THE EASTERN CHEMICAL COMPANY, LIMITED AND THE  
DHARAMSI MORARJI CHEMICAL COMPANY, LIMITED.**

**Evidence of Messrs. W. S. SINCLAIR, H. SHARPE and G. St. JOHN  
COWPER representing the Eastern Chemical Company and  
Messrs. DONGARSINGH RAMSINGH and D. G.  
GOKHALE, representing the Dharamsi Morarji  
Chemical Company recorded at Bombay  
on Tuesday, the 9th April 1929.**

*Superphosphate.*

*President.*—This morning I propose to go into the estimates for superphosphates. After we have finished that, our expert Mr. Brodie would like to ask you some questions as regards chemicals. Did you get this information as regards rock phosphate and machinery from England or did you work out these figures from the published reports?

*Mr. Sinclair.*—Rock phosphate—from England.

Machinery—from quotations that we had.

Buildings—I actually worked out the cost of Dharamsi's Buildings.

Power—I went over their factory and used as a basis what they are doing on their bones superphosphate plant at present.

*President.*—I want to know first of all how you have got these figures for rock phosphate.

*Mr. Ramsingh.*—We got quotations from England by cable and on these quotations we have based our estimates.

*President.*—Is it in code?

*Mr. Ramsingh.*—It is in plain language (handed in).

*President.*—Is Algerian phosphate the same as Gasfa phosphate?

*Mr. Ramsingh.*—No.

*President.*—You will have to select your own phosphate—whether Algerian, Gasfa or some other. Algerian phosphate is said to contain more calcium carbonate.

*Mr. Sharpe.*—Yes.

*President.*—And so if you use that you will require more sulphuric acid.

*Mr. Sharpe.*—Yes.

*President.*—We assume that you will get a suitable kind of phosphate for your purposes.

*Mr. Sharpe.*—Yes.

*Dr. Matthai.*—Your estimate is for rock superphosphate containing 15 per cent. of soluble  $P_2O_5$ .

*Mr. Ramsingh.*—Yes.

*President.*—You have taken a rather high percentage of purity for this phosphate (66 per cent.). It is a very high percentage for most of these African phosphates. There are some which contain 75 per cent. but normally it would not exceed 60 per cent.

*Mr. Cowper.*—Our cable is for 60 per cent.

*President.*—If you took about 60 per cent., you would be nearer the mark than if you took 66 per cent.

*Mr. Cowper.*—Yes.

*President.*—You take 0.525 tons of 66 per cent. rock, that is to say, it will require practically 35 units of rock phosphate to get about 15 units of  $P_2O_5$ .

*Mr. Gokhale.*—Yes.

*President.*—114 T. W. sulphuric acid? What percentage is that?

*Mr. Brodie.*—That is 65 per cent. acid.

*President.*—As regards the price, the f.o.b. price is 3*d.* a unit, that is, 15 shillings a ton.

*Mr. Cowper.*—Yes.

*President.*—It makes all the difference whether you have 500 tons or 8,000 tons.

*Mr. Sinclair.*—Yes. To start with we should have to take 25 shillings as the freight. That will give us £2 a ton or Rs. 27. Port Trust Charges will be about Rs. 3 a ton, that is, Rs. 30. To get to Ambarnath it will be another Rs. 2, thus making a total of Rs. 32.

*President.*—In calculating the eventual costs we have to take the smaller freight.

*Mr. Ramsingh.*—Our cable says 18*s.*

*President.*—This is an actual enquiry as regards freight?

*Mr. Ramsingh.*—Ours is a firm quotation for placing orders.

*President.*—Yours is 7*s.* 6*d.* for 3,000 tons.

*Mr. Cowper.*—Ours is from the Red Sea and theirs is from Algeria. You asked us also to ascertain what the freight would be from either the Red Sea or the Mediterranean Sea to Holland. They tell us that those are the freights from the Red Sea. The higher one is from the Red Sea and the lower one from the Mediterranean.

*President.*—That means the cost of the rock phosphate whichever place you take it from would be the same when it reaches the destination. If you take it from the Mediterranean ports, the price per unit is more than if you take it from the Red Sea ports so far as you are concerned.

*Mr. Cowper.*—Actually the quotations are that way.

*President.*—What it comes to is this: allowing for wastage if we took equal quantities more or less of chamber sulphuric acid and rock phosphat<sub>3</sub>, it would be roughly correct.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—You may take a little less of sulphuric acid.

*President.*—It is in these figures for cost above material that you appear to be very much out. First of all, what plant is this?

*Mr. Sinclair.*—It is Sturtevant plant.

*President.*—Is it all mechanical?

*Mr. Sinclair.*—Yes.

*President.*—For 10,000 tons?

*Mr. Sinclair.*—Yes.

*President.*—Is that the smallest they have?

*Mr. Sinclair.*—A five thousand ton plant is the lowest economic unit.

*President.*—Is it completely mechanical?

*Mr. Sinclair.*—Yes. All handling is done mechanically.

*Dr. Matthai.*—Have you got the f.o.b. price of the machinery?

*Mr. Sinclair.*—£2,281.

*Dr. Matthai.*—For a 10,000 ton plant?

*Mr. Sinclair.*—For a 5,000 ton plant.

*President.*—I want to know whether the plant, if it is Sturtevant, is all mechanical?

*Mr. Sinclair.*—It is a mechanical plant.

*President.*—Both for handling materials and for other things?

*Mr. Sinclair.*—Yes, for everything. I have all plant cost details but unfortunately I have left them in the office.

*President.*—I would like to know what precisely it includes.

*Mr. Sinclair.*—The figures that I have here include duplicate machines for grinding in case of a breakdown, building and everything else. Building I have taken at Rs. 30,500 and the rest is for the plant. The whole thing is to be driven electrically and a lakh of rupees would cover it. I had the revised quotations before me when I was working these out.

*President.*—If you took a 10,000 ton plant the capitalization would work out at Rs. 14 a ton for superphosphates. It is rather high.

*Mr. Sinclair.*—It seems to be fairly high but I think it is a fairly reasonable estimate. I went into it very carefully. We could double the output of the plant for another Rs. 40,000. Capitalization comes to Rs. 12-8-0 a ton for 5,000 tons and Rs. 8-12-0 per ton on a 10,000 ton unit.

*President.*—Rs. 1,40,000 for the plant and buildings?

*Mr. Sinclair.*—Yes. To increase the output up to 20,000 tons it would cost about Rs. 1,60,000. It is only the crushers which will have to be increased in number.

*President.*—At present we will take the 10,000 tons unit. These other costs, e.g., power for crushing, mixing and so on seem to be pretty high. How did you calculate this power for crushing?

*Mr. Sinclair.*—I have taken for 10,000 tons production about 240 h.p. for crushing, elevating and all mechanical processes. I went into the costs of crushing bones at Dharamsi's chemical works. Power cost them Rs. 8-12-0 for crushing 1 ton of bones in 8 hours without any other handling charges, power cost at As. 1-9 per unit.

*President.*—First of all let us see how many units you took. I take it your plant produces what is called No. 1?

*Mr. Ramsingh.*—Mixture of 0 and 1.

*President.*—If you took 0, it will turn out 3 to 3.5 tons an hour, that is 10,000 tons a year. This book gives for the plant 14 h.p. per ton per hour and it gives the cost per ton at 2d. per k.w. hour. How much have you taken Mr. Ramsingh?

*Mr. Gokhale.*—1 anna 9 pies at present. The Western India Match Company are paying 2 annas 6 pies at Ambarnath for their power per unit.

*President.*—If you had power from the Tata Electric later on?

*Mr. Gokhale.*—Then we might pay less than that.

*President.*—This is of course only for crushing. Then for mixing and grinding it is 1s. 9d.

*Mr. Sinclair.*—We have had no actual experience and the only thing I could do was to base our figures on the actual practice of Dharamsi's. Considering their present cost is Rs. 8-12-0 for crushing bones, I have taken a figure for all power required at Rs. 8. You can't work these grinders with much less than a 25 h.p. motor.

*President.*—If you take these figures given in this book and work out it would be useful.

*Mr. Ramsingh.*—In 1928 we got tenders and in the tender we received they mention the power required for a S.S. mill and according to that it will come to Rs. 1-4-0 for crushing.

*Mr. Sinclair.*—You can calculate .8 units per h.p. per hour. For 25 h.p. that is 20 units per hour and at 1 anna 9 pies that comes to 35 annas for grinding.

*President.*—And for mixing?

*Mr. Sinclair.*—If you take somewhere about 240 h.p. for plant of 10,000 tons capacity for mixing elevating, crushing, grinding and handling, that means Rs. 21 for 40 tons output per day.

*President.*—Let us say Rs. 5.

*Mr. Brodie.*—The total horse power you are taking appears to be on the high side for grinding which one would think would be the most important part of the operation.

*Mr. Sinclair.*—There is a lot of handling to be done, as well as grinding. We have estimated for three crushers at 25 b.h.p. each. I have worked on Dharamsi's actual figures.

*Mr. Ramsingh.*—This book is more or less an advertisement for their machinery.

*President.*—It deals with all kinds of plant.

*Mr. Sinclair.*—The Sassoon group of mills reckon on .8 unit per horse power hour. For rock phosphates we can only work on comparative bone figures. I think the figure given in the book is very much on the optimistic side. When the grinding mills become worn output drops very rapidly.

*President.*—You think you can come down eventually to Rs. 5?

*Mr. Sharpe.*—Yes.

*President.*—How much does your electricity cost you?

*Mr. Sinclair.*—1 anna 9 pies.

*President.*—That is too much. What about Tata Power?

*Mr. Sinclair.*—For small quantities it costs 2 annas 3 pies per unit in Bombay.

*President.*—For 10,000-tons how much would you require in a year?

*Mr. Sinclair.*—Taking 240 h. p. hour, that is 192 units, we might get it under 1 anna 6 pies. I can enquire from Tata's.

*President.*—That should make some difference?

*Mr. Sinclair.*—Yes.

*President.*—Even to-day Tata's electricity is dearer than it should be when compared with coal. What rate do they charge to the mills?

*Mr. Ramsingh.*—725 annas per unit.

*President.*—What is the minimum load that you have got to take?

*Mr. Ramsingh.*—1,500 k.w.

*President.*—Why shouldn't they give you the same rate for this if you negotiate with them?

*Mr. Ramsingh.*—I had once asked them. At that time they said that they had no station there. Now they have a station at Kalyan and they might consider the question.

*President.*—You might enquire, Mr. Sinclair, because that might make a substantial difference to the costs.

*Mr. Sinclair.*—Yes, I will.

*President.*—We do not know the costs in Europe, but we know the f.o.b. cost of the rock phosphate and we know the price at which they sell. Therefore the all in costs including profits and everything would be Rs. 15.2.

*Mr. Sinclair.*—Yes.

*President.*—In your case also difference should be between the f.o.b. cost of the rock phosphate and the f.o.b. cost of the superphosphate. That is theoretically what you ought to get.

*Mr. Sinclair.*—Allow a little extra for Indian labour.

*President.*—There we have got two different figures which give us an idea of what the cost, profit and overhead ought to amount to if you are going to stand world competition not now but eventually.

*Mr. Sharpe.*—Yes.

*President.*—If you take the f.o.b. price of the rock phosphate at 15s. and if you take the cost of the superphosphate at £2-15-0 that represents the complete spread, is it not?

*Mr. Ramsingh.*—Yes.

*President.*—Therefore your cost above materials and everything should not exceed £2. That is excluding the cost of the rock phosphate. That is what you will have to get eventually.

*Mr. Sinclair.*—Yes.

*President.*—You have no experience of this and you can go on with what little experience Messrs. Dharamsi Morarji Chemical Works have.

*Mr. Sinclair.*—All these estimates are based on their costs.

*President.*—The other figures are merely a matter of calculation. We have two most important figures—the rock phosphate and the sulphuric acid.

*Mr. Sharpe.*—£2-15-0 a ton f.o.r. works.

*Mr. Ramsingh.*—£2-13-6 for 16/17 per cent.

*Dr. Matthai.*—That is Rs. 47 c.i.f.

*Mr. Ramsingh.*—Yes.

*President.*—£2-13-3 f.o.b. Dutch port.

*Mr. Ramsingh.*—I am speaking of c.i.f.

*President.*—The freight is 22s. 6d. It comes to £3-16. The last figure that we got f.o.r. any port is Rs. 70.

*Dr. Matthai.*—The Imperial Chemicals gave us a price of Rs. 65 to Rs. 70 for superphosphate 18 per cent. f.o.r. Calcutta.

*Mr. Cowper.*—That is right.

*President.*—Rs. 7 they calculate as landing charges, harbour dues, etc., £3-16-0 is equal to about Rs. 50. It must include some rebagging and other charges.

*Mr. Cowper.*—Yes, godown storage and other things.

*Mr. Sinclair.*—Their selling price is Rs. 65.

*President.*—According to the figures that we have got, the importers get a commission and there is the commission agent who gets nearly as much as the importer.

*Mr. Cowper.*—In the case of Brunner Monds who have their own offices, whatever profit they make is a general profit to the firm.

*President.*—They have got a manufacturing Company; they have got a selling Company and the selling Company is a sort of middleman who gets the profit.

*Mr. Sinclair.*—They have got to show a profit on the selling organization.

*President.*—The Indo-Agri., Limited is not part of Brunner Monds, but Shaw Wallace are the agents.

*Mr. Cowper.*—They represent to other manufacturers in the same way. Superphosphate is not manufactured by the Imperial Chemicals. They are merely selling agents.

*President.*—Your costs are based on 15 per cent.  $P_2O_5$ .

*Mr. Sharpe.*—Yes.

*President.*—Is that soluble?

*Mr. Sharpe.*—Yes.

*President.*—They say their is 18-20 per cent.

*Dr. Matthai.*—The increased charges would be on rock phosphate and not on the sulphuric acid.

*Mr. Sharpe.*—That is so.

*President.*—What quantity of rock phosphate is required?

*Mr. Sharpe.*—The quantity of rock phosphate will remain the same but it will be a higher grade.

*President.*—We have dealt with the power. We will have to take 6 of a ton instead of 525. We have got to start with 77 per cent. Is the price per unit the same?

*Mr. Sharpe.*—You get a different quotation. For the high percentage you have got to pay more money.

*President.*—You get so much more per unit.

*Mr. Sharpe.*—You get so much less.

*President.*—We have to allow much more on this rock phosphate. Theoretically '6 is the correct one.

*Mr. Sharpe.*—Then your yield of the material will be more than a ton because of the impurities.

*President.*—Yes. I am applying the same method. You took '525 of a ton for 15 per cent. I am applying the same proportion to get the 18 per cent. I am not doing anything at all. I am taking your own figure.

*Mr. Ramsingh.*—From the particular Algerian phosphate, we won't get superphosphate of 18 per cent.

*President.*—You have to use better quality.

*Mr. Ramsingh.*—Yes.

*President.*—Supposing we took your unit cost and divided that by 15, you would get just under Rs. 5. Theirs is Rs. 70 for 18 units.

*Mr. Cowper.*—Theirs is really 19/20 per cent.

*Dr. Matthai.*—Do you mean the imported super?

*Mr. Cowper.*—Yes. The price is Rs. 65.

*President.*—Rs. 65 divided by 19/20 will give you Rs. 3 a unit whereas yours is Rs. 4. Supposing you use a better quality of phosphate rock.....

*Mr. Sinclair.*—We would not pay freight on the impurities. This would show a saving.

*President.*—You would be using more sulphuric acid if you use the impure rock.

*Mr. Sharpe.*—We might or might not. It depends on other impurities. If it is calcium sulphate we won't be using more. If it is calcium carbonate, we shall use more.

*President.*—We must take some figure which would make your price comparable with theirs in terms of  $P_2O_5$ .

*Mr. Ramsingh.*—I have got a note from Mr. Gupta in which he says "I have definite offers at \$5.5 per ton f.o.b. Casablanca. The freight to Bombay is 17.5 shillings. This is a better quality containing 70 per cent. calcium phosphate against 66 per cent. which means a great saving in freight".

*Dr. Matthai.*—The freight of 17 shillings is rather on the low side.

*Mr. Ramsingh.*—It is 17.5 shillings.

*President.*—What is the f.o.b. price?

*Mr. Ramsingh.*—It is \$5.5 or Rs. 15-12.

*President.*—Supposing the freight is 25 shillings?

*Mr. Ramsingh.*—No, it is only 17.5 shillings.

*President.*—Landing and other charges come to how much?

*Mr. Ramsingh.*—Rs. 5.

*President.*—That comes to roughly Rs. 37. How many lbs. will you take of that?

*Mr. Ramsingh.*—The same quantity. Only the finished quantity will contain a higher proportion of  $P_2O_5$ .

*President.*—That is 660 lbs. or about .3 of a ton.

*Mr. Ramsingh.*—Yes.

*President.*—If we take the same quantity for our present purposes you may have to add 2 or 3 rupees to this cost of superphosphate to get the better quality.

*Mr. Ramsingh.*—Rs. 2½.



*President.*—The sulphuric acid would not be so much.

*Mr. Gokhale.*—The quantity would be the same.

*Mr. Brodie.*—How much will you allow for loss of fumes, etc.?

*Mr. Sharpe.*—It won't be more than 5 to 10 per cent. on this basis.

*Mr. Brodie.*—Do you think that that is reasonable?

*Mr. Sharpe.*—I think so.

*Mr. Brodie.*—It must give off a certain amount of carbon dioxide so that 5 per cent. may be a low allowance.

*Mr. Sinclair.*—We have no actual experience of this. I should say with 95 per cent. yield we would be doing very well.

*Mr. Brodie.*—Have you got a complete analysis of the stuff offered to you, Mr. Ramsingh?

*Mr. Ramsingh.*—No.

*Mr. Brodie.*—If I can get the analysis I shall be able to work it out.

*President.*—We will work it out and see what happens.

*Mr. Brodie.*—If we say 5 per cent. excess of acid will that be all right.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—If we take 5 per cent. loss in addition to the theoretical loss that will be a fair basis.

*President.*—You have taken Rs. 62.5 per ton of sulphuric acid. How have you arrived at that?

*Mr. Sharpe.*—We took the price of sulphuric acid as Rs. 75 and then we deducted the profit of Rs. 12.8 from that.

*President.*—That is how you have calculated.

*Mr. Sharpe.*—Yes.

*President.*—Rs. 75 is for 100 per cent., is it not?

*Mr. Sharpe.*—Yes.

*President.*—This is 65 per cent.

*Mr. Sharpe.*—Yes.

*President.*—Two-thirds of that will be Rs. 50.

*Mr. Sharpe.*—Yes.

*President.*—Of that you want half a ton.

*Mr. Sharpe.*—Yes.

*President.*—That would be Rs. 25.

*Mr. Sharpe.*—Yes.

*President.*—The labour figure does not seem to be excessive compared to the other figures. Supposing it is Rs. 2 a ton, that means Rs. 20,000 a year. That is manual labour.

*Mr. Sharpe.*—Yes.

*President.*—You take Rs. 400 as the average?

*Mr. Sinclair.*—Yes, we went into that very carefully.

*President.*—It compared pretty well. Now as regards repairs and renewals, it comes to Rs. 35,000 a year on 10,000 tons. That does seem a lot on a plant costing only Rs. 1,00,000.

*Mr. Sinclair.*—Crushing is expensive. I know of a case recently where in respect of crushing machinery the charges for repairs came to as much as Rs. 70 a day. It is a very expensive job.

*Mr. Gokhale.*—The hammers are very costly. They are made of chrome steel.

*President.*—If you take a plant at Rs. 1,00,000, to spend Rs. 35,000 on that in addition to the depreciation that you allow is really too much.

*Mr. Sinclair.*—It does seem a lot.

*President.*—We will have to consider that. At first sight, it does seem a high figure.

*Mr. Sinclair.*—Admittedly.

*President.*—What it comes to is this. You have this Rs. 35,000. Then, though we allow 6½ per cent. on the whole block value, on the machinery it is 10 per cent. That means Rs. 45,000 a year which is really half the value of the machinery.

*Mr. Ramsingh.*—Yes, but there are many breakdowns.

*Mr. Gokhale.*—The grids break.

*President.*—It is a figure which I am not prepared to accept. You consider it again. My information is that repairs and renewals come to £30 a year.

*Mr. Sinclair.*—We have had a lot of experience, with crushing magnesite and other materials to find that maintenance cost on our grinding machines are very high. We can't possibly do it at the figures given.

*President.*—General supervision, rents and taxes; these are all right. Then selling charges.

*Dr. Matthai.*—Do you include propaganda in your selling charges?

*Mr. Sinclair.*—Yes, but as a matter of fact those may be on the low side.

*Dr. Matthai.*—How much do you allow for propaganda?

*Mr. Sinclair.*—Rs. 3.

*Dr. Matthai.*—It is rather low for propaganda on superphosphates.

*Mr. Sinclair.*—Possibly it is.

*President.*—At present all this propaganda is supposed to cost the Nitrams a lot of money.

*Mr. Sharpe.*—Messrs. Parry and Company's expense for propaganda must be fairly large.

*President.*—Yes. We shall make a separate allowance for propaganda. What items do you include under selling charges? Do you include any commission to the brokers or anybody else?

*Mr. Sharpe.*—No.

*President.*—That simply means godown charges, and ordinary distribution charges?

*Mr. Sinclair.*—Yes, we estimated a figure of Rs. 3, which would give us Rs. 30,000 for propaganda which is a fair amount.

*President.*—Plant and buildings we have considered. You have calculated working capital on six months turnover?

*Mr. Sinclair.*—Yes.

*President.*—Head office and agents commission you have calculated at 8 per cent.?

*Mr. Sharpe.*—That is the same figure allowed on previous calculations for other chemicals.

*President.*—We will apply here the same percentage that we have done in the case of other chemicals. As I have explained, it works out to a very big figure and we have got to cut it down a bit I am afraid, Mr. Sinclair. If you were running this as a separate unit then Rs. 3 would be a fair estimate but if you were running it as a part of your chemical works it is excessive and it ought to come down somewhat. If a 10,000 ton plant was working by itself, probably it might require more head office and other expenses than it would if it was part of the big works. Now having produced this superphosphate you have got to take into account the existing organizations which deal in superphosphates. I want to know how you propose to deal with them. If you combine with them and put up the price to the same level as the imported stuff, then Government may very well say "these people have combined with the importers and the consumer has not got the benefit of the assistance we have given" and they may like to reconsider the position. On the other hand if you don't there is a chance they may compete against you; they may do without their

selling commission and you may be compelled to sell practically at the import price.

*Mr. Cowper.*—It is more than likely that they will compete. That has been, I think, Dharamsi's experience in sulphate of ammonia. As soon as they put their stuff on the market the importers put their prices down to break them.

*Mr. Ramsingh.*—Exactly.

*President.*—Supposing we recommended a bounty, an administrative difficulty arises. If we put it on sulphuric acid then people may use more sulphuric acid than is required and then we may have to take a theoretical figure to apply that. That is very difficult. You may put less and spoil the superphosphate. These things do happen: people don't attach much importance to the quality when they see that a certain quantity has to be made. The question of superphosphates is a very important one because if you really put an inferior quality of super on the market it will not only spoil your name but you will obstruct the use of it. Can we propose it on the unit of phosphoric acid in it?

*Mr. Sinclair.*—It will have to be sold on the same basis as the imported article.

*President.*—Quite true, but supposing we recommended a bounty it means that somebody has got to analyse your superphosphate.

*Mr. Sharpe.*—You could limit it to 5 per cent. sulphuric acid over the theoretical content of the phosphate rock required by the analysis.

*President.*—The whole point is that somebody must check.

*Mr. Sharpe.*—I think Government, if it gives anything, will require some guarantee.

*Mr. Sinclair.*—They would have samples of the rock phosphates available, and they would be able to analyse these for themselves.

*President.*—That throws on somebody a lot of work; they (phosphate rocks) may come from different places at different times.

*Mr. Sinclair.*—They would come in very big shipments.

*Dr. Matthai.*—If you were getting different qualities of phosphate rocks somebody has got to see whether that part of the output of superphosphate on which bounty has been given has been produced from a particular class of rock phosphate.

*Mr. Sinclair.*—There will be a guarantee from the works, *e.g.*, Batch number so and so, and it will be up to Government to call for samples.

*Dr. Matthai.*—Let us say for argument's sake that the bounty is Rs. 36 per ton on 18 per cent. superphosphate; that works out to Rs. 2 per unit of phosphoric acid. Supposing we said the bounty to be given is Rs. 2 per unit of phosphoric acid, would that be all right? That simplifies the work of administration. Supposing the provincial agricultural department is given charge of it, an officer goes round your works and looks at your superphosphate and then calculates the bounty on the basis of the unit of phosphoric acid.

*Mr. Ramsingh.*—That is a very practical suggestion. The bounty should be based on the units of phosphoric acid contents, to be analyzed by some Government officer under the direction of the agricultural officer of the province. That would simplify things.

*Dr. Matthai.*—What it comes to is this. We first determine in terms of sulphuric acid what bounty is required. Then we determine in terms of the phosphoric acid content. Supposing we said it was Rs. 30 per ton of sulphuric acid, taking 1/3 of a ton of sulphuric acid for a ton of superphosphate, Rs. 30 per ton of sulphuric acid would mean Rs. 12 per ton of superphosphate, that is 2/3 of a rupee per unit of phosphoric acid.

*Mr. Sharpe.*—Yes.

*President.*—We can first of all calculate the measure of the bounty in terms of sulphuric acid and then convert it in terms of phosphoric acid. There of course we have control, but if we give it on sulphuric acid it cannot be done.

*Mr. Sharpe.*—Supposing we were making everything else but not superphosphate?

*President.*—Supposing we gave protection in the case of chemicals we could give it by means of a duty but in the case of superphosphates duty is out of the question. Therefore if you don't make any superphosphates then you will have to depend simply on the duty on chemicals, but if you manufacture superphosphates then you benefit both ways.

*Mr. Sinclair.*—Our whole trouble is this, that if we don't come into agreement about the price with the importer we are going to be crushed; if we do, we do not get any bounty for combining with them.

*President.*—This question of combine we are not going into, but it does seem to us that if this combine is going to add to the price, Government may eventually take action.

*Mr. Sinclair.*—If we start manufacturing they will cut their prices until we are driven out.

*President.*—This is a commodity which has got a world price and therefore if they did that then there is a case for Government to say "it is sold in Holland for so much; it has an international price and you are selling it in India at so much" and a case for dumping can be easily proved. They are limited by these two factors: their price can never go down below the price at which they sell in the international market plus the freight. If they do that, it is obvious they are dumping. Then again there is a very big margin for you because you have the whole freight. Supposing they can sell at £2-15-0 and they incur 25 shillings freight, that makes it £4. What is the lowest limit to which they can take it? They can sell it 15s. below that, but even then there will be this freight margin.

*Mr. Ramsingh.*—Yes. Copper sulphate is an agricultural product, will there be any bounty on it?

*President.*—Most of it is used in rubber plantations, is it not?

*Mr. Gokhale.*—Even for jowar, grape-vines, and other things this is being used.

*President.*—No, I don't think we can give any bounty for copper sulphate. How long would it take to get up to the output of 10,000 tons? At present the amount of superphosphate imported into the country amounts to about 7,000 tons and the market estimate is about 10,000 tons, that is, not making any allowance for the increase. During the last three years it has increased from 500 to 7,000 tons. It would all depend upon the rate at which the market expands, but we have got no means of saying how long it would take. Can this plant be increased in instalments?

*Mr. Sinclair.*—Yes.

*President.*—Overheads make some difference?

*Mr. Sinclair.*—It is only in the crushing units that there will be much difference.

*Dr. Matthai.*—Overhead won't make more than a difference of a rupee between the two?

*Mr. Sinclair.*—Rs. 2. The plant is capable of expansion. It is a comparatively small item, this increase in the crushing units.

*Mr. Ramsingh.*—It will take about 10 to 15 years to consume this present quantity plus 10,000 tons.

*President.*—It depends on how cheaply you can put them on the market.

*Mr. Ramsingh.*—Yes.

*Mr. Sinclair.*—It will be very difficult to say when that will come up. It all depends on propaganda.

*Dr. Matthai.*—Propaganda in the sense of what you do to make the agriculturist understand it and partly in the way of reducing prices.

*Mr. Sinclair.*—That is really the main part of the propaganda.

*President.*—In this bagging, have you allowed for single or double bags?

*Mr. Sinclair.*—Single bags.

*President.*—Have you taken into account the fact that you have got to keep superphosphate in stock for some time?

*Mr. Sinclair.*—We are assuming that the stuff is being sold practically as it is made.

*President.*—How can it be? The demand for superphosphate is seasonal. Six months turnover ought to be all right.

*Mr. Sinclair.*—In the working capital we have reckoned that.

*President.*—In some parts of the world they close down the plant.

*Mr. Sharpe.*—It might be necessary here to close down the plant during the monsoon.

*Mr. Sinclair.*—Although Messrs. Dharamsi Morarji Chemical Company have said that it is possible to work their bone-metal plant all the year round, I think it is impossible to work it during the monsoon.

*President.*—There is one other point I would like you consider. If in the case of war or anything like that your supplies of rock phosphate were shut out, then for the time being would it be possible to get your superphosphate out of bones?

*Mr. Ramsingh.*—Yes.

*President.*—Then of course the price of bones would come down. If there is to be a war, there will be no shipping and it is quite possible that you may get your bone at about the same price as rock phosphate. We are assuming that 200,000 tons of bones are available in the country.

#### Chemicals.—Nitric Acid.

*Mr. Brodie.*—Take the case of nitric acid first. Is this nitre that you use hygroscopic?

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—When you take the quantity as 1.35 tons, is that as actually weighed or is it taken on a dry basis?

*Mr. Sharpe.*—It is as actually weighed in.

*Mr. Brodie.*—It may contain a variable amount of sodium nitrate.

*Mr. Sharpe.*—It is largely confined to the monsoon.

*Mr. Brodie.*—Still there is that point.

*Mr. Sharpe.*—Yes. The nitre is all kept in the godown, sealed and the liquor that comes out is evaporated and that nitre is used again. So we don't lose much.

*Mr. Brodie.*—I don't mean that. The actual weight that you take contains a fairly considerable amount of water.

*Mr. Sharpe.*—Not very much.

*Mr. Brodie.*—Will it be 5 per cent.?

*Mr. Sinclair.*—Not as much as that.

*Mr. Brodie.*—3 per cent.?

*Mr. Sharpe.*—Yes.

*Mr. Sinclair.*—This is a good average working figure taking the year round.

*Mr. Brodie.*—What is the impurity in the nitre?

*Mr. Sinclair.*—Our specification is over 96 per cent.  $\text{NaNO}_2$ .

*Mr. Brodie.*—That is including moisture.

*Mr. Sharpe.*—4 per cent. includes moisture.

*Mr. Brodie.*—You have taken 1.35 parts of nitre to a ton of nitric acid. That is the theoretical amount, although your nitre is only 96 per cent. pure.

*Mr. Sinclair.*—Our specification is not less than 96 per cent.  $\text{NaNO}_3$ , but it is often 97.5 per cent.

*Mr. Brodie.*—You can't get 100 per cent. yield out of it.

*Mr. Sharpe.*—We frequently get near 98. It is done in a Valentiner plant under vacuum.

*Mr. Brodie.*—That is 2 per cent. loss on the nitre on the impurities and another 2 per cent. loss in the plant. That is 4 per cent. loss if you get 96 per cent. yield on the theoretical basis.

*Mr. Sinclair.*—It never falls below 96.

*Mr. Brodie.*—Then you are allowing 100 per cent. yield.

*Mr. Brodie.*—What about you Mr. Ramsingh? You take more than that. 1.6 you allow.

*Mr. Ramsingh.*—Yes.

*Mr. Brodie.*—That is a great difference between 1.6 and 1.35.

*Mr. Sinclair.*—We have our actual figures here. In statement "L" our actual practice is given showing an efficiency of 98.06.

*Mr. Brodie.*—I have got some figures of English practice here—4 English factories. They take crude nitre averaging about 1.50. I don't think you can work better than they can.

*Mr. Sinclair.*—I do not agree there.—Excepting for pure nitric acid. They don't use the same type of condenser as we do. We use the Valentiner condenser. They use amongst other the silica type which is not so efficient as the Valentiner but as there is no vacuum required, production costs are cheaper, yield lower, but purity not so good.

*Mr. Brodie.*—1.50 is roughly 10 per cent. loss and their crude nitre in many cases contains a considerable amount of water, because very often it is charged dry. If you have got to dry it, it means it had a lot of moisture.

*Mr. Sinclair.*—It is not usual to dry it.

*Mr. Brodie.*—The figures I have got show dry nitre in a good number of cases.

*Mr. Sharpe.*—The big people do not trouble very much about drying there. It must be for some special purpose.

*Mr. Brodie.*—Do you think, Mr. Ramsingh, 5 per cent. loss is reasonable?

*Mr. Ramsingh.*—No.

*Mr. Brodie.*—Including impurities in the nitre, your loss is much more.

*Mr. Ramsingh.*—Yes.

*Mr. Brodie.*—Do you think you can do with 1.43?

*Mr. Ramsingh.*—Yes.

*President.*—There you have an advantage.

*Mr. Sinclair.*—Yes.

*Mr. Brodie.*—As regards sulphuric acid used in the nitric acid manufacture, the figure we have got here is 1.6 per ton of nitrate on the 100 per cent. basis. That seems to be very high.

*Mr. Sharpe.*—That is all 95 per cent. acid.

*Mr. Brodie.*—On 100 per cent. basis it is 5 per cent. less than that.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—That comes to 1.52.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—Supposing you assume that 170 parts of nitre require 160 parts of sulphuric acid to decompose them. Those are the figures Lunge gives.

*Mr. Sharpe.*—170 parts of nitre to 160 of acid?

*Mr. Brodie.*—Yes. That is two molecules of nitres to somewhat less than two molecules of sulphuric acid. They get a nitre cake that is intermediate between natural sodium sulphate and acid sodium sulphate.

*Mr. Sharpe.*—We get acid sodium sulphate.

*Mr. Brodie.*—I know you cannot push your distillation so far as to get the neutral sulphate but you carry it further than the acid sulphate stage.

*Mr. Sharpe.*—We don't.

*Mr. Brodie.*—Why not?

*Mr. Sharpe.*—We don't send out nitric acid containing any sulphuric at all. Our nitric acid shows no reaction for sulphate.

*Mr. Brodie.*—Supposing it is slightly impure?

*Mr. Sharpe.*—If the reaction is taken to such a stage that a bye-product between sodium sulphate and sodium sulphate is produced there is a danger that the nitric acid may contain some sulphuric acid.

*Mr. Brodie.*—What is the disadvantage of that?

*Mr. Sharpe.*—We simply can't sell it.

*Mr. Brodie.*—The figure that I have got from English practice is 1.39 of sulphuric acid of 100 per cent. as against your 1.52. Dharamsi's figure is better than yours. They have got 1.5. Is that 95 or 100 per cent. acid?

*Mr. Ramsingh.*—100 per cent.

*Mr. Brodie.*—Then the two are practically the same. I am still concerned with the fact that in England the usual yield corresponds to 1.39 parts of sulphuric acid on a 100 per cent. basis.

*Mr. Sharpe.*—Those two are practically dependent on one another. If you go beyond the acid sulphate, you have to use a higher temperature and will therefore decompose the nitric acid, in which case your efficiency on the basis nitric acid will be lower.

*Mr. Brodie.*—If I were asking you to agree to an efficiency based on getting a neutral sodium and sulphate, I should quite agree that you would be destroying your nitric acid. The English practice is to take it to an intermediate temperature. They carry the distillation further than the acid sulphate though they do not get the neutral sulphate. The English practice seems very reasonable. |

*Mr. Sharpe.*—In our particular case we are using a Valentiner plant. We must not have a decomposition.

*Mr. Brodie.*—Surely it is a vacuum plant.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—You can get your decomposition at a lower temperature.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—Your low temperature corresponds to a higher temperature at atmospheric pressure.

*Mr. Sharpe.*—Slightly.

*Mr. Brodie.*—Therefore you can easily raise your temperature to something which would give a reasonable yield?

*Mr. Sharpe.*—The reduction of pressure is going to help distillation of sulphuric acid also.

*Mr. Brodie.*—Does it affect the two equally?

*Mr. Sharpe.*—Pretty well.

*Mr. Brodie.*—When I come to think of it, these figures are for nitric acid used for making explosives. Does that affect the matter?

*Mr. Sharpe.*—Yes, I think it does. Sulphuric acid is not objectionable in this case.

*Mr. Brodie.*—For power and fuel you have given a figure of Rs. 25.

*Mr. Sinclair.*—That is per ton of 100 per cent.

*President.*—We took Rs. 15 a ton as the price of coal.

*Mr. Brodie.*—That makes  $1\frac{3}{4}$  tons of coal.

*President.*—There is another item electricity in that.

*Mr. Sinclair.*—No.

*Mr. Brodie.*—How much is used for the vacuum and how much is used for the still?

*Mr. Sinclair.*—I cannot tell you.

*Mr. Brodie.*—Half and half?

*Mr. Sinclair.*—We do it by allocation.

*Mr. Brodie.*—You have  $1\frac{3}{4}$  tons whereas the average practice in England is .29 ton. That is for distillation. I do not know about the vacuum.

*Mr. Sharpe.*—They do not work in vacuo.—We give the Indian coal put under the still as 12 cwts.

*Mr. Brodie.*—That is per ton of 70 per cent.?

*Mr. Sharpe.*—That is per ton of 100 per cent.

*Mr. Brodie.*—That is .6 of a ton.

*Mr. Sharpe.*—That is for distillation.

*Mr. Brodie.*—In that case, what is the advantage of the Valentiner system?

*Mr. Sharpe.*—We tried the other system also. Under the Valentiner system, all the chlorine that is in the nitrate of soda keeps on going to the pump end of the plant and the acid containing that chlorine is gradually brought forward towards the still end where the chlorine is drawn out. We can supply an acid that gives no reaction whatever for chlorine. Where the nitric acid is going to be used for gold refining, the acid must be absolutely pure. Practically the whole of our acid is for gold refining.

*Mr. Brodie.*—It is not commercial acid; it is pure acid.

*Mr. Sharpe.*—It is pure acid. Very little is used for anything else. We sell practically not more than a ton a year for etching.

*Mr. Brodie.*—What is the difference of price in England between the commercial acid and the acid refined like yours?

*Mr. Sharpe.*—I do not know.

*Mr. Brodie.*—What about Dharamsi's plant? Is it vacuum?

*Mr. Gokhale.*—No. It is silica condensation plant with draught from the chimney.

*Mr. Brodie.*—Your aim is to make a different sort of nitric acid.

*Mr. Gokhale.*—Yes. We sell it as commercial acid.

*Mr. Brodie.*—Is it free from chlorine?

*Mr. Gokhale.*—Yes, except for traces.

*Mr. Brodie.*—Is it free from sulphate?

*Mr. Gokhale.*—Not absolutely of course; there are traces.

*Mr. Brodie.*—The point is this. The Eastern Chemical Company use a ton of coal for maintaining the vacuum on the ground that it gives a pure acid, whereas the Dharamsi Morarji Chemical Company say that they do not need such a plant. It may make all the difference between a price that will be economic enough, when we get a bigger yield, and another that will not be. The difference between your practice and English practice is very heavy even allowing for the fact that Indian coal is not of such high calorific value as English coal. You are buying first quality of coal, are you not?

*Mr. Cowper.*—We are getting the cheapest quality.



*Mr. Sinclair.*—We have to pay extra cartage to the works.

*Mr. Brodie.*—How much ash is there in your coal?

*Mr. Sinclair.*—Somewhere about 30 per cent.

*President.*—What is the price of South African coal?

*Mr. Sinclair.*—About Rs. 25 last December.

*President.*—Not quite so much. You can get 1st class Jharia coal at Rs. 5 at the pitsmouth and you have to pay about Rs. 12 freight.

*Mr. Cowper.*—The Sessoon Mills are buying Deshargarh coal at Rs. 21 to Rs. 22.

*Mr. Brodie.*—Here it appears to me that we are dealing with two companies having two different processes. One process requires one more ton of coal than the other.

*President.*—What is your actual practice? Altogether how much does it come to per ton?

*Mr. Sinclair.*—This figure is not very far out taking the whole of our coal consumption. As I said the way we have allocated the cost of coal is to take the whole of our coal consumption, on the boilers and spread it over the whole of our manufactures, in ratios which we think each item can bear.

*Mr. Brodie.*—Is distillation done by open fire?

*Mr. Sinclair.*—It is done by fire under the still.

*Mr. Brodie.*—Mr. Ramsingh, what is your actual figure?

*Mr. Ramsingh.*—Rs. 15 per ton.

*Mr. Brodie.*—What is your coal consumption under the still?

*President.*—You gave me Rs. 25. How do you say that it is one ton?

*Mr. Ramsingh.*—Power is a separate item and fuel is separate.

*President.*—You manufacture nitric acid for a time and then close the plant.

*Mr. Ramsingh.*—Yes.

*President.*—It is not continuous.

*Mr. Ramsingh.*—No.

*Mr. Brodie.*—How much does your Valentiner plant grapple with?

*Mr. Sharpe.*—Roughly three quarters of a ton we charge. We could do up to 1½ tons as we have two stills, or 3 tons per 24 hours.

*Mr. Brodie.*—We were talking about nitric acid. I suppose you can make concentrated acid as well as 70 per cent. in your plant.

*Mr. Sharpe.*—As a matter of fact the greater proportion of the acid we get comes off at about 90° Tw. and if we use concentrated sulphuric acid instead of 77 per cent. we get over 98 per cent. concentration.

#### *Hydrochloric acid.*

*Mr. Brodie.*—In one of your tables you have given the purity of salt as 82 per cent. Can we take that as right?

*Mr. Sharpe.*—Sometimes it is 80 to 85. The average is 82.

*Mr. Brodie.*—And yours Mr. Ramsingh?

*Mr. Gokhale.*—Ours is 95 per cent.

*Mr. Brodie.*—Is it a different salt from that of the Eastern Chemical Company?

*Mr. Gokhale.*—We cannot say. We buy from the local salt works. We buy what is commercially called Calcutta salt.

*Mr. Sharpe.*—We buy the cheapest salt because we are not concerned with salt cake.

*Mr. Brodie.*—Is the 82 per cent. salt cheaper than the 90 per cent.? What is the remaining 18 per cent?

*Mr. Sharpe.*—A large amount of water; a certain amount of dirt and magnesium salts.

*Mr. Brodie.*—Including magnesium chloride?

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—Do you allow for that?

*Mr. Sharpe.*—Yes. We take the total chlorides and calculate them as equivalent to so much sodium chloride.

*Mr. Brodie.*—So that a figure of 2.2 per ton of 100 per cent. acid is not unreasonable?

*Mr. Gokhale.*—No.

*Mr. Brodie.*—You have put in 2 in your statement?

*Mr. Sharpe.*—I think that was a rough figure.

*Mr. Brodie.*—As regards sulphuric acid you use 1.75 tons. That is a very high figure.

*Mr. Sharpe.*—Yes, on account of the still we are using Dharamsi's figure ought to be lower.

*Mr. Brodie.*—The figures that I have got here are:—

	Tons.
Eastern Chemical . . . . .	1.75
Dharamsi Morarji . . . . .	2.31

*Mr. Sharpe.*—Theirs is based on 77 per cent. I think.

*Mr. Brodie.*—What sort of salt cake do you get? Is it acid?

*Mr. Gokhale.*—Yes.

*Mr. Brodie.*—I think for efficient working we should base our calculations on neutral salt cake.

*Mr. Sharpe.*—We realize that our method is not the most modern method.

*Mr. Brodie.*—I should think 1.50 tons is a reasonable figure.

*Mr. Sharpe.*—I should think so.

*Mr. Brodie.*—Do you use any nitre cake in your hydrochloric acid plant?

*Mr. Sharpe.*—No. Ours is the horizontal cast iron cylinder. If we make very hard salt cake it will take an hour and a half to take it out.

*Mr. Brodie.*—What about your works Mr. Ramsingh? Do you use nitre cake to make hydrochloric acid?

*Mr. Ramsingh.*—Yes.

*Mr. Brodie.*—Nitre cake contains 30 to 40 per cent. sulphuric acid which at present in your works is practically useless.

*Mr. Sinclair.*—We are using it for Glauber's salts.

*Mr. Brodie.*—You must incur a very heavy expenditure in neutralizing it. Would it not be possible, if you got a bigger demand for hydrochloric acid, to have a modern plant and have your nitre cake used up?

*Mr. Sharpe.*—That is what it is based on, for to make 600 tons per annum. We should have to put in a salt cake plant.

*Mr. Sinclair.*—But it would not pay at the present moment to put in a salt cake plant.

*President.*—We are taking into account 600 tons of hydrochloric acid.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—In that case we can include nitre cake as an available ingredient for making hydrochloric acid?

*Mr. Sharpe.*—Yes, except that you don't get a very big yield when the production of nitric acid is small compared with hydrochloric acid. We are making only 150 tons of nitric acid.

*President.*—If you use nitre cake in addition to the acid you have to use more salt also; therefore the total quantity of salt cake that is recoverable would increase if you use nitre cake?

*Mr. Sharpe.*—Yes. You can look upon nitre cake roughly as a mixture of salt cake and sulphuric acid.

*Dr. Matthai.*—What is the quantity of nitre cake that you get from 150 tons of nitric acid?

*Mr. Sharpe.*—Roughly double. 255 tons from 150 tons of nitric acid.

*Mr. Brodie.*—Supposing you get neutral salt cake, can you sell it for glass manufacture?

*Mr. Sharpe.*—We might. But even the glass people here do not import salt cake. They import alkali. With the difference in price they should import salt cake. It is considerably cheaper than alkalis, yet they are not buying it.

*Mr. Brodie.*—Taking the salt cake at present it is of no value and if you could sell even a small amount it would be of some use because it would reduce the costs.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—I have been told by chemical manufacturers that glass manufacturers in India will not use salt cake. But so far they have not been given any suitable salt cake to use.

*Mr. Sharpe.*—They can buy salt cake at a considerably cheaper price than alkali at home but they don't use it.

*Mr. Brodie.*—Still there is a possible outlet that way?

*Mr. Sharpe.*—We have that in mind.

*Mr. Ramsingh.*—We tried in several glass works and we gave free samples to them, but they said by using our salt cake they had to use more fuel for melting their glass. That's why they preferred to use soda ash.

*Mr. Brodie.*—On the Calcutta side they have cheap fuel and getting their salt cake at a cheaper rate would make a lot of difference to them. Up to the present it seems they have not been given neutral salt cake.

*Mr. Ramsingh.*—It contains iron and that is an objection.

*Mr. Brodie.*—In Calcutta they are using Manchester salt: they have cheap fuel. Would it be possible to give them neutral salt cake instead of acid salt cake?

*President.*—Then the thing to do would be to take credit for nitre cake in nitric acid.

*Mr. Sinclair.*—Yes.

*President.*—We did not take any credit for salt for Glauber's salts or sodium sulphide, so there is no point in taking any credit for salt cake contained in the nitre cake. We can only take credit for the sulphuric acid in it. How much of the sulphuric acid in the nitre cake is recoverable?

*Mr. Sinclair.*—Practically all of it; about 35 per cent.

*President.*—In that way it may be done—by taking credit for the sulphuric acid.

*Mr. Sharpe.*—We use correspondingly less sulphuric acid in the hydrochloric acid. If you are going to allow Rs. 20 in the nitre cake, and take Rs. 20 off the acid it comes to the same thing to the manufacturer of hydrochloric acid.

*Mr. Brodie.*—It helps the manufacture of nitric acid.

*Mr. Sharpe.*—It will help in the salt cake but in hydrochloric acid it won't make any difference.

*Mr. President.*—You will get an increased quantity of salt cake.

*Mr. Sharpe.*—Yes.

*Dr. Matthai.*—Could we make a rough estimate of the increase in salt cake that would result supposing nitre cake were used?

*Mr. Brodie.*—I reckon about 160 tons.

*Mr. Sharpe.*—Yes.

*President.*—Supposing we took no credit in the hydrochloric acid for salt cake then it means that sodium sulphide and Glauber's salt would come down?

*Mr. Brodie.*—As regards the fuel in the hydrochloric acid, the cost you give is very high.

*Mr. Sharpe.*—As we said before, we had to go on Dharamsi's figure and even then it is less than their actual consumption.

*President.*—Messrs. D. Waldie and Company's practice is about 3 tons for 100 per cent.

*Mr. Brodie.*—The German practice is two-thirds of a ton. The highest figure that I have got for any sort of furnace is 1.1 allowing for a lower quantity of coal. Let us say 2 tons; would that be reasonable?

*Mr. Sharpe.*—I should think so.

*President.*—2 tons would be about Rs. 34?

*Mr. Sharpe.*—Rs. 30-8-0.

*Mr. Cowper.*—I have got quotations this afternoon; they are—

	Per ton.
	Rs.
Bengal Coal, Deshargarh . . . . .	20
Natal coal . . . . .	23
English coal . . . . .	30

*Mr. Gokhale.*—Our latest purchase was at Rs. 18-4-0; that contained 15 per cent. ash.

*Mr. Brodie.*—Deshargarh is good coal. If they were using Deshargarh coal I think Eastern Chemical's consumption would come down to 1½ tons.

*Mr. Sharpe.*—It comes to the same thing.

#### *Glauber's Salts.*

*Mr. Brodie.*—The whole crux of the matter in Glauber's salt is that you have taken a large amount of soda ash to neutralise the salt cake.

*Mr. Sharpe.*—That is not entirely for neutralising the salt cake. We have to precipitate the iron as well. That soda ash is lost so far as Glauber's salt is concerned. †

*Mr. Brodie.*—How much iron will you have in it?

*Mr. Sharpe.*—3 or 4 per cent.

*Mr. Brodie.*—Where does the iron come from?

*Mr. Gokhale.*—From the brick working furnace and the C. I. pan.

*Mr. Sharpe.*—If we were going in for this particular scheme, we should have to use pure salt. That would put up the price slightly.

*President.*—We have allowed Rs. 18 for the best salt.

*Mr. Sharpe.*—That is the best salt.

*Mr. Gokhale.*—It is not the best salt; it is perhaps the worst salt. In Bombay it is called Calcutta salt.

*President.*—There is no such thing as Calcutta salt.

*Mr. Sharpe.*—There are two grades; Cooper salt is a very low grade. Calcutta salt is white.\*

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\* Note.—Calcutta salt is the trade name given in Bombay to the white variety of salt.

*President.*—You were using salt for which you paid Rs. 12. It was stated to us that you wanted better quality and we put it at Rs. 18. The Liverpool salt is Rs. 35 and you are not going to use that.

*Mr. Gokhale.*—No. Calcutta salt is very fine. On the Bombay side salt is sold by volume and not by weight.\*

*President.*—For your purpose do you want that variety?

*Mr. Sharpe.*—At present no. If we were going to make Glauber's salt from salt cake, we should need a pure salt, as pure as we could possibly get.

*President.*—You don't want pharmaceutical salt.

*Mr. Sharpe.*—No.

*Mr. Brodie.*—I take that the iron that you speak of is not in solution. The iron is present in the form of scale, I think?

*Mr. Sharpe.*—It is largely converted into ferrous sulphate.

*Mr. Brodie.*—In Glauber's salt the amount of soda ash you use raises the cost very heavily. As far as the acidity of the cake is concerned—I do not know what you get—the English practice is to consider the salt cake good if it contains less than one per cent.

*Mr. Sharpe.*—I don't think I have brought my figures. We think anything between 1½ to 2 per cent. is equally good.

*Mr. Brodie.*—They call it 1 per cent. of  $\text{SO}_2$ . That is 1.2 per cent. of sulphuric acid.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—Taking it at 1.2, I calculated the amount of soda ash you require to neutralise it as .007 which is exactly  $\frac{1}{10}$ th of what you use. Can't you precipitate the iron by means of lime?

*Mr. Sharpe.*—Yes. If we do that, we have got to wash the mud. If you use lime for precipitating iron, you get a sludge. Sooner or later that sludge accumulates and the cost of washing it and evaporating the very weak liquor is going to be out of all proportion, to the value. That is what we find.

*Mr. Brodie.*—You have to get a sludge anyhow.

*Mr. Sharpe.*—If we are going to throw that away, we are going to throw Glauber's salt away.

*Mr. Brodie.*—In Glauber's salt we have taken Rs. 10.5 for soda ash. It is 25 per cent. of the total cost and you cannot possibly waste 25 per cent. of the Glauber's in washing the sludge out.

*Mr. Sharpe.*—It is 25 per cent. of the total cost because we have no value for salt cake.

*Mr. Brodie.*—Even if you take a value, it is high.

*Mr. Sharpe.*—Of course; it is high.

*President.*—The price of Glauber's salt has been very much higher. It has come down very recently. Formerly it was all right when you made it as a sort of by-product. Now when you want to sell it in competition against this foreign Glauber's salt which is very much cheaper, it is advisable for you to consider whether you could not do with less soda ash not necessarily the theoretical percentage, but very much less as Mr. Brodie has pointed out just now.

*Mr. Brodie.*—A third of the amount of soda ash is out of all proportion. The industry can't stand it.

*Mr. Sharpe.*—No.

*Mr. Brodie.*—It means practically that you are making Glauber's salt out of soda ash.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—What do you think it could be reduced to? Do you agree to .01 of a ton?

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\* NOTE.—We do not agree, we (E. C. C.) buy our salt by weight in Bombay, and duty is assessed on weight.

*Mr. Sinclair.*—That is a big cut from 1·05.

*Mr. Brodie.*—I know, but what I am suggesting is that it is correct practice.

*Mr. Gokhale.*—In hand furnaces we get 3 per cent. acidity in the salt cake.

*Mr. Brodie.*—You may assume that in England all sorts of furnaces are working.

*Mr. Sharpe.*—Very few mechanical.

*Mr. Brodie.*—I am sure in England it is not the custom to add large amounts of soda ash to salt cake liquors. I doubt whether they add any at all. If you take ·01 of soda ash and twice the amount of lime it would be enough.

*Mr. Ram Singh.*—But these are our actual figures.

*Mr. Brodie.*—Supposing you assume that the amount of soda ash to neutralise the salt cake is ·01, you want something to precipitate iron and possibly alumina.

*Mr. Sharpe.*—Mostly iron.

*Mr. Brodie.*—That would be how much?

*Mr. Sharpe.*—Negligible.

*Mr. Brodie.*—What does the lime cost?

*Mr. Sharpe.*—Rs. 60 a ton.

*President.*—How much would you have to use?

*Mr. Sharpe.*—I am prepared to neglect it.

*Mr. Brodie.*—If you are using 2 per cent., it comes to Rs. 1·2. *Mr. Ram Singh*, do you think if we took lime as 2 per cent., we should be right.

*Mr. Gokhale.*—Our actual practice is 60 lbs. of lime per ton of Glauber's salt.

*Mr. Brodie.*—At present you are working on acid cake.

*Mr. Gokhale.*—Not always.

*Mr. Brodie.*—60 lbs. of lime on a ton of Glauber's salt is more or less 3 per cent. It costs you Rs. 2.

*Mr. Gokhale.*—Yes.

*President.*—Besides lime what do you add?

*Mr. Gokhale.*—Soda ash.

*President.*—How much soda ash do you use?

*Mr. Gokhale.*—8 per cent.

*Mr. Brodie.*—It is impossible to take that as good practice. We are considering now that if you have an increased output, you were working to a neutral salt cake. In that case you practically don't need soda ash. I am taking it at one per cent. which I think should be enough.

*Mr. Gokhale.*—In hand working furnaces I don't think you can go so low as that.

*Mr. Brodie.*—It is the usual practice. I can't find a single instance in English practice or European practice of using a highly acid cake. I think you can reckon ·01 soda ash at Rs. 140 and ·02 of lime at Rs. 60.

*Mr. Gokhale.*—Yes.

*Mr. Brodie.*—About the amount of salt cake in the Glauber's salt you are taking ·50.

*Mr. Sharpe.*—Yes.

*Mr. Gokhale.*—Some oxidizing agent is necessary. In the salt iron exists in the ferrous stage. Unless we oxidize it to the ferric stage, it would not precipitate. We generally use bleaching powder. When we use nitre cake, it is not necessary.

*Mr. Brodie.*—The oxidising agent does not appear in your statement

*Mr. Gokhale.*—When we used nitre cake, it contained some little nitric acid and that is used for the oxidization.

*Mr. Brodie.*—What do you think about that, Mr. Sharpe, does iron exist in the ferrous condition?

*Mr. Sharpe.*—Largely.

*Mr. Brodie.*—But if you precipitate the ferrous iron with lime, it comes down after a bit.

*Mr. Sharpe.*—It does not come quite so well. We used to do that with magnesite. When we deal with Epsom salt, there we use nitric acid.

*Mr. Brodie.*—Would it not be better to blow air into it? In water you sometimes get ferrous iron. As soon as you bring it to the open, it throws out ferric hydroxide. What do you think you ought to allow for bleaching powder?

*Mr. Sharpe.*—It is a very small amount. We can neglect it.

*Mr. Brodie.*—You are not in favour of including it?

*Mr. Sharpe.*—No.

*President.*—We do not mind giving you one rupee more, but our report would be subject to a lot of criticism. It appears on the face of it that it is uneconomic and that is not going to do you any good. It is important to improve your practice so that you may put up a good show. It is no use giving us Rs. 15 when you ought to do with Rs. 2. After all, people interested in this are going to read our report and say something about it.

*Mr. Gokhale.*—I think that it should be the same as lime.

*Mr. Brodie.*—Two per cent. seems a lot. The cost of lime is small whereas bleaching powder is more expensive. What are you taking the cost of bleaching powder at?

*Mr. Gokhale.*—Rs. 7 a cwt.

*Mr. Sharpe.*—It is more than double the cost of lime.

*Mr. Brodie.*—That is what I am afraid of. Supposing we allowed 8 annas for bleaching powder per ton, it would be reasonable.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—We will take alumina ferric now; do you call it alumina ferric or aluminoferric?

*Mr. Sharpe.*—Aluminoferric.

*Mr. Brodie.*—What can we take as the purity of bauxite?

*President.*—It is said to be as good as any bauxite.

*Mr. Brodie.*—The amount the Board has put down is '36 as against '254 theoretical. That is allowing about 60 per cent. of recoverable alumina in the stuff.

*Mr. Sharpe.*—It will vary between 55 and 60.

*Mr. Brodie.*—Sulphuric acid you have taken '47 as against '441 theoretical.

*Mr. Sharpe.*—Yes.

*President.*—As regards bauxite I think we agreed that it should be taken at about Rs. 16 per ton.

*Mr. Cowper.*—Yes, I have had that confirmed.

*Mr. Brodie.*—I don't think that any alteration is necessary.

*Mr. Sharpe.*—No.

#### Alum.

*Mr. Brodie.*—As regards potash alum, the figures for bauxite and sulphuric acid correspond to those of aluminoferric, but the amount of potassium sulphate seems to be high—'23 as against the theoretical '1835. I do not know what is the cause.

*Mr. Gokhale.*—Potassium sulphate that we use is not 100 per cent. pure.

*Mr. Brodie.*—How much is it?

*Mr. Gokhale.*—About 90 to 95 per cent.

*Mr. Brodie.*—There is 5 to 10 per cent. loss on purity.

*Mr. Gokhale.*—Yes. There is some loss in the process also.

*Mr. Brodie.*—Say 15 per cent. in all. That gives you '21 instead of '23.

*Mr. Ramsingh.*—Rs. 165 is the gross price. It is not the net price. When you take the gross price, the weight of the bag comes in there. '23 includes the weight of the bag.

*Mr. Brodie.*—Is that the usual way of doing it?

*Mr. Gokhale.*—Yes.

*Mr. Brodie.*—Where do you get your potassium sulphate from?

*Mr. Gokhale.*—From England.

*President.*—Supposing you use instead of sodium nitrate potassium nitrate either in sulphuric acid or in nitric acid you would get potassium sulphate.

*Mr. Sharpe.*—That is a thing which we actually tried on a somewhat small scale, making nitric acid from potassium nitrate and using that potash cake for decomposition to potassium sulphate.

*President.*—Then, it can be done.

*Mr. Sharpe.*—Yes, but there are one or two practical difficulties.

*President.*—Supposing your sodium nitrate is cut off and you do not get any supplies, we have potassium nitrate in the country and therefore you can use potassium nitrate for nitric acid and for sulphuric acid.

*Mr. Sharpe.*—The reason why we should not agree to do it is that the purity of potassium nitrate is not always high as that of sodium nitrate.

*President.*—I am only asking you.

*Mr. Sharpe.*—It is possible to do it.

*Mr. Gokhale.*—We have actually done it but we do not find it profitable.

*President.*—But as a substitute you can use it.

*Mr. Gokhale.*—We have used it and we can use it.

*President.*—Would you use it for sulphuric acid or nitric acid?

*Mr. Gokhale.*—We can use it for both.

*President.*—In the manufacture of sulphuric acid you use very little.

*Mr. Sharpe.*—That is so.

*President.*—How much are you paying for potassium sulphate? For '23 of a ton, you are paying at the rate of Rs. 165 a ton.

*Mr. Sharpe.*—Yes.

*President.*—You are taking saltpetre cake.

*Mr. Sharpe.*—If we use potassium nitrate—actually the same class for everything else for which we are using sodium nitrate, potash cake is formed and that cake must be valued by considering the difference in costs between using sodium and potassium nitrates.

*President.*—Potash cake is potassium sulphate.

*Mr. Brodie.*—It is acid potassium sulphate.

*President.*—Supposing you are shut out of sodium nitrate, you can still go on manufacturing potash alum and nitric acid.

*Mr. Sharpe.*—Yes. If we cannot obtain sodium nitrate we will have to consider making alum in order to get rid of the potash cake. That is one of the things we have to consider.

*Mr. Brodie.*—Is the consumption of alum going to continue?

*Mr. Cowper.*—The market seems to be as good as before. But the use of aluminium sulphates increasing.



*Mr. Brodie.*—When you buy potassium aluminium sulphate you are buying potassium sulphate for nothing. If, as I understand, you can now make aluminium sulphate free from iron, I don't see any use for potash alum.

*Mr. Sharpe.*—Except for purposes in which they can use only alum the consumption of alum is going down.

*President.*—Supposing you had synthetic ammonia and synthetic nitrogen by the synthetic process, then you can use that for making sodium nitrate.

*Mr. Sharpe.*—It can be done.

*President.*—I think that it is produced.

*Mr. Sinclair.*—Yes. We had a certain amount of it.

*Mr. Brodie.*—How do they get the soda into it?

*Mr. Sinclair.*—I do not know the process.

#### *Epsom Salts.*

*Mr. Brodie.*—What is the purity of the magnesite?

*Mr. Sharpe.*—Roughly 96 per cent.

*Mr. Brodie.*—It appears to me that in the case of Epsom salts you are taking too much magnesite and too little of sulphuric acid.

*Mr. Sharpe.*—We always have a certain amount of magnesite left.

*Mr. Brodie.*—What about sulphuric acid? You cannot have cent. per cent. efficiency on that?

*Mr. Sharpe.*—No. In our particular case, efficiency is worked out on the sulphuric acid and not on magnesite.

*Mr. Brodie.*—Magnesite being cheaper?

*Mr. Sharpe.*—We have a bonus scheme under which efficiency is calculated that way. In order to ascertain whether the work is done efficiently or not in regard to Epsom salts, the Directors judge the efficiency on the basis of sulphuric acid.

*Mr. Brodie.*—What sort of efficiency do you reckon on?

*Mr. Sharpe.*—About 95 per cent.

*Mr. Brodie.*—You are getting 100 per cent. efficiency here.

*Mr. Sharpe.*—The theoretical figure we work on is that 1 ton of 95 per cent. acid will produce 2·387 tons of Epsom salts 100 per cent.

*Mr. Brodie.*—You are working here to the theoretical figure roughly. If we took '38 of magnesite and '42 of sulphuric acid, would that be all right?

*Mr. Sharpe.*—Yes.

#### *Copper sulphate.*

*Mr. Brodie.*—As I was saying to the President, it seems to me that yours is an uneconomical method of making copper sulphate.

*Mr. Gokhale.*—That is so. (This refers to D. M. C. Co. The E. C. C. do not make copper sulphate.)

*President.*—Mr. Brodie was suggesting that now that this copper mine is working it might be possible for you to get either ore or the concentrates.

*Mr. Sharpe.*—They won't part with the ore at the moment I think.

*Mr. Brodie.*—Have you made copper sulphate, Mr. Ramsingh?

*Mr. Gokhale.*—Yes, we did from scrap copper.

*President.*—It is no use using copper if you can use some cheaper substitute for it.

*Mr. Sharpe.*—I understood that Messrs. Dharamsi's were getting copper in a form which was comparatively cheap.

*President.*—At Rs. 800 a ton.

*Mr. Sharpe.*—Whoever sells you copper dross won't sell you at a lower rate.

*Mr. Brodie.*—By this process you waste a molecule of sulphuric acid by converting it into sulphur di-oxide.

*Mr. Sharpe.*—We could avoid that.

*Mr. Brodie.*—You mean by passing the sulphur di-oxide back into the chamber?

*Mr. Sharpe.*—No, without doing that.

*Mr. Brodie.*—How are you going to do it?

*Mr. Sharpe.*—If you oxidise at the same time, it can be done by blowing in steam.

*Mr. Brodie.*—You have '25 of copper and '78 of sulphuric acid.

*Mr. Sharpe.*—I don't know how they have done it.

*Mr. Brodie.*—Mr. Ramsingh, you are using over 2 molecules of sulphuric acid for every one that appears in the finished copper sulphate. Can we avoid that loss of sulphuric acid?

*Mr. Gokhale.*—We are trying that.

*Mr. Brodie.*—How?

*Mr. Gokhale.*—Just by putting it back into the chamber.

*Mr. Sharpe.*—This is the French practice. (A large amount is made in this way in France.) Their acid is spread over the copper which is contained in a sort of tower and as the acid trickles down over the scrap, steam is injected from below and a certain amount of air is blown in with it and they don't lose a molecule of sulphuric acid.

*Mr. Brodie.*—You can make copper sulphate in a thousand different ways. The way we have here is the least efficient. If we take half the amount of acid that would be reasonable. Would you agree to that?

*Mr. Ramsingh.*—Yes.

*Mr. Brodie.*—That brings us down to '44 acid.

*President.*—The whole point is, can you get down to that?

*Mr. Sharpe.*—Yes, I can do it in the laboratory on a small scale I have a note here to show that this is actually done in this way in France. France is a big producer of copper sulphate.

*Mr. Brodie.*—My point is this that of all the methods you could think of you would never choose a way which would involve the use of '87 per cent. acid?

*President.*—As regards the copper concentrates you have to get them down from the copper mines and pay freight on them and that will make a difference to the price.

*Mr. Sharpe.*—I think the people who sell copper scrap would base it largely on the prevailing rate for copper and allow 10 per cent. off for the difficulty of working it, so that by the time you get it down to the works it would not make much difference.

*President.*—It would be easier to use the dross than the concentrate, would it not?

*Mr. Sharpe.*—I should think so but I have no actual experience.

*President.*—I suppose this dross would pay about the same price as its copper content. We know about zinc dross and really speaking there is no difference and I suppose the same thing would apply.

*Mr. Sharpe.*—At present the market rate for copper sulphate varies with the price of copper and it points to that.

*Mr. Brodie.*—That is easily understood. There is another way of doing it which appears in the text-books, that is you heat the copper with sulphur and admit air into the furnace and oxidise it.

*Mr. Sharpe.*—I have tried that in the laboratory but it was not successful.

*Mr. Brodie.*—Well, using sulphuric acid, I think that if we cut down the acid by half, that would give us a fair idea.

*President.*—The trouble is the variation in the price of copper.

*Mr. Ramsingh.*—To-day copper scrap is sold at Rs. 1,100.

*President.*—What is the price of copper sulphate?

*Mr. Cowper.*—Rs. 26-8-0 a cwt. for fine crystals, Rs. 28 for large.

*President.*—That is Rs. 560 a ton, including duty?

*Mr. Sinclair.*—That is their selling price.

*President.*—Who sells this copper scrap?

*Mr. Gokhale.*—The bazaar people.

*Mr. Sharpe.*—I might suggest taking off Rs. 54 for the cost of sulphuric acid from the final cost, say Rs. 440 and you then get a rough figure that the final copper sulphate costs you 1·8 times the cost of copper in it. If you are going to consider that the copper is going to vary you might take that as the rough standard, viz., that the cost of  $\text{CuSO}_4$  is 1·8 times the cost of copper in it, that is assuming that the other figures are correct of course. Another way is to take off Rs. 54 from Rs. 360; that will give you Rs. 306 and the cost of copper you will take as Rs. 216.

*President.*—The price of copper is £78-5-0 in England. India copper is £104. So if you take £78-5-0 in England that is equal to Rs. 1,100 then you are paying the same price as the price of copper.

*Mr. Ramsingh.*—Yes.

*Dr. Matthai.*—If the price of copper sulphate is Rs. 561 I don't see why you should not make a very good profit, taking your scrap at Rs. 1,100.

*Mr. Sinclair.*—At the time the price for copper was given as Rs. 800 I went all round Bombay and could not get any evolution less than Rs. 900.

*President.*—I think the best thing is to take the British price, that is £78 which is equal to Rs. 1,040: you will have to add a certain percentage to get the local price.

*Dr. Matthai.*—Rs. 1,100 would be the probable price.

*President.*—What these people do is to sell at the London price plus so much: you save the duty and you save the freight. Probably they may charge you 3 or 4 per cent. more. If you halve the R. O. V. and then if you take the price of copper scrap at Rs. 1,100 you get a fair selling price which comes below the duty free price.

*Mr. Cowper.*—Rs. 28 a cwt. was the rate yesterday afternoon.

*Mr. Gokhale.*—We can't take that price as the basis because we can't be sure that the price of copper sulphate has risen sympathetically with the price of copper. You may take last year's average.

*Mr. Sharpe.*—Taking March 15th the price of copper sulphate has gone up to £28-10-0: it was £27-15-0 on 1st March.

*Mr. Brodie.*—Over how long a period have you ascertained this?

*Mr. Cowper.*—The price has varied.

*Mr. Brodie.*—Take the case of white lead. Can you find any relation between the price of white lead and metallic lead?

*Mr. Cowper.*—We did in the case of white lead.

*Mr. Brodie.*—Over a long period, the ratio changes a lot.

*President.*—This is March 15 also. In the Chemical Trade Journal the price of copper is given as £81-16-0. Copper sulphate is £28-10-0. We must take the same price in the same day.

*Mr. Sinclair.*—Yes.

*President.*—It is quite possible that the price of copper has gone still higher in Europe.

*Mr. Cowper.*—Yes.

*Dr. Matthai.*—As a matter of fact if you take the price of copper scrap from Rs. 800 to Rs. 1,100, then the cost of copper per ton of copper sulphate has gone up by about Rs. 85. At the same time if the price of copper sul-

phate has gone up from Rs. 382 to Rs. 487 which is a rise of more than Rs. 100, though the price of copper scrap has gone up by Rs. 100, the price of copper sulphate has gone up by Rs. 85. That is more or less sympathetic.

*Mr. Sharpe.*—Yes.

*President.*—I think the best thing is to take the prices on the same date of both the materials. The market prices here are really no guide.

*Mr. Sharpe.*—No.

*President.*—We must take the price of copper.

*Mr. Cowper.*—Let us leave out the scrap altogether. The dealers in scrap are fully informed about the rise in the price of copper.

*President.*—There may be a difference of 5 per cent. When there are these fluctuations, we must start from some point. Let us take 1st and 15th March. The price of copper on 1st March was £79-13-0 and on the 15th March £81-16-0. The price of copper sulphate on 1st March was £27-15-0 and on the 15th March £28-10-0. There is a difference of 15s.

*Mr. Sharpe.*—I have taken both those figures and divided in each case the cost of the copper sulphate by the cost of the copper. On the 1st March it comes to 3'35 and on 15th March 3'48.

*President.*—It is going to be more or less the same.

*Mr. Sharpe.*—Yes. The trouble is that there are only two instances and we have to do it over a series of weeks.

*President.*—That price of Rs. 800 certainly did not correspond to the price of copper at all.

*Mr. Sinclair.*—I remember I said at that time (January) that D. M. C. C.'s was a cheap lot bought from the Great Indian Peninsula Railway. We passed some comments on the price at that time.

*President.*—Is there a real copper scrap market here?

*Mr. Sinclair.*—A very small market.

*Mr. Cowper.*—There are certain recognised dealers in copper scrap. One of these dealers I understand is also an importer of copper ingots. About three years ago I was in a department which handled railway supplies and we used to supply copper ingots to the railways. I remember in those days there was a dealer in the bazaar who used to buy scrap and he was familiar with copper ingots also.

*President.*—What is the difference ordinarily?

*Mr. Cowper.*—I don't remember now. There was slight difference between the two and the price of scrap was governed by the price of ingots.

*President.*—That would be so. There may be perhaps 5 per cent.

*Mr. Cowper.*—I couldn't tell you that off hand. I don't think it will be difficult to ascertain.

*President.*—You can never depend upon getting the scrap. If you want say 200 tons of copper, you would not get it in scrap.

*Mr. Cowper.*—The dealers tender for the scrap. The railways have scrap also. They buy it and remelt it.

*Mr. Ramsingh.*—A certain quantity of scrap is also exported.

*Mr. Cowper.*—That might be due to the fact that scrap has been imported from places near and round about India and comes to Bombay and is then re-exported from Bombay.

*President.*—I think it would be safe to take the price of copper ingots.

*Mr. Cowper.*—It would be better to work on the ingot price.

*President.*—But I think you can make some reduction for scrap.

*Mr. Cowper.*—Yes.

*President.*—It is not always possible to get so much scrap.

*Mr. Cowper.*—No.

*President.*—There is quite a lot of imported copper.

*Mr. Cowper.*—Copper ingots are imported in large quantities.

*President.*—These people here will sell all the copper that they produce in the country at the import price. You won't get them cheaper.

*Mr. Sharpe.*—They will certainly do that.

*President.*—And they will take the duty also.

*Mr. Cowper.*—Not necessarily; they are not doing it in the case of lead. Both copper and lead are sold on thin metal content. Copper and lead are sold on a percentage basis, viz., 99 or 98·8 per cent. The price depends on the percentage of purity of the ingot.

*Mr. Sinclair.*—In the case of lead the price is practically the same whether you buy in India or in London.

*Mr. Cowper.*—It is the London market that controls the price of these metals. You probably would not save the duty by buying copper in the country. They would sell it at the same price as in total copper. When they export it they have to take a lower price.

*Mr. Brodie.*—If manufacturers abroad do the same thing, you accuse them of dumping.

*Mr. Sinclair.*—The one thing it does, is it stabilises the metal market.

*President.*—Do you suggest that we have to take a price which is lower than the London price for the scrap?

*Mr. Cowper.*—I think it would be better to work on the London price and ignore the local price.

*President.*—That is to say we must take the price of ingot copper.

*Mr. Cowper.*—That will be practically the same as the London market price. The London market controls the price.

*President.*—But the freight would be very little compared to the value.

*Mr. Cowper.*—It should be.

*President.*—Still it would not come to very much.

*Mr. Cowper.*—It doesn't take up much space.

*President.*—It would be a good cargo.

*Mr. Sinclair.*—Yes, it is.

*Mr. Cowper.*—The freight is usually between 25 and 35s. a ton.

*President.*—I think we will have to make some modification in the price of copper and in the cost of the R. O. V.

*Mr. Brodie.*—If you were using dross you would not need R. O. V. but you would require chamber acid.

*Mr. Sharpe.*—Yes.

*President.*—I think the best thing is to take pure copper.

*Mr. Sharpe.*—Yes.

#### *Copperas.*

*Mr. Brodie.*—You have got a very high figure for iron scrap.

*Mr. Sharpe.*—We don't put any value.

*Mr. Cowper.*—It is Dharamsi's valuation.

*Mr. Ramsingh.*—We buy the scrap which is very rusty.

*Mr. Brodie.*—Is the rust all waste?

*Mr. Sharpe.*—Some of it is wasted.

*Mr. Brodie.*—Do you think the figures are all right?

*Mr. Sharpe.*—Yes.

*President.*—The price of Rs. 10 a ton taken for scrap is too low.

*Mr. Sinclair.*—Yes.

*President.*—We never got a figure so low as that anywhere. Is it steel or iron scrap?

*Mr. Sinclair.*—It is tin clippings and odds and ends, chiefly tin and mild steel.

*President.*—That is steel scrap. Steel scrap you can never get. The smaller the scrap the bigger is the price.

*Mr. Sharpe.*—These are hoop iron.

*President.*—Is the price of Rs. 10 a ton correct?

*Mr. Sharpe.*—It is a matter of cartage. It is rubbish that is dumped.

*President.*—In Calcutta there is a scrap market.

*Mr. Sharpe.*—There is a market here for heavy stuff.

*Mr. Brodie.*—Is Rs. 10 a ton all right?

*Mr. Sinclair.*—I think Rs. 10 is a fair figure.

*Mr. Brodie.*—How much loss are you allowing on acid? The theoretical figure is 352. You are taking something like 35 per cent. over the theoretical.

*Mr. Sharpe.*—One ton of 95 per cent. sulphuric acid produces 2.693 tons of copperas.

*Mr. Brodie.*—Have you calculated it the other way round, that is to say the amount of sulphuric acid used to one ton of copperas?

*Mr. Sharpe.*—37 ton.

*Mr. Gokhale.*—The scrap contains a lot of rust.

*Mr. Brodie.*—I am thinking of the acid.

*Mr. Gokhale.*—I mean the acid. When the iron is rusty, as it always is, it causes waste of acid. We get basic ferric sulphate formed.

*Mr. Brodie.*—I think that it is all right then.

*Mr. Gokhale.*—Yes.

*Mr. Sharpe.*—Yes.

#### *Rectified Oil of Vitriol.*

*Mr. Brodie.*—You have an efficiency of roughly 90 per cent.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—The amount of chamber acid used is 1.1.

*President.*—I am cutting it down to 1.05.

*Mr. Sharpe.*—Yes.

*President.*—At present they are not able to use R. O. V. which is not of proper strength. When they increase the output of salts, they can use it up and then the wastage may be stopped.

*Mr. Sharpe.*—We are using the cascade system of concentration? and SO<sub>2</sub> and water go through scrubber and combine as much as possible. From that we get an acid (40 tw.) which is impure. When the Epsom salts plant is working we can put that in and use it up. In the ordinary course it goes back into the chamber.

*President.*—You cannot take it as being wasted.

*Mr. Sharpe.*—No. All the losses are borne by the Chamber plant.

*President.*—I think that it would be fair even at this stage to take 5 per cent. as the loss on that.

*Mr. Sharpe.*—We have agreed to that.

*Mr. Brodie.*—Is the cascade system generally in use now?

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—I thought that there were more modern concentrators.

*Mr. Sharpe.*—Very few people installed them. Four years ago I saw one. The cascade system is the best. The Indian standard of Rectified Oil of Vitriol is very high.

*Mr. Brodie.*—It is being called R. O. V. but is it not C. O. V.?

*Mr. Cowper.*—Some people call it C. O. V. In India it is called R. O. V.

*Mr. Sharpe.*—There is a slight difference between the two. Sulphuric acid out here is water white. C. O. V. need not be so, but R. O. V. is.

*Mr. Brodie.*—When you are comparing your costs with those of foreign manufacturers, in which of your products do you make a comparison with arsenical acid and in which with de-arsenicated acid?

*Mr. Sharpe.*—If you are going to compare the price of 95 per cent. you must compare it with de-arsenicated acid.

*Mr. Brodie.*—What I mean to say is: in some cases you are using an arsenic free acid where it is not necessary.

*Mr. Sharpe.*—I agree there.

*Mr. Brodie.*—In general do you think a fair comparison could be made with foreign costs by taking the cost of arsenical acid?

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—But surely for making ammonium sulphate, you remove the arsenic first?

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—And in superphosphate?

*Mr. Sharpe.*—I don't think so for the simple reason that they are using Chamber acid.

*President.*—In the case of superphosphate if they use it, it would mean a lot of difference.

*Mr. Sharpe.*—Even the German stuff that is coming would be arsenic-free.

*President.*—Is any commercial acid coming in?

*Mr. Sharpe.*—Sulphuric acid (95 per cent.) is coming in.

*President.*—Because prices are very high, because you have made it profitable for them to send.

*Dr. Matthai.*—What is the c.i.f. price?

*Mr. Cowper.*—£10-10-0, that is allowing for the price that you would get for the drums. The Germans actually quote much lower to the consumers than they do to the bazar.

*President.*—That is equal to Rs. 140.

*Mr. Cowper.*—Yes. It comes to something like Rs. 165 delivered per ton. You get a rebate on the empty drums. The price of these drums is fairly high.

*President.*—Are the drums sent back?

*Mr. Cowper.*—No.

*President.*—Then?

*Mr. Cowper.*—The drums are the buyer's. He can do what he likes with them. The price actually delivered would be Rs. 165 or Rs. 170 but there would be a discount on the drums.

#### *Sodium Sulphide.*

*Mr. Brodie.*—The point about sodium sulphide rests on fuel.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—You have taken here for power and fuel Rs. 50. How is that split up? How much of that is involved in furnace and how much in concentration or crystallisation or whatever you do?

*Mr. Sharpe.*—There we rely on Dharamsi's figures, and they have done it only on a small scale. I looked it up a week or so back. Lunge is a recognised authority. The figures he has given for the various works vary tremendously—

4 parts of sulphate to 1 part of coal.

2 parts of sulphate to 2 parts of coal.

100 parts of sulphate to 16.9 of coal.

100 parts of sulphate to 30 of coal.

150 parts of sulphate to 100 of coal.

*Mr. Brodie.*—I was not bothering so much about the coal used for reduction. I was thinking of the coal used as fuel.

*Mr. Sharpe.*—These are the figures representing the total amount of coal used.

*Mr. Brodie.*—16.9 per cent. is impossible. The theoretical figure is more than that.

*Mr. Sharpe.*—He gives that as the work's actual practice.

*Mr. Brodie.*—Mr. Ramsingh you have put in some figures from the American works. The general effect of that is that you use about 50 per cent. of coal for reducing, is that right?

*Mr. Gokhale.*—Salt cake is 1.3 and coal dust 1 ton.

*Mr. Brodie.*—I am taking the note showing the costs in America which you have submitted. There it is given one ton of salt cake and half a ton of coal. Is that right?

*Mr. Gokhale.*—Yes. But they use bituminous coal whereas we use ordinary coal.

*Mr. Brodie.*—You ought to use high class coal for reduction to prevent continuation of the sulphide with the coal. Would it not be better to use a smaller amount of the higher quality?

*Mr. Gokhale.*—Yes.

*President.*—Then they must take it at Rs. 20.

*Mr. Ramsingh.*—We ought to use bituminous coal.

*Mr. Brodie.*—That is steam coal.

*President.*—How much do you want of that?

*Mr. Brodie.*—The average experience abroad is 50 per cent. If they cannot get as good a coal as the people abroad they might have to use 60 per cent. I am not trying to bring down the cost but trying to improve the quality.

*President.*—To-day's quotation was Rs. 20 you said.

*Mr. Cowper.*—Yes.

*President.*—Was that delivered at the mill?

*Mr. Cowper.*—Yes.

*Mr. Brodie.*—You want ordinary coal for that. I make it something like 3 ton of English coal. What would you allow for the furnace and what would you allow for concentration?

*Mr. Gokhale.*—Half a ton for furnace and one ton for concentration.

*Mr. Brodie.*—In what form is sodium sulphide produced? Is it 60 per cent. fused?

*Mr. Gokhale.*—60/62 per cent. fused. Crystals are 30/32 per cent.

*Mr. Brodie.*—What is the process? First of all you heat it with the coke to reduce it.

*Mr. Gokhale.*—Yes. The smelt is then lixiviated and the clear liquor is concentrated. We must allow it to settle down and then pack it in drums.

*Mr. Brodie.*—What is the strength of your liquor?

*Mr. Gokhale.*—About 60-T. W. that is 24 per cent. sodium sulphide. You have to concentrate about 2½ times.

*Mr. Brodie.*—What about caustic soda? What is the cost of concentrating caustic soda?

*Mr. Sharpe.*—Fairly high.

*Mr. Gokhale.*—It is done in cast iron pots.



*Mr. Brodie.*—It makes an awful difference in the cost. Have you any actual practice of concentrating caustic soda?

*Mr. Sinclair.*—Yes, we can give you actual figures.

*Mr. Brodie.*—You were saying you took half a ton to the furnace and one ton to concentration. That comes to  $1\frac{1}{2}$  tons, in place of 3.

*Mr. Gokhale.*—But then there is light, steam and general engineering service.

*Mr. Brodie.*—Should there be another 1·5 for general services?

*Mr. Gokhale.*—A lot of steam is used for lixiviation. Use of crude oil for the furnaces also required steam; besides, lights for night work, and so on.

*President.*—As regards power we can take it separately—electric power, yard charges and so on. What is the actual quantity of fuel that you require?

*Mr. Gokhale.*—Direct fuel is 1·5. Then you require coal for generating steam.

*President.*—You want steam for other chemicals too.

*Mr. Gokhale.*—Our point is that though we won't run the steam boiler only for sodium sulphide, we require a very large amount of steam for the lixiviation process, in the manufacture of sodium sulphide.

*President.*—Are you making this regularly?

*Mr. Gokhale.*—No.

*Mr. Brodie.*—I think if you could bring down the fuel it would help you a lot. At present your fuel is an enormous amount in the total cost.

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—You say 1·3 parts of salt cake. Where does that all go? When you reduce it to sodium sulphide you lose about 20 per cent. of it. Is that right?

*Mr. Gokhale.*—Yes.

*Mr. Brodie.*—I think the whole thing hinges on the fuel question.

*President.*—Have you any suggestions to offer?

*Mr. Sharpe.*—No, except that in this particular case I rather fancy that the repairs and renewals are alighty on the low side.

*President.*—Fuel is the main thing.

*Mr. Cowper.*—I was informed that fuel comes to 50 per cent. of the salt cake used in the English practice.

*Mr. Brodie.*—Everybody agrees about that. The point is how much fuel you want for concentration and how much for lixiviation.

*Mr. Gokhale.*—The point is about the cost of steam for lixiviation.

*Mr. Brodie.*—It does not require a lot of fuel to do that?

*Mr. Gokhale.*—It does. Steam is not only used for heating but for stirring also.

*Mr. Brodie.*—On how big a scale have you made sodium sulphide up to the present?

*Mr. Ramsingh.*—One ton at a time. We experimented on it.

*Mr. Brodie.*—You cannot deduce anything from that, if you are going to make sodium sulphide on a reasonable scale. As regards concentration it is merely done by evaporation. It is only the boiling of water. It does not hold water tenaciously as sulphuric acid does. When you are concentrating for Epsom salt manufacture how much concentration have you to carry on?

*President.*—The fuel required for Epsom salts is chiefly for concentration?

*Mr. Ramsingh.*—Yes and for drying.

*Mr. Brodie.*—It appears as if the fuel costs are rather too high and you can never establish an industry in India at such high costs.

*Zinc Chloride.*

*Mr. Brodie.*—In what form does zinc chloride come into the market?

*Mr. Ramsingh.*—Solid.

*Mr. Brodie.*—What percentage is it?

*Mr. Ramsingh.*—98 to 100 per cent.

*Mr. Brodie.*—You allow 10 per cent. wastage on that?

*Mr. Sharpe.*—Yes.

*Mr. Brodie.*—Is the zinc impure?

*Mr. Sharpe.*—I can't say; these are Dharamsi's figures.

*Mr. Gokhale.*—It does contain iron.

*Mr. Brodie.*—It will probably be about 97 per cent. pure?

*Mr. Gokhale.*—Yes.

*President.*—If the process is very simple why is the plant expensive in the case of zinc chloride? You give the price of the plant as Rs. 1,00,000. What is the process that you use?

*Mr. Gokhale.*—Zinc dross is dissolved in hydrochloric acid and then iron and other impurities are precipitated and the liquor filtered. Concentration is then done by steam coils and finally over coal fire in copper pots and then baled into drums—.

*Uneconomic production.*

*President.*—I want to know what you are going to do. As I told you before, we cannot allow production on such a small scale. Can you give us some idea as to what you propose to do?

*Mr. Cowper.*—We are still negotiating with the Dharamsi Morarji Chemical Company on behalf of the Eastern Chemical Company and we have no doubt that when the Board decides on something we could come to terms. At present it is only natural that both sides want to get as much as they can in the bargain.

*President.*—It is quite uneconomic.

*Mr. Cowper.*—That point has been admitted.

*President.*—I just wish to know if anything has been done. Supposing we made a recommendation on estimates made of 4,000 tons production and we found afterwards that nothing was done and the industry remained where it was, all this labour is wasted.

*Mr. Sinclair.*—It was apparent to us a long time ago that two companies could not live. When I returned from leave it was practically settled then that one company would close down and negotiations were opened with this object. These negotiations fell through and now we are trying to come together again.

*President.*—It is not our idea that there should not be competition but that stage has not yet been reached. First of all you must have economic production, before you can have competition. But this competition is entirely uneconomic and nothing can be done if the industry only works to this capacity.

*Mr. Cowper.*—Dharamsi's realise the advantage of their company and the Eastern Chemical Company working together. Certain proposals have been made and they are being considered at present.

*President.*—The industry must work as a single unit for purposes of manufacturing anyhow.

*Mr. Sinclair.*—That is apparent.

*Mr. Cowper.*—I think they realize that, as far as one product is concerned, viz., hydrochloric acid, which is made entirely by the Eastern Chemical Company, there is no advantage in working separately.

*President.*—You cannot manufacture salts unless you actually manufacture 600 tons of hydrochloric acid. At present you are each manufacturing about 30 tons.

*Mr. Cowper.*—We realize that unless one company shuts down there is no possibility of the chemical industry developing in Bombay.

*Mr. Ramsingh.*—We propose amalgamation of the two companies.

*President.*—We are not interested in your internal arrangements. What I am trying to point out is that the Board must feel sure that the industry is going to be put on a sound footing. It is no use putting a burden on the consumer. You can both run your plants to death and eventually both will close down.

*Mr. Sinclair.*—That is what would happen. If things go on as at present the whole industry will collapse.

## THE BARODA CHEMICAL WORKS, BARODA.

Oral Evidence of Mr. TRILOKINATH KAO, recorded at Bombay on  
Thursday, the 28th March, 1929.

### Introductory.

*President.*—What position do you hold in Baroda Chemical Works?

*Mr. Kao.*—I am one of the proprietors of the Baroda Chemical Works. We are two partners. I am one of the partners and the other is Mr. Hiralal Chhanganlal Parekh.

*President.*—I understand from your representation that the works belonged to somebody else before.

*Mr. Kao.*—Yes, some years before. But recently it was purchased by us.

*President.*—When did you purchase?

*Mr. Kao.*—About 1926.

*President.*—It was an old plant, was it not?

*Mr. Kao.*—It was not a pre-war plant. It was established only in 1921.

*President.*—There is another chemical works in Baroda, Alembic Chemical Works?

*Mr. Kao.*—They are manufacturing alcohol and tinctures only. They are not making heavy chemicals. Ours is the only heavy chemical plant in Baroda.

*Dr. Matthai.*—Are you located in Baroda city?

*Mr. Kao.*—Yes, in Goyagate Road, Baroda.

*President.*—You manufacture sulphuric acid, hydrochloric acid and glauber's salt?

*Mr. Kao.*—Yes.

*President.*—For which there is a local market?

*Mr. Kao.*—Yes. The Maharanee Woollen Mills are there. For wool dyeing they require glauber's salt in a bit larger quantity.

*President.*—Not much?

*Mr. Kao.*—Not much. Because there is only one woollen mill there.

*President.*—You produced about 140 tons of sulphuric acid and 61 tons of hydrochloric acid.

*Mr. Kao.*—Yes, from 1st September 1926 to 31st October 1927.

*President.*—As regards sulphuric acid, is it concentrated acid?

*Mr. Kao.*—Yes, whatever we turn out is concentrated.

*Mr. Mathias.*—Don't you sell any acid of a lower specific gravity?

*Mr. Kao.*—We don't sell any acid with a lower specific gravity in the market. (It is not exactly 1.84; it is about 1.83.)

*Mr. Mathias.*—What is the percentage?

*Mr. Kao.*—About 98 to 99 per cent.

*Dr. Matthai.*—The hydrochloric acid output that you give, what percentage is that? Is it 33 per cent.?

*Mr. Kao.*—About that, because hydrochloric acid is used as a solution, not as real acid. Real hydrochloric acid is a gas at the ordinary temperature. Leaving any temperature below 0, it is always a gas. We have to use it in commerce as a solution.

*President.*—Who uses hydrochloric acid so much?

*Mr. Kao.*—Near Baroda—about fifty miles from there—there is a dye works. They are using it in chrome dyeing.

*President.*—Is it a chemical dye works?

*Mr. Kao.*—Yes. They are dyeing about 40 bales per day—chrome dyeing, Turkey red dyeing, etc. Leaving out the Bombay Dyeing Works, they are the biggest works in India.

*President.*—Is it used for bleaching?

*Mr. Kao.*—For chrome dyeing. They dye the thread in sugar of lead and then afterwards it is dipped in potash bichromate or sodium bichromate solution. The colour of the thread does not become perfectly bright yellow. It has to be dipped in the acid solution and then only it becomes bright yellow.

*Dr. Matthai.*—How much salt cake do you get out of 61 tons of hydrochloric acid?

*Mr. Kao.*—When we decompose 6 maunds of salt we get about 7 maunds of salt cake.

*Dr. Matthai.*—1.1 ton you would get.

*Mr. Kao.*—Yes.

*President.*—From one ton of salt?

*Mr. Kao.*—Yes.

*President.*—You use that for glauber's salt.

*Mr. Kao.*—Yes, but not the whole quantity. Some of that is still lying there.

*President.*—You only manufacture about 10 tons of glauber's salt.

*Mr. Kao.*—Yes.

*President.*—It is rather a small unit.

*Mr. Kao.*—Yes, it is one of the smallest units. As you know, sulphuric acid is a corrosive liquid. We just sell our product within a radius of 70 miles from our factory wherever there is a market. So, we are not losing. Although the other chemical works are losing, we are somehow making the two ends meet because we are near the market.

*President.*—That is the advantage in these acids.

*Mr. Kao.*—Yes, to be just near the market—and specially hydrochloric acid cannot be packed in anything but China or glasswares. Sulphuric acid comes in iron drums. But hydrochloric acid is not sent from foreign countries because there is much risk of breakage in glass and Chinawares.

*President.*—Can it not be taken in tank wagons?

*Mr. Kao.*—No. Hydrochloric acid is one of the most corrosive acids. Nitric acid and sulphuric acid can be taken like that, but not hydrochloric acid.

*Mr. Mathias.*—Hydrochloric acid is sent in aluminium drums.

*Mr. Kao.*—No.

*Mr. Mathias.*—What is it imported in?

*Mr. Kao.*—As far as I know, it is imported in Chinaware jar, it cannot be imported in Aluminium vessels which it will dissolve reaching.

*Mr. Mathias.*—How is nitric acid imported?

*Mr. Kao.*—Nitric acid is not much imported. Whatever quantity is imported in jars or China wares. But now-a-days they are trying to import it in aluminium drums.

*Dr. Matthai.*—Who were the proprietors of your works before you took it over?

*Mr. Kao.*—It was a joint-stock concern.

*Dr. Mathai.*—What happened to them? Were they not able to run it or what?

*Mr. Kao.*—They were incurring losses. There was a big fire and then because of the prices being lower, they were losing. Further, a joint-stock company management is a bit costlier than a private company management.

I was one of the Directors of that old concern also. On account of heavy losses, the company had to go into liquidation.

*President.*—They are not manufacturing any of these acids at Petlad, are they?

*Mr. Kao.*—There are two dye houses in that place. The persons concerned with one of the dye houses as friends, used to come and see our works, and then they thought that they would probably manufacture hydrochloric acid. At first I was the sole proprietor of the entire concern. Then, it was turned into a limited concern which went into liquidation and was purchased by Mr. Hiralal and myself. I am a native of Kashmir and Mr. Hiralal is a Guzerati gentleman and has many friends in Guzerat. I never used to allow anybody to enter my works but with Mr. Hiralal many people came and saw the works. As friends they used to visit our works, and when they saw that the acid was a bit cheaper, they started their own works recently to manufacture Hydrochloric acid.

*Mr. Mathias.*—What is the specification of your glauber's salt? Is it 42 per cent.?

*Mr. Kao.*—About 45 per cent.

*President.*—As regards the price of salt which you have given in answer to question 16 . . . . .

*Mr. Kao.*—It includes the duty.

*President.*—Where do you get your salt from?

*Mr. Kao.*—From Kharagoda or Dharsaná near Surat.

*President.*—At the Salt Works, what have you to pay?

*Mr. Kao.*—We have to pay Rs. 1-2-0 per Guzerat maund because in Kharagoda they calculate according to the Guzerat maund. It comes to about 12 to 14 annas per Bengal maund.

*President.*—You give Rs. 1-7-9 as the price of salt per Bengal maund. Rs. 1-4-0 is the duty.

*Mr. Kao.*—The duty is Rs. 1-4-0 per maund.

*President.*—Then the cost of salt is Re. 0-3-9.

*Mr. Kao.*—I think there is no duty included in it: Rs. 1-4-0 per Bengal maund we have to pay and including railway fare and other things it has come to Rs. 1-7-9 excluding duty.

[N.B.—The cost of salt at Dharsaná salt works is Re. 0-3-9 per Bengal maund. In the beginning we have to pay Rs. 1-4-0 duty. This way we have first to pay into the Government Treasury Rs. 1-7-9 per Bengal maund salt, out of which, the duty Rs. 1-4-0 per maund is refunded, when the salt is used up in the manufacture of Hydrochloric acid. Moreover, we have to pay cartage from Dharsaná salt works to Dongri Railway Station, commission to merchants, railway freights, cartage in Baroda, cost of gunny bags and other sundry expenses, all of which added together make up the price up to Re. 0-12-0 to Re. 0-14-0 per Bengal maund at our works excluding duty which is refunded.]

*President.*—There must be some mistake there. However we are writing to the Collector of salt to find out what the facts are. I suppose you buy this salt from the bazar?

*Mr. Kao.*—We buy direct from the salt works through a merchant.

*President.*—You have given these import prices of sulphuric acid. Are these actual import prices or merely quotations?

*Mr. Kao.*—These are import prices which we got from one of the hydrochloric works which has recently been started at Petlad. They buy sulphuric acid from foreign countries.

*President.*—You give a price of £11-10-0. Do they get it *via* Okha?

*Mr. Kao.*—Generally through Okha. Previously they were also getting from Bombay but now they get direct.

*Dr. Matthai.*—Is that concentrated?

*Mr. Kao.*—Yes.

*Dr. Matthai.*—They don't save very much by getting it from Europe if you can sell it at this price?

*Mr. Kao.*—No, they don't save much.

*Dr. Matthai.*—What is the distance from your place to Petlad?

*Mr. Kao.*—About 60 miles.

*President.*—What is the distance from Petlad to Okha?

*Mr. Kao.*—More than 200 miles. Recently prices have gone down, they say they get it at about Rs. 6-8-0 per case of 82 lbs.

*President.*—And yours would be about Rs. 8 at Baroda.

*Mr. Kao.*—No Rs. 8 at Petlad.

*President.*—In answer to question 54 you have given these freight rates, are these for small consignments or for wagon loads?

*Mr. Kao.*—They have not given any concession to us for wagon loads. We have to supply even wagon loads at these rates. There is no concession from Baroda, the concession rate is from Bombay.

*Dr. Matthai.*—What is the distance from Bombay to Baroda?

*Mr. Kao.*—About 260 miles.

*Mr. Mathias.*—Is it necessary to get your jars from England?

*Mr. Kao.*—Yes. Recently some people have started manufacturing acid proof jars near Ahmedabad. But they are not hydrochloric acid proof. After sometime the glaze goes away if they are used for hydrochloric acid.

*Mr. Mathias.*—Did you use them?

*Mr. Kao.*—About 20 per cent. of our requirements we now get from them.

*Mr. Mathias.*—How do they compare in price with imported jars?

*Mr. Kao.*—The price is just about the same. They are not able to give them cheaper. But as it is an Indian industry we get some from them.

*Mr. Mathias.*—You get your lead sheets from abroad?

*Mr. Kao.*—Yes, from England.

*Dr. Matthai.*—You have only one chamber?

*Mr. Kao.*—One big and one very small chamber.

*Dr. Matthai.*—There are no towers?

*Mr. Kao.*—No.

#### *Internal competition.*

*President.*—You say. "We do feel some competition from the Eastern Chemical Company and the Dharamsi Morarji Chemical Company in sulphuric acid. But we believe when there will be no foreign competition, internal competition will not affect us". Why?

*Mr. Kao.*—If foreign importation is stopped, these local manufacturers will not compete in our markets.

*President.*—Very little comes now in the way of acids?

*Mr. Kao.*—Whatever small quantity comes in it affects the price. I don't say it is coming in large quantities but it cuts the price. If a small chemical works is started in Baroda and if the other stuff enters that market only for the sake of competition and reduces the price by one rupee per jar, that would affect our price adversely.

*President.*—How can you stop that?

*Mr. Mathias.*—Surely if you stop all imports altogether you will still have your prices reduced by internal competition, since in order to extend their market local firms will reduce their prices.

*Mr. Kao.*—We are not much affected by their lowering of prices because on their products so much railway freight has to be added. We keep our

price at Petlad and Ahmedabad at the Bombay rate *plus* railway freight and other things.

*Dr. Matthai.*—Your price at Petlad is based upon the Bombay price *plus* the freight?

*Mr. Kao.*—Yes.

*Mr. Mathias.*—If the Bombay manufacturer reduces his price your price will be still further reduced?

*Mr. Kao.*—It will affect us to some extent but our price will not be reduced to the extent to which their prices will be reduced owing to the higher railway freight they will have to pay for the longer distance.

*President.*—You ask for a duty of 60 per cent. If that duty was enforced it would simply mean that more plants would be built and there would be more competition. If the price of sulphuric acid were raised in that way, it would be profitable for a man to get two retorts and make sulphuric acid.

*Mr. Kao.*—Sulphuric acid cannot be made like hydrochloric acid in retorts. That will require large capital and experience.

*President.*—You must have heard of the case of the match industry. They put on a duty of 150 per cent. and the result was that everybody started manufacturing matches and eventually prices came down so much that some of the factories had to close down. That may happen here.

*Mr. Kao.*—Even then there will be no competition from foreigners and the money will go into Indian pockets. We are ready to suffer for other factories' sake.

*Mr. Mathias.*—The imports of acids are very small now?

*Mr. Kao.*—There may not be much import of acids but when importers quote foreign prices we are asked to quote even lower prices.

*President.*—Is there any business in bones in your parts?

*Mr. Kao.*—Yes. There is one just near our factory.

#### *Superphosphate.*

*President.*—Why don't you make superphosphate?

*Mr. Kao.*—The manufacture of superphosphate is not difficult but it is the propaganda that is necessary to educate the agriculturist to use fertilizers that is difficult. The Indian farmer has not yet learnt its value and these should be distributed free for some time before they are convinced of its usefulness. Experimental and propaganda works should be done and once they know the value of these manures they will purchase these. Take the case of nitrate of soda in Gujerat. They were not using any chemical manures for tobacco but the Chilean Nitrate Company started doing propaganda work and distributing it free and the result is that for the last two years the farmers have realized the value of nitrate of soda and are using it in tobacco cultivation. In the same way superphosphate will be used by the farmers if there is propaganda. We had carried out some experiment on super with bones and supplied a small quantity to the Baroda agricultural department, for demonstration purposes.

*Mr. Mathias.*—Was it a paying proposition?

*Mr. Kao.*—Compared to the price of super in the local market it was a paying proposition from the manufacturer's point of view.

*Mr. Mathias.*—Then why did you stop it?

*Mr. Kao.*—Because we found it was not as difficult to manufacture as to demonstrate to the ryot because they were not ready to use our things. The selling of these was difficult and we found it difficult to make them realize that this will pay them in the long run.

*Dr. Matthai.*—You were able to produce it at a cost which was lower than the market price?

*Mr. Kao.*—Yes.



*Dr. Matthai.*—What was the market price at the time?

*Mr. Kao.*—I don't remember at the moment but I will let you have the information.

*Dr. Matthai.*—Was it about Rs. 80 or Rs. 90?

*Mr. Kao.*—It would be about Rs. 100 I think.

*Dr. Matthai.*—And you were able to produce at a lower cost than that?

*Mr. Kao.*—Yes. In superphosphate manufacture we do not require concentrated sulphuric acid and so the cost of manufacture is low. Once the agriculturist knows the value of superphosphate he will try to use it.

*Dr. Matthai.*—What do you suggest would be the most effective means of propaganda?

*Mr. Kao.*—We have seen many Government farms being opened in India. Have they ever been able to push on or make the agriculturist know the value of these things. About one or two per cent. of the people might be using chemical manures. Mostly they are using primitive things. It is only the business people who could educate the agriculturist in the use of chemical manures. How did the Chilean Nitrates introduce their sodium nitrate? As they were business men, they could spend on propaganda work, experiment on them and make them sure that this would pay after some time. That would require some capital. Some people say that sulphate of ammonia is much more useful as a manure than superphosphate. As far as I have seen, it gives better products for that year in which it is put in, but after some years it has a detrimental value to the soil. Superphosphates improve the quality permanently. So much bone is being sent away and that is why the crops are falling away in India. This was used up in India when there was no bone exported. When bones were not exported to foreign countries, bones used to lie in the fields for some years—10 years, or 20 years or 50 years and get mixed up with the soil. Bones are exported to foreign countries and fertilisers are made out of bones there. That is the reason why our soil is giving much less crop than it used to give in previous years as they say.

#### *Sulphuric acid.*

*President.*—These costs that you have given, they are for concentrated sulphuric acid?

*Mr. Kao.*—Yes.

*President.*—They work out to about Rs. 208 per ton of sulphuric acid.

*Mr. Kao.*—Yes.

*President.*—It is a very high cost. Does this include your packing charges?

*Mr. Kao.*—Yes, railway freight to destination and commission on selling. Everything is included.

*President.*—Packing charges mean packing in jars.

*Mr. Kao.*—Yes. Every time we have to put in more straw.

*President.*—That does not include the price of the jar.

*Mr. Kao.*—No, because jars come back. We have to take the cost on the acid itself and jars come back. Wooden cases also are destroyed and they back from us the whole price. We have to renew some wooden parts.

*President.*—On these figures you are not making very much profit.

*Mr. Kao.*—No. If there had been a case of very much profit, then there would not have been any need for our representation. Something of the chemical lines I myself know. We have not employed highly paid chemists there. We are both partners working as chemists, financiers and everything. We are now able to meet the two ends. We can't make out much profit. It would come to about Rs. 7-8-0 per case of 82 lbs. and we are selling at Rs. 8.

*President.*—You have not seen the cost of these works in Bombay, have you?

*Mr. Kao.*—I have not seen. Is it much cheaper?

*President.*—It is.

*Mr. Kao.*—Theirs is a bigger plant and their cost must be cheaper.

*President.*—Dharamsi Morarji's cost is Rs. 139 per ton.

*Mr. Kao.*—Including everything?

*President.*—Yes except depreciation and profit against your Rs. 208. If they wanted to compete against you in Baroda, they could do it even to-day. That is on a small production.

*Mr. Kao.*—They will have to add so much freight up to Baroda.

*Dr. Matthai.*—Even then it will be about Rs. 20.

*Mr. Kao.*—How is that?

*Dr. Matthai.*—If they send it in wagon loads, it comes under 4th class. It will come to Rs. 20.

*President.*—It is not foreign competition that you have to be afraid of; it is the competition from the bigger works in Bombay. The Eastern Chemical Company's costs are about the same.

*Mr. Kao.*—About Rs. 130 per ton.

*Dr. Matthai.*—So that if we accept your suggestion of 60 per cent. duty and these Bombay people increase their output and reduce their costs, you will be faced with severe competition.

*Mr. Kao.*—There may be some other factor. Why did they not compete with us up till now. We are also there. We have not formed any Association with them.

*President.*—They have got just enough for what they want and they have not turned their attention that way, but I am trying to point out that the position is such that if these people wanted to compete against you, they could do it very easily.

*Dr. Matthai.*—If they increased their output of sulphuric acid and if they wanted an outlet for it, they could do it.

*Mr. Kao.*—Is it concentrated acid?

*Dr. Matthai.*—It is R. O. V.

*Mr. Kao.*—There is the question of breakage.

*President.*—Yes, but look at the margin. Even if you take Rs. 140, add Rs. 30 freight, Rs. 15 for breakages and something else if you like. . . .

*Mr. Kao.*—We are paying 12 per cent. commission on all sales.

*President.*—In their price also commission is included; packing is included and their selling charge is much higher than yours. Their selling charge is Rs. 30 a ton. That is exactly 30 per cent. Mr. Kao, that is the position. Don't you agree that the increase of duty in that case would put you in a worse position than you are now.

*Mr. Kao.*—How would it put us in a worse position?

*Dr. Matthai.*—They will increase their output and they will begin to think of capturing your market.

*President.*—They may sell it much more cheaply in the up country markets. They may dump their goods.

*Mr. Kao.*—We are not putting our things in Bombay. In Bombay the prices are much higher than at Baroda. They have told us not to send our things to Bombay from Baroda. The price of hydrochloric acid is Rs. 10 per case.

*President.*—You are perfectly right.

*Mr. Kao.*—We don't send. If we send our stuff say 20 or 30 jars at a time, we will make much better profits.

*President.*—That is the reason why they don't compete against you in Baroda.

*Mr. Kao.*—As I said a small manufacturer can make the market price lower. That is why the bigger manufacturers have a consideration for the smaller manufacturers.

*President.*—Have you got anything more to say? I think your representation gives us all the information we want.

*Mr. Kao.*—The only thing I have to say is if any protection is given to sulphuric industry, after some time, it will become a by-industry instead of a main industry. In foreign countries sulphuric acid is not a main industry.

*President.*—Really speaking nobody has asked for any protection on sulphuric acid, because the prices are fairly high in the country and there is very little import and it can't help you.

*Mr. Kao.*—Only small import lowers the price.

*President.*—How can it? It can't.

*Mr. Kao.*—It might not be able to affect so much as regards the consumption of foreign acid, but the price becomes cheaper. They are selling now at Petlad Rs. 6-8-0 per case. Why Messrs. Dharamsi Morarji Chemical Company and the Great Eastern Chemical Company have not been able to send their things when their cost price is less.

*President.*—That is their business.

*Mr. Kao.*—I don't understand why they are not able to send their things, when their costs are very low. So much foreign acid has come in Ahmedabad and Petlad.

*Dr. Matthai.*—Have you sold any glauber's salt recently?

*Mr. Kao.*—Not in large quantities.

*Dr. Matthai.*—What is the price?

*Mr. Kao.*—Rs. 3-4-0 a cwt.

*President.*—That is based on the Bombay price plus the freight?

*Mr. Kao.*—A bit lower than that.

*President.*—We got the price the other day and it is only Rs. 42 per ton in Bombay.

*Mr. Kao.*—It might be. I don't say that protection should be given on sulphuric acid for a very long period. It is an industry which should be encouraged to some extent.

*President.*—We must be satisfied that there are imports. There are no imports to speak of.

*Mr. Kao.*—Our Ahmedabad and Petlad markets are so much affected by imports of sulphuric acid. The Bombay market might not be affected. Only for some years we want protection. Once we are able to gain some public confidence in one of the chemical industry which is already in hand, then only we can except for other things.

*President.*—We will consider that point.

*Mr. Kao.*—We want protection for a short period.

*Dr. Matthai.*—What period do you suggest?

*Mr. Kao.*—I might suggest any period to serve my own interest, but it is for you to decide.

*Mr. Mathias.*—We would like to know what you mean by short period.

*Mr. Kao.*—5 to 10 years. Once we get some encouragement, we will be able to pull on with the other by-products. We will do some propaganda work and show to the agriculturists the value of superphosphate. Once the agriculturists know the value of superphosphates, then sulphuric acid will become a by-product. Superphosphates will be our main product. Then we will be able to compete with foreigners in this line. With a larger output, our costs will be lower. In foreign countries they don't sell sulphuric acid as such in very large quantities. They use it in their own works. Whatever surplus they have, they send it out to other countries. This is a case of protecting whatever chemical industry there is in India.

*President.*—We will consider that point.

**MESSRS. D. WALDIE AND COMPANY, LIMITED.**

**Oral Evidence of Mr. ERIC HAYWARD recorded at Calcutta on  
Tuesday, the 26th February, 1929.**

*Introductory.*

*President.*—Mr. Hayward, what position do you hold in Messrs. D. Waldie and Company?

*Mr. Hayward.*—I am the sole remaining partner in the firm of the managing agents.

*President.*—Who are the managing agents?

*Mr. Hayward.*—Messrs. D. Waldie and Company. There are two entities. There is the private firm and there is the Limited Company, both having the same name. The Chemical works is owned by the limited company. I left India four or five years ago but I was asked to come back to India by Messrs. D. Waldie and Company, Limited, to set their house in order.

*President.*—Is this an ordinary commission agency?

*Mr. Hayward.*—No, it is managing agency.

*President.*—Are they both rupee companies?

*Mr. Hayward.*—Yes.

*President.*—Are the head quarters of both the companies in Calcutta?

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—Does the partnership firm do any other business besides this managing agency?

*Mr. Hayward.*—Yes, we are running a distillery.

*President.*—You have not supplied us with any of your cost figures except your total expenditure. That does not give us any idea of what the position is. First of all, I take it, you are interested in this application for protection like the other companies?

*Mr. Hayward.*—Yes. I am interested in the sense that I am running D. Waldie and Company as managing agent.

*President.*—For which of the chemicals are you asking for protection?

*Mr. Hayward.*—We are only asking for protection on red lead and heavy sulphates.

*President.*—The other companies have given us their costs, but you have not given it.

*Mr. Hayward.*—I am afraid it was entirely an oversight. May I send them on to you later?

*President.*—Yes. In determining the measure of protection we have to determine first of all what is your fair selling price and what are the import prices. If we are satisfied that the industry ought to be protected then somehow or other you get the difference, either by way of increased duties or by bounty or in some other way. Therefore it is important for us to have these costs because it is important that the Government and the Assembly should know these costs. I hope you have no objection to giving us the costs at all.

*Mr. Hayward.*—None at all.

*President.*—When do you think you would be able to supply us with these costs?

*Mr. Hayward.*—I will be able to give them within a week.

*President.*—Sulphuric acid is really the basis for these chemicals and therefore it is very important to have the cost of sulphuric acid.

*Mr. Hayward.*—I can give you a rough price. That is Rs. 34 a ton for chamber acid excluding overhead charges of any sort and also fuel. I think this acid is 64·2 per cent.

*President.*—In calculating the cost we take 100 per cent. acid into account.

*Dr. Matthai.*—Have you got the cost for the manufacture of potassium nitrate?

*Mr. Hayward.*—We are not making it now.

*Dr. Matthai.*—Are you making copper sulphate?

*Mr. Hayward.*—We are not making it at the moment. We at one time considered the question of making it from the copper concentrates in the mines of the Indian Copper Corporation.

*President.*—What about magnesium sulphate?

*Mr. Hayward.*—We have not made it for four years.

*President.*—I think it would be just as well for you to work out these costs.

*Dr. Matthai.*—You have given an estimate of the cost of copper sulphate.

*Mr. Hayward.*—Yes, we have.

*Dr. Matthai.*—Please give us the costs of sulphuric acid, chamber acid and rectified oil of vitriol.

*Mr. Hayward.*—We have given the costs of copper sulphate and red lead.

*Dr. Matthai.*—You would also give us the costs of the acids, alumina ferric, alumina sulphate, red lead, alum and copperas.

*Mr. Hayward.*—Copperas we do in small quantities. I may mention that I have just got a process for making red lead under pressure by which we can colour it within 30 minutes instead of 40 hours that it takes now. The plant is erected but it is not yet working.

*Mr. Mathias.*—Will you give us the cost of that process?

*Mr. Hayward.*—If it works we can give you the cost.

*Mr. Mathias.*—Is it supposed to be less costly than the other process?

*Mr. Hayward.*—It colours in 30 minutes instead of 40 hours. We have to use compressed air, so the extra cost of the air has to be taken into account.

*Dr. Matthai.*—Have you any other works besides the one at Konnagar?

*Mr. Hayward.*—No. We have sold the Cawnpore Chemical Works.

*Dr. Matthai.*—Did you have any works at Lahore?

*Mr. Hayward.*—The people to whom we have sold the Cawnpore Works have got their works at Lahore.

*President.*—Arguing generally the main difficulty of the industry arises from the fact that the production is on a small scale.

*Mr. Hayward.*—One might say that is the chief trouble. That is why I have singled out a few things.

*President.*—For that what can anybody else do for you?

*Mr. Hayward.*—To pick those lines in which big production can be obtained.

*President.*—We cannot select those lines for you. It is for the industry to so regulate its production that it is able to produce on a reasonably large scale and so reduce the costs.

*Mr. Hayward.*—It cannot reduce the costs without demand. We are dependent on the demand.

#### *Need for economic unit of production.*

*President.*—You can produce within the limits of the demand. The trouble is that there are more works in the country than there is room for it. The capacity for production is greater than the demand. Take sulphuric acid for instance. That is the basis of most of these chemicals. None of the plants that we know of is working to full capacity and none of the

plants produces even quantities which would be considered reasonable to enable them to bring down the costs. Is not that the position?

*Mr. Hayward.*—That is the position with regard to sulphuric acid, but we do manufacture reasonable quantities so far as sulphates and a good many other things.

*President.*—Therefore the first condition to the success of the industry is that sulphuric acid on a fairly large scale should be produced in one works.

*Mr. Hayward.*—In a small country that would be correct, but in a huge place like India where railway freights are so enormous.....

*President.*—That is perfectly true. We have tried to make an estimate of the difference in the costs. We have taken an actual unit of 1,200 tons and we tried to make an estimate for a unit producing 4,000 tons on an average of sulphuric acid and the difference in cost is enormous.

*Mr. Hayward.*—That is quite correct.

*President.*—So long as you are producing 1,200 to 1,500 tons of sulphuric acid the chances are that all your costs are higher and therefore it may be very difficult for you to compete except under very heavy protection. There is one thing that we have always to bear in mind and that is that the industry should be reasonably well organised, that is to say the units in operation must be reasonably economic as regards production.

*Mr. Hayward.*—The trouble is, with the present profits no capital will be attracted to enable the particular branch of the industry I am representing to put up an up to date plant.

*President.*—You are up against several difficulties. The first is that there is at present only a limited market for sulphuric acid as well as for the different products in which sulphuric acid is used.

*Mr. Hayward.*—In sulphates of alumina there is an equally fair market—about 5,000 tons a year.

*President.*—That is for the whole of India. I am talking of Calcutta.

*Mr. Hayward.*—This part has quite a fair market.

*Dr. Matthai.*—I think you have a market for 2,500 tons in Bengal.

*Mr. Hayward.*—Yes, and if we introduce the Baeyer process we can make pure white alumina sulphate from Indian bauxite.

*President.*—All the same it cannot absorb more than 4,000 tons of sulphuric acid.

*Mr. Hayward.*—That is quite correct.

*President.*—The manufacture of sulphuric acid must be undertaken in one works which produces 4,000 tons of sulphuric acid. Possibly 8,000 tons would be more like an economic unit.

*Mr. Hayward.*—Of course the more you make the less it costs.

*President.*—We have tried to calculate the cost on an 8,000 ton basis and they are very much lower than anything you would be able to supply us at.

*Mr. Hayward.*—May I ask what is the cost of working on an 8,000 ton basis?

*President.*—It would work out to Rs. 55 a ton including profit, depreciation and the works cost.

*Mr. Hayward.*—It all depends on how much capital expenditure there is on the plant. We put up our own sulphuric acid plant at a 3rd the rate you can buy a plant at.

*President.*—During the course of evidence in Bombay Messrs. Dharamsi Morarji Chemical Company told us that they spent about Rs. 12 lakhs on the plant. They are over-capitalized and the evidence we took there suggest that for about Rs. 5 lakhs you can have a plant which would produce about 8,000 tons of sulphuric acid, including land and everything. We will, however, examine you again on this when we have your costs. If we calculated the cost on that value I don't think the fair selling price including a profit of 10 per cent. on the investment, depreciation and other charges would very much

exceed Rs. 55 a ton. Even if we take 4,000 tons production, allowing for everything it won't exceed Rs. 75.

*Dr. Matthai.*—That would be Rs. 45 a ton on the 65 per cent. acid including everything.

*President.*—We would like to know what one can do where your market is limited and that market is divided amongst more than one manufacturer. That is a thing for which a scheme of protection can hardly provide.

*Mr. Hayward.*—In some of the chemicals there is severe competition and in others there isn't.

*President.*—As I was explaining to you, we start from sulphuric acid and the total demand for sulphuric acid and its products. Supposing it was 4,000 or 5,000 tons, unless all the sulphuric acid and all the products are manufactured in one place the manufacture is uneconomic.

*Mr. Hayward.*—With the present demand you cannot start factories which would run into really modern economic units as the industry stands to-day, and from the manufacturer's point of view unless we get protection we never will.

*President.*—Assuming that you get protection on the basis of each man producing 1,000 tons the amount of protection required will be so high that I don't think Government would agree to it.

*Mr. Hayward.*—There is no one making alumina hydrate from Indian bauxite and we should certainly tackle that when we get protection.

*President.*—The whole point is this: If you take the production of sulphuric acid at even 4,000 tons and then proceed to manufacture your alumina sulphate you will probably find that you won't require as much protection as you think you do.

*Mr. Hayward.*—It revolves in a vicious circle. Until you show profit you cannot attract capital. Once we have got the thing going on a moderately economic scale it is probable we won't need protection, but until we can show reasonable profits we cannot attract capital.

*President.*—Any way you ought to be able to show that one unit would produce all the chemicals that are required in this market; then you have got to give us an estimate in terms of sulphuric acid, how much sulphuric acid is required.

*Dr. Matthai.*—Supposing your works produced all the acids and salts required in this part of India, how much in terms of sulphuric acid would that mean? Do you think it would be 4,000 tons of sulphuric acid?

*Mr. Hayward.*—I should think about 4,000 tons.

*President.*—If we take 4,000 tons of sulphuric acid you will probably find that except against unfair competition, you will not require as much protection as you think you do.

*Mr. Hayward.*—But there is the capital required for the new plant.

*President.*—What we do is this. We first take sulphuric acid plant and then we make an estimate of the other plant, that is the auxiliary plant that you require. In each case we allow depreciation, 6½ per cent. on the whole block value, that is on land and everything; then we allow a certain percentage which corresponds to about 6½ per cent. on the works cost for head office agents commission and things like that. Then we allow 7 to 7½ per cent. on the working capital and then add 10 per cent. profit in each case. If we do that and take 4,000 tons you will find that your costs are so reduced that you would not require anything like 33 per cent. duty that you think you do.

*Mr. Hayward.*—Having arrived at that desirable situation probably we should not!

*President.*—Supposing we gave you protection what would happen is this, that smaller units might find it more profitable to produce in larger quantities and compete against you under a heavy tariff with the result there will

certainly be over production in the country. Nobody will make any profit and the scheme of protection will not eventually be a success.

*Mr. Hayward.*—That will be perfectly true as regards sulphuric acid and hydrochloric acid which are easily made in the bazaar. There is no doubt about it in cases like that and no amount of protection would help internal-throat cutting, but where an up-to-date plant is required without which the article cannot be made you would not get that situation I think.

*Dr. Matthai.*—Alum is produced on this side of India in small quantities, is it not?

*Mr. Hayward.*—Last year the demand was 170 to 180 tons in Calcutta. There is not very much made here. We have a plant for making 300 tons a year.

*President.*—All these three things, viz., alum, alumina sulphate and alumina ferric are used more or less for the same purpose, are they not?

*Mr. Hayward.*—Alumina sulphate white which is practically the colour of a white sheet of paper is used in paper making whereas the others are used for water clearing, that is settling the muddy water.

*President.*—More or less they are a sort of cognate products.

*Mr. Hayward.*—Yes, but alum is largely used in dyeing and the alumina sulphate white is used in a part of the process for making white paper.

*Dr. Matthai.*—Is it more expensive to make alumina sulphate than alumina ferric?

*Mr. Hayward.*—Yes. In alumina ferric the bauxite is dissolved in acid and you don't make any attempt to get rid of the iron which is a very serious impurity. By the Baeyer process you get rid of the iron and it gives you pure alumina sulphate which is incidentally the raw material for making aluminium metal.

*Dr. Matthai.*—Roughly what is the difference in price per ton between alumina sulphate and alumina ferric?

*Mr. Hayward.*—The difference is only Rs. 10 a ton. From the Titaghur Paper Company there is exactly a gross profit of Rs. 18 per ton on alumina sulphate white, that is without any overhead. It is simply the actual raw materials. We simply regard it as a contribution towards our overhead. There is no profit in it. If you work it out on a tonnage basis and allocate the overhead per ton, you will find that we are losing.

*Mr. Mathias.*—This alumina sulphate for paper making, did you say you were going to introduce a new plant for its manufacture?

*Mr. Hayward.*—We want to introduce the Baeyer process which would enable us to manufacture alumina sulphate white in this country, that is from alumina hydrate.

*Mr. Mathias.*—You would transform your alumina hydrate into alumina sulphate by that process.

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—As a matter of fact, don't you think that in regard to alum and alumina sulphate a chemical factory in Bengal would be in a position of advantage as compared with Bombay, because for one thing you get your bauxite cheaper?

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—And then there is a larger market for these products in Bengal than in Bombay.

*Mr. Hayward.*—Yes, because there are no paper mills on that side. The paper mills are the biggest users of chemicals. The four biggest users of chemicals are the fertiliser industry, the paper industry and the artificial silk industry and the high explosives industry. With reference to your remarks that there are more producers than is necessary, I may incidentally tell you that D. Waldies are the only manufacturers of red lead between Suez and Australia.



*President.*—That red lead we will discuss later on an entirely different footing. I am just trying to point out these obvious difficulties. Supposing we took a unit of 8,000 tons, I don't know whether if it is in Calcutta, the Bombay market can be supplied or if it is in Bombay the Calcutta market can be supplied, with a slight reduction in freight. Is that impossible?

*Mr. Hayward.*—The sea freight is Rs. 18 a ton.

*President.*—But there is a reduction in the cost of sulphuric acid by about Rs. 25 or Rs. 30 a ton on a larger unit.

*Mr. Hayward.*—That is on the 100 per cent. acid. It may perhaps give one a wrong idea, because we don't use 100 per cent. acid.

*President.*—We calculate on that footing. It is a mere matter of calculation.

*Mr. Hayward.*—67 ton of chamber acid is equal to 4 ton of 100 per cent. acid.

*President.*—If you produce 5,000 tons in one place, the cost would be obviously lower than if you produce 1,000 tons.

*Mr. Hayward.*—We will have to go into that question carefully.

*President.*—The position would be this. Let us take Bombay and Calcutta as the principal markets. What would happen is that if you have two small units working in two different places, the selling price of the articles in both places is high. Supposing you manufacture all the products in one place, at least in that place the price will be comparatively low.

*Mr. Hayward.*—Yes.

*President.*—And adding the cost of transport and other things, and taking it to the other place may not necessarily make it more expensive than if we were to produce on a small scale.

*Mr. Hayward.*—I think in practice it will be very much more expensive. There is the question of transport.

*President.*—I am assuming that the transport charges are lower than they are now.

*Mr. Hayward.*—The steamer freight is already so much lower than the rail freight that there does not appear to be any chance of reducing it. I don't think one would be able to induce the steamship companies to reduce very much more.

*President.*—Even if you take it at Rs. 18 to Rs. 20, it may not be an impossible figure considering the double management, the double depreciation and so on in the other case.

*Mr. Hayward.*—I don't think that is correct.

*President.*—If you have a plant of 5,000 tons capacity and you are only producing 2,000 tons, that means that has to bear the depreciation cost. The whole thing comes to this. Supposing the cost of sulphuric acid is Rs. 45 as against Rs. 80, on half a ton of sulphuric acid there is a difference of Rs. 18 to Rs. 20 which will be enough to cover the freight. Then there will still be a reduction in the cost of the other chemicals because the unit will be larger.

*Mr. Hayward.*—Before answering your suggestion, I would like to go into the figures. I quite see your theory. The cheapest sulphuric acid in India ought to be made at Ghatsila near the Indian Copper Corporation's plant.

*Mr. Mathias.*—Have they any sulphuric acid plant?

*Mr. Hayward.*—No. They are burning a ton of sulphur to make a ton of copper. It is equal to 4 tons of chamber acid per ton of copper produced.

*Dr. Matthai.*—How much ore are they getting now?

*Mr. Hayward.*—Actually to-day they are producing at the rate of 5,000 tons of ore a month.

*Dr. Matthai.*—That would mean about 4 per cent. of copper and about the same quantity of sulphur.

*Mr. Hayward.*—That is about 5,000 tons of ore a month.

*Dr. Matthai.*—Supposing I said that 4 per cent. of that would be sulphur?

*Mr. Hayward.*—That would be right.

*Dr. Matthai.*—That is about 200 tons a month or 2,400 tons a year. Out of that you can make about 7,000 tons of sulphuric acid.

*Mr. Hayward.*—Yes. Look at the future possibility. For every ton of copper they make, they burn one ton of sulphur. That will give 4 tons of chamber acid. If they work up to the total demand of Indian copper which is about 18,000 tons, you will have 18,000 tons of sulphur or 72,000 tons of chamber acid. Of course it is only a possibility.

*President.*—I am not suggesting that the unit should be either here or in Bombay; whichever place is more suitable, ought to have the unit, that is the point.

*Mr. Hayward.*—One would have to go into the freight figures and losses in transport and so on very carefully. Then there is the question of stocking, handling and so on.

*President.*—That is perfectly true. At first sight one would think that there is such a tremendous difference in the cost of production between two units and one!

#### *Railway rates.*

*Mr. Hayward.*—Would you mind my going into the figures and then give my opinion on it. I will have to get the exact freights and so on.

*President.*—Yes, we shall be glad to have your opinion on it. The question of freight we have gone into with the railway companies to see what is possible. Obviously on the present freight rates, it may not be a very feasible proposition.

*Mr. Hayward.*—I don't think it is as things stand at present.

*President.*—Take the rates they have given you on bauxite for instance, *vis.*, 1 of a pie.

*Mr. Hayward.*—That is a very good rate.

*President.*—A rate like that might not make it an impossible proposition.

*Mr. Hayward.*—But it appears to be a fixed maxim for the railways to charge freights more or less on the same basis as doctors do their fees! For sending 1,000 ton of stuff costing Rs. 1,000 a ton you cannot expect them to charge the same rate as they would charge for sending 1,000 ton of bauxite which costs Rs. 5 a ton!

*Mr. Mathias.*—Where do you get your bauxite from?

*Mr. Hayward.*—From Katni in the Central Provinces.

*Mr. Mathias.*—The railways have given you a special rate?

*Mr. Hayward.*—Yes.

*Mr. Mathias.*—How did you get your special rate? Was it by special negotiation?

*Mr. Hayward.*—I think so.

*President.*—The distance from Katni is about 600 miles?

*Mr. Hayward.*—About that, 676 miles

*President.*—And the freight is Rs. 10 a ton?

*Mr. Hayward.*—Yes.

*President.*—Let us assume the freight at 1 of a pie merely for purposes of examination. Take a through rate, both for your raw materials and for your finished products and then take your markets. Take a market within a radius of 1,000 miles.

*Mr. Hayward.*—The freight on finished products would be very much higher. You can't get railways to reduce that.

*President.*—You can't tell. They have reduced freight on fertilisers. Freight on sulphate of ammonia is 1 of a pie.

*Mr. Hayward.*—Fertiliser has a special rate.

*Mr. Mathias.*—Fertilisers are necessary for agriculture but some of these chemicals are also necessary for different industries.

*Mr. Hayward.*—That is so.

*President.*—We just want to examine the position from that point of view. The idea is that you must have large units: large units are only possible if the industry is reasonably situated as regards the raw materials and the cost of distribution is also lower.

*Mr. Hayward.*—And the demand is there.

*President.*—Yes, that is covered by the cost of distribution really speaking.

*Mr. Hayward.*—First of all you have to find out a sort of centre of demand to place the plant. So far as sulphate of alumina concerned, I think this side of India is the place where you have the biggest demand.

*President.*—You have got to take everything together, because you will probably find that 8,000 tons is at present about the limit in terms of 100 per cent. sulphuric acid for the whole of India for chemical manufacture, taking of course Calcutta and Bombay as the principal markets. That gives you about 12,000 tons of chamber acid.

*Mr. Hayward.*—I think that is quite reasonable. Are you excluding what is used for sulphate of ammonia?

*President.*—Sulphate of ammonia is entirely different. That consumes a much bigger quantity.

*Mr. Hayward.*—Yes.

#### *Alkalies.*

*President.*—We shall examine you in detail when you get the costs; in the meantime we will ask you some general questions. You don't manufacture any alkalies, e.g., soda ash, do you?

*Mr. Hayward.*—No.

*President.*—That of course is a branch of the chemical industry which does not really exist practically in India.

*Mr. Hayward.*—Not touched in India.

*President.*—There also the question of unit comes in.

*Mr. Hayward.*—Yes, and also the freight on raw materials.

*President.*—One of the raw materials we have available here is salt. Can you tell us the price of salt in this part of India?

*Mr. Hayward.*—Rs. 35 a ton *ex* Government duty.

*President.*—That is exactly double what they pay in Bombay. Can you give me the freight on salt?

*Mr. Hayward.*—We are using Liverpool salt. The freight on the salt from the salt range we can work out for you, but we can't give it to you off hand.

*President.*—Your nearer source would be Madras or would it be the salt range?

*Mr. Hayward.*—The salt range will, I think, be nearer. We will have that looked up.

*President.*—In Bombay we got a figure of Rs. 18 delivered at the works. That is Bombay sea salt. Really speaking it is Rs. 12, but for hydrochloric acid they thought they required a better salt. They paid Rs. 13 *plus* Rs. 4 to the works and yours is just about double.

*Mr. Hayward.*—There is no salt made here.

*President.*—You are using Liverpool salt, because Bengal refuses to use any other salt for some reason or other, but if you get Indian salt, I don't see why it should cost you Rs. 35 at all. Supposing they get it at Rs. 12 and the freight to Calcutta is added on it, I don't think it would come to anything like Rs. 35.

*Mr. Hayward.*—The freight is about Rs. 2½ from Bombay.

*President.*—It is rather important to find out what the position is, because in the soda industry is to be started, you must have salt.

*Mr. Hayward.*—Yes. But you must remember that some of the competitive works have got their salt mines beneath them. I think their salt costs them 6d. or a shilling a ton, that is what they reckon as the cost of salt in England.

*President.*—But they have got to pay the freight from England to India, so there is not much in it.

*Dr. Matthai.*—For these alkalies if you are in Bengal, you have got the coal and limestone, you have got ammonia sulphate nearby and you have got the biggest market.

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—You include soda crystals among your manufactures. That is made out of imported soda ash, is it not?

*Mr. Hayward.*—Yes.

*Mr. Mathias.*—Can you give us your balance sheet and profit and loss account for the last three years?

*Mr. Hayward.*—Certainly.

*President.*—You have given us the price of coal at Rs. 1-12-0 a ton *ex pit*. Is that second class?

*Mr. Hayward.*—That was third class rubble.

*President.*—Do you pulverise it?

*Mr. Hayward.*—We use it as it is. It is rubble screened from the dust. As a matter of fact we simply pay Rs. 7-8-0 a ton for the coal delivered and stocked in our works. It comes from Searsole.

*President.*—Supposing you had these alkali works in the coalfields, you would have coal cheaper than anywhere in the world.

*Mr. Hayward.*—If we had the works in the coalfields, we could buy our coal at Rs. 2-8-0 a ton.

*President.*—And the better coal would be about Rs. 3 or Rs. 4 a ton?

*Mr. Hayward.*—Yes.

*President.*—Taking all the alkalies, the only disadvantage you would have compared with the foreign manufacturer is the salt. Ammonia you may get either from the collieries or you can manufacture yourselves.

*Mr. Hayward.*—Yes, I think that is the chief disadvantage, this question of salt.

*President.*—And the cost of distribution, but that would apply just as much to the foreign importers after it enters the port, isn't that so?

*Mr. Hayward.*—It is so. The only other disadvantage which doesn't apply so much in the case of very large works is the cost of supervision which is much more here than it is in England.

*President.*—I don't know if it is so, because the overhead charges of these big corporations is tremendous. They have enormous expenditure at the top. We found in the case of the Swedish Match Company for instance that their expenditure at the top was very much higher than that of the Indian manufacturer.

*Mr. Hayward.*—Yes, but I was not thinking so much of superior management expenditure as works management expenditure.

*President.*—If you take a fairly large unit, I don't think it will come to so very much more. The whole idea is that if the industry is started here in the country, eventually you will have more Indians than you have now. I mean the imported supervision will gradually become less and less necessary. That is the idea of having an industry in the country.

*Mr. Hayward.*—That is so. I think you are quite correct that salt is the chief consideration.

*President.*—How about lime stone?

*Mr. Hayward.*—I have not studied it with an idea of manufacturing alkalis.

*President.*—We asked the Director of Geological Survey of India yesterday and he thought that there was considerable quantity of lime stone round about here.

*Mr. Hayward.*—Yes.

*President.*—Zinc chloride solution that you mention, is it a drug or a heavy chemical?

*Mr. Hayward.*—It is a heavy chemical. We sell it to the oil companies in soluble form for soldering their tins.

*Dr. Matthai.*—How do you make this?

*Mr. Hayward.*—We make it from zinc residue and hydrochloric acid.

*Dr. Matthai.*—Is it the usual form in which zinc chloride is sold?

*Mr. Hayward.*—Cotton mills buy it solid.

*Dr. Matthai.*—Is it more or less the same process of manufacture?

*Mr. Hayward.*—It is more or less the same process, except that the solution is evaporated to dryness and then we get the white solid.

*President.*—It would be cheaper to produce, but it would be more expensive to transport, will it not?

*Mr. Hayward.*—Yes, it will be more expensive to transport. There is no doubt about that.

*President.*—I suppose you make it in small quantities.

*Mr. Hayward.*—Yes. I have not gone into the question of making it on a large scale.

#### *Superphosphates.*

*Dr. Matthai.*—You have never tried making superphosphates here, have you?

*Mr. Hayward.*—We made superphosphates for many years from waste bone char from the sugar refineries at Cossipore. When that works closed down, we stopped manufacturing it.

*Mr. Mathias.*—Did you experience a good demand?

*Mr. Hayward.*—We made 200 tons a year. There is a very big demand. It is a very important question as regards the future of India. The demand is one that should ultimately become enormous. Think what Egypt has done. In Egypt they are using 30,000 to 40,000 tons a year with a population of 12 millions.

*Mr. Mathias.*—Whom did you sell to?

*Mr. Hayward.*—We sold mostly to tea and indigo planters. It was a very small quantity of course, but Imperial Chemical Industries are doing awfully good work with propaganda in connection with fertilisers. Madras is a big buyer of superphosphates.

*Mr. Mathias.*—On the tea plantations, do they use superphosphate by itself or in combination with sulphate of ammonia?

*Mr. Hayward.*—They mix it as a rule with bone meal.

*Mr. Mathias.*—It is not really economic to manufacture superphosphates from bones?

*Mr. Hayward.*—No.

*Mr. Mathias.*—It would be a better proposition to make superphosphates from rock phosphate and sell the bones?

*Mr. Hayward.*—Yes. I think when the demand for superphosphate has increased, it will be a good proposition to work it from rock phosphate.

*Mr. Mathias.*—From rock phosphate and sulphuric acid made from imported sulphur?

*Mr. Hayward.*—Yes. When you get to 100,000 tons unit in India, you would be able to save Rs. 5½ lakhs on freight and about Rs. 80,000 on freight

on bags which are at present made here and go to Europe and carry back superphosphates into India.

*Dr. Matthai.*—Supposing you had a unit of 2,000 tons of superphosphate, would it be possible for you to import rock phosphate and make it and sell it at competitive prices.

*Mr. Hayward.*—I have gone into it. On 2,000 tons you save a freight on 750 tons. Freight on super is Rs. 25 a ton I think. Freight at Rs. 25 on 750 tons is about Rs. 18,000. That is what you save on a 2,000 ton unit.

*President.*—The position is that most of these exporting countries have to make their superphosphates from imported rock phosphate.

*Mr. Hayward.*—Yes.

*President.*—Supposing Great Britain was exporting superphosphates to India, it would have to get its rock phosphate from somewhere. Probably they will pay about the same freight or a little less than you would. Then they are using sulphuric acid; they will either have to import sulphur or pyrites and you do the same. They have to pay freight on the finished product from Great Britain to the Indian port, the whole of which you can save. That is the advantage to the manufacture of superphosphates in the country apart from the units. That is roughly the position.

*Mr. Hayward.*—Yes, but then you have to carefully weigh what the freight from Africa to Belgium or Holland is as against the freight for phosphates to India. It should not be very much higher if you import in ship load lots, say 5,000 tons. You can get it at about Rs. 10 a ton.

*President.*—You would be in about the same position.

*Mr. Hayward.*—I should think so.

*President.*—If you take Sicilian sulphur or use pyrites, pyrites would be regulated by sulphur or sulphur by pyrites, so there is not really much to choose between the two.

*Mr. Hayward.*—Yes.

*President.*—Then they have got to pay on the finished products; that is where your advantage comes in.

*Mr. Mathias.*—Did you say rock phosphate from the Red Sea?

*Mr. Hayward.*—Yes, Egyptian phosphate.

*President.*—Those superphosphates will be used in conjunction in some places with nitrogenous fertilisers?

*Mr. Hayward.*—Yes with sulphate of ammonia or nitrate of soda.

*President.*—Nitrate of soda you haven't got and therefore the only thing will be sulphate of ammonia which you have got.

*Mr. Hayward.*—Yes. When the demand increases, it can be made.

*President.*—If the manufacture of superphosphate is undertaken, it would help also to reduce the price on sulphuric acid all round, would it not?

*Mr. Hayward.*—It would reduce it for those works which are making superphosphates, but I think for superphosphates to be made cheaply, it will just have to be one unit for superphosphates, and nothing else, on a big scale. One single unit is necessary for superphosphates alone.

*President.*—That means they would produce sulphuric acid on a sufficiently large scale to reduce the cost of sulphuric acid.

*Mr. Hayward.*—They might sell half their acid to reduce the cost of it.

*Dr. Matthai.*—Why should you necessarily have it separate? If you were making on a scale of say, 4,000 tons, it would be more economical to have it in connection with the general chemical plant. You can use the same sulphuric acid plant for both.

*Mr. Hayward.*—It would, but then there is the question of economy of manufacturing one single product by having simpler management.

*Dr. Matthai.*—You treat your rock phosphate in the sulphuric acid as you treat various other products.

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—If you can get sufficient demand.

*Mr. Hayward.*—One man can make 100,000 tons of super with the same trouble that he will have to take to make 500 of several other things.

*Dr. Matthai.*—I was thinking of it this way, that while you were trying to get the demand increased to a sufficient extent, the most economic way of making superphosphate would be to put it up next to a chemical works which will utilise the sulphuric acid in various other ways.

*Mr. Hayward.*—That would undoubtedly, be the best way.

*Mr. Mathias.*—Do you know anything of mixed fertilisers?

*Mr. Hayward.*—I have not had any experience of that.

*Mr. Mathias.*—I understand a kind of fertiliser is imported which contains sulphate of ammonia and phosphoric acid directly combined.

*Mr. Hayward.*—I don't know.

*President.*—Half the quantity of sulphuric acid produced in the world is practically used by fertilisers, is it not?

*Mr. Hayward.*—I think that is probably about right.

*President.*—So that even if a new process is started, it will take a long time before the whole world begins to discard the use of sulphuric acid as a means of producing superphosphates?

*Mr. Hayward.*—That is so.

*Dr. Matthai.*—As a matter of fact the trouble I think will be with regard to the Bengal works, as things stand at present, that there is not much demand for phosphatic fertilisers compared with the other parts of India such as Madras.

*Mr. Hayward.*—Yes, and as far as one can see till one of the provinces has given them a lead, there is not likely to be much demand for it in Bengal. They are using fertilisers in appreciable quantities in Madras now.

*President.*—You make some soda crystals too. Is that manufactured from imported soda ash?

*Mr. Hayward.*—Yes, on a very small scale.

*Dr. Matthai.*—I remember your representative who came to give evidence before us during the enquiry into the duty on sulphur said that your company used about 5,000 tons of sulphuric acid at a time. You give your capacity as 2,400 tons?

*Mr. Hayward.*—That was including Cawnpore.

*Dr. Matthai.*—How much sulphuric acid do you manufacture a year now?

*Mr. Hayward.*—To-day we are running at about 125 tons a month.

*Dr. Matthai.*—That is because you manufacture this alumina ferric?

*Mr. Hayward.*—In a months time we shall be doing about 200 tons a month. I may say that one unit has closed down.

#### *Red lead.*

*Mr. Mathias.*—This red lead that you manufacture is used by the railways?

*Mr. Hayward.*—Yes.

*Mr. Mathias.*—Can you give the reason for reduction in the price of imported red lead? Is it due to competition with your red lead or is it due to the low price of red oxide of iron plant?

*Mr. Hayward.*—It is due to competition between ourselves, the Japanese and the Italians.

*Mr. Mathias.*—How far is iron oxide going to affect you?

*Mr. Hayward.*—I don't think it affects us at all.

*Mr. Mathias.*—What is the advantage of red lead over iron oxide?

*Mr. Hayward.*—The advantage of red lead is that if the first coating is put on properly it will last for 15 years at least and after half a century

or more of its use every engineer will admit this straightaway. There is nothing like red lead.

*Mr. Mathias.*—So far as you are aware this red oxide of iron does not really compete with your red lead at all?

*Mr. Hayward.*—I don't think so.

*President.*—You have given us a list of these various percentages in answer to question 14. Are these theoretical percentages or based on actual practice?

*Mr. Hayward.*—These are based on practice.

*President.*—This pig lead that you get in Burma, how does the price delivered at the works compare with the price at which it is obtainable in the competing countries?

*Mr. Hayward.*—We pay the London price for pig lead plus 4 per cent. A man in London would get it 4 per cent. cheaper.

*Mr. Mathias.*—What is the idea of this 4 per cent. extra?

*Mr. Hayward.*—The point is that the market price of lead here is the cost of importing lead from Europe or Australia plus 15 per cent. import duty and our suppliers of lead might take the whole 15 per cent.

*Mr. Mathias.*—But they take only a moderate proportion.

*Mr. Hayward.*—Yes.

*President.*—They supply you direct from Burma. That costs them a certain amount of freight and they set that off against the freight from London and 4 per cent. represents the difference.

*Mr. Hayward.*—Compared to the London manufacturer, we are at a 4 per cent. disadvantage on that. Then of course we are secure because the freight on red lead is more than the freight on pig lead.

*Dr. Matthai.*—Your price is Rs. 15 a cwt. that is Rs. 300 a ton. The latest tariff valuation is Rs. 20. You save Rs. 5 a cwt. by buying it from Burma besides duty.

*Mr. Hayward.*—Yes. The present London price is £23.

*President.*—Will you give me the following particulars about salt? Supposing you used Indian salt and bought it in your nearest market and brought it up to your works, first give the price f.o.b. plus the freight and other transport charges to the works and also give the price of Liverpool salt.

*Mr. Hayward.*—Yes, we will send it to you.

*Mr. Mathias.*—Is Italy a large producer of red lead?

*Mr. Hayward.*—Not very much, about 2,000 tons a year.

*President.*—Is it by special negotiations with the Burma Corporation that you are able to get these special rates?

*Mr. Hayward.*—Yes. We have been buying from them for some years and we always had this special treatment. The prices have always been based on the London price.

*President.*—The price of bauxite you give as Rs. 16-8-0 a ton delivered at the works, is that right?

*Mr. Hayward.*—Yes.

*President.*—Rs. 10 is the freight.

*Mr. Hayward.*—Yes. We pay Rs. 5-8-0 ex-mines.

*President.*—Where do you buy it from?

*Mr. Hayward.*—From Katni.

*President.*—What I can't understand is this. So far as you are concerned, Katni is on both the lines, G. I. P. and E. I. Railways. So far as Bombay is concerned, the distance is about the same, but their freight is twice as much as yours. Their freight is Rs. 18 a ton. That probably is explained by the fact that there is this competition between the Great Indian Peninsula Railway and the East Indian Railway on this side while there is none on the other side.



*Mr. Hayward.*—There is no reason why there should be competition between the two Government railways.

*Dr. Matthai.*—As regards these estimates that you give about the cost of copper sulphate, you say your costs including overhead charges are Rs. 370 or c.i.f. Rs. 380. If you add Rs. 60 duty on that, you get a price of Rs. 440.

*Mr. Mathias.*—Did you ever negotiate for your bauxite to be brought over the Bengal Nagpur Railway?

*Mr. Hayward.*—I don't think we ever did.

*President.*—In this cost of manufacture that you have given how much have you allowed for the copper and how much for the sulphuric acid?

*Mr. Hayward.*—I can't give you that off hand. We will give you the details later.

*President.*—In answer to question 21 you say " sulphuric acid is dependent on imported sulphur but sulphide ores of copper are now available in India from which it should be possible to work out a process for the manufacture of sulphuric acid ". Are you referring to this new Company, the Indian Copper Corporation?

*Mr. Hayward.*—Yes.

*President.*—Has it seriously got going?

*Mr. Hayward.*—Yes. They have spent half a million on the plant already.

*President.*—In answer to question 37 you give the total demand for the various products. How have you got this figure of 15,000 tons of sulphuric acid (chamber acid)? Did you include the sulphate of ammonia plant?

*Mr. Hayward.*—Yes.

*President.*—Where did you get these figures from?

*Mr. Hayward.*—That is really an expression of opinion. It is rather difficult to get the actual figures.

*Dr. Matthai.*—If you take sulphate of ammonia out of the sulphuric acid figure, the other figures will more or less correspond to our figure.

*Mr. Hayward.*—That is very interesting.

*Dr. Matthai.*—Only as regards red lead you say 2,400 tons and I can make up only 1,500 tons taking the imports and your production.

*Mr. Hayward.*—In 1927, 1,700 tons of red lead were imported and we made 700 tons.

*Dr. Matthai.*—Last year's import was 900 tons and you made 700 tons.

*Mr. Hayward.*—Last year there was a drop. But at the time I wrote this, I was not in possession of the latest figures. They may go up again. Those are really 1927 figures.

*Dr. Matthai.*—These import prices that you give in answer to question 46. These are c.i.f. prices, are they not?

*Mr. Hayward.*—These prices include duty, freight, landing charges and so on.

*President.*—To get the c.i.f. prices you have got to deduct the other charges?

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—Then the landed price of your copper sulphate becomes Rs. 440 a ton which is precisely the figure we got in Bombay.

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—In form (ii) of the same answer, this 'acid sulphate' (1,550), is this Chamber acid?

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—To whom do you sell it?

*Mr. Hayward.*—We have sold it to the gas works as chamber acid.

*Dr. Matthai.*—How much chamber acid are you able to sell on this side of India?

- Mr. Hayward.*—They take about 45 tons a month or say 500 tons a year.
- Dr. Matthai.*—Then 'sulphuric acid (1,740)', is that commercial acid?
- Mr. Hayward.*—That is what is called "lead boiled".
- Dr. Matthai.*—What percentage of sulphuric acid is that?
- Mr. Hayward.*—80.68 per cent.
- Dr. Matthai.*—It is not R. O. V.?
- Mr. Hayward.*—No, it is partly concentrated.
- Dr. Matthai.*—What is this Italian Combine you are speaking of?
- Mr. Hayward.*—That is a combine of Italian red lead manufacturers. It is a combine for regulating prices.
- Dr. Matthai.*—Do they deal generally in chemicals or only in red lead?
- Mr. Hayward.*—Only in red lead.
- Dr. Matthai.*—And this Associated Lead Manufacturers that you mention?
- Mr. Hayward.*—That is English. I am afraid I left out the Japanese. I can't tell you whether they have got a ring or not. They are dumping, that I am certain. They are just getting a proportion of their overhead charges.
- Dr. Matthai.*—I find that since 1925, Italy has considerably increased its imports, from 900 cwts. to 8,000 cwts. in the course of a year or two.
- Mr. Hayward.*—Yes, they have done it by price cutting.
- Dr. Matthai.*—The price that you realised for 1928 is somewhere about Rs. 460, but since then there has been a further cut in the price of red lead.
- Mr. Hayward.*—Yes. To-day if we want to sell in the bazaar we have to sell at Rs. 420.
- Mr. Mathias.*—How much red lead is sold by the Italian Combine in India?
- Mr. Hayward.*—About 400 tons a year.
- President.*—In answer to question 49 you give the prices in Germany and the prices for export. Where do you get them from?
- Mr. Hayward.*—We have got them from the oil and Colour Trades Journal.
- President.*—Can you let us have some of the latest copies of these journals where we can get the current prices?
- Mr. Hayward.*—We have got the Chemical Trades Journal. Of course you can't take the prices in the journals as being very accurate, because you get lower figures for actual business.
- President.*—In England too, they have these different prices, one for the home consumption and the other for export.
- Mr. Hayward.*—Yes.
- Mr. Mathias.*—What is this soda hypo chiefly used for?
- Mr. Hayward.*—It is used for photography; it is also used in tanneries.
- Mr. Mathias.*—This different quotation for the home market and for export is not peculiar to the chemical trade alone, is it?
- Mr. Hayward.*—I suppose it is not.
- Dr. Matthai.*—What is the difference between litharge and red oxide?
- Mr. Hayward.*—Litharge is yellow.
- Dr. Matthai.*—That is the first stage in the manufacture.
- Mr. Hayward.*—That is right. It contains less oxygen. The demand for litharge is less. We don't sell very much. I don't know how much is imported into India. It is used for adding to the oil before they boil it for paints.
- Dr. Matthai.*—As regards the question of protection for red lead and litharge, so far as you are concerned, they stand on the same footing.
- Mr. Hayward.*—We have not put in any claim for protection on litharge, because we are not selling it in the market, but it is one stage lower than red lead manufacture.

*President.*—There is a margin of £6 between litharge and red lead.

*Dr. Matthai.*—If you get protection for red lead, you won't worry about protection for litharge.

*Mr. Hayward.*—We have not asked for protection on litharge, because we don't sell so much of it, but if protection is granted on lead oxide, it will automatically help litharge. There is 2 per cent. more oxygen in red lead.

*President.*—In answer to question 52, you give 1920 prices, but they don't lead us anywhere. We want the prices from 1923-24. What we really want are the variations in the c.i.f. prices between 1923 and 1928. You might give us the c.i.f. prices of the chemicals with which we are concerned, except the acids.

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—Prices of all these things of which you are giving an estimate of the cost.

*Mr. Mathias.*—When you say magnesium sulphate is a by-product of the potash industry, you mean that it is a waste product which has got to be sold at any price, is that correct?

*Mr. Hayward.*—Yes, that is the case in Germany.

*Mr. Mathias.*—So that in regard to that there is no hope for you. They will be prepared to reduce their prices still further.

*Mr. Hayward.*—I suppose so.

*President.*—In answer to question 55, are you not rather overestimating the additional cost of plant and machinery when you say 60 per cent. above foreign cost? In our estimates we do not exceed 25 per cent. including buildings and everything else.

*Mr. Hayward.*—I am quite prepared to admit that 60 per cent. is too high, but 25 per cent. is a bit too low. I will have to look into this again. At this moment I am importing the superwagon lorry for spreading road material on the roads. It cost me £600 and the freight is £150.

*President.*—If you import a car, obviously the freight is much more than on machinery.

*Mr. Hayward.*—I will go into that again.

*President.*—Will you give us an estimate of the plant that you require for these products of which you are giving an estimate at the present price, that is a plant for making 8,000 tons of sulphuric acid and then the other plants for making various chemicals, if you were to put up a new plant?

*Mr. Hayward.*—I will look that up and let you know.

*President.*—In answer to question 57 (a), what is this galenicals that you are talking of?

*Mr. Hayward.*—This is a pharmaceutical product.

*President.*—You say you have tried to come to some agreement with the other manufacturers, but without effect. What manufacturers are these?

*Mr. Hayward.*—They are mentioned in 57 (b).

*President.*—The Bengal Chemical and Pharmaceutical Works are coming to give evidence before the Board. These people are manufacturing chiefly pharmaceutical products, so that they don't come into conflict with you very much, do they?

*Mr. Hayward.*—Quite sufficient to reduce the prices in the market. They make acids and some of the heavy chemicals and their competition is enough to bring prices down.

*Dr. Matthai.*—They make considerable quantities of alum.

*Mr. Hayward.*—Yes, and sulphuric acid and hydrochloric acid are made in the bazaar also. The mere presence of a low priced article in the market is enough even if it is not selling very much, to bring down the prices.

*President.*—Do you think 4,000 tons is an economic unit?

*Mr. Hayward.*—I don't say that it is the most economic unit, but I think we can manage to produce acids quite economically on that scale.

*President.*—Don't you think the unit too small for competition?

*Mr. Hayward.*—The idea is that if all these are under one management in a chemical works, you can produce quite economically with this quantity.

*President.*—In your acid plant you have got no towers. What process do you call it?

*Mr. Hayward.*—Chamber process.

*President.*—Is this economical, not having any towers?

*Mr. Hayward.*—It is not. There is no doubt about it.

*President.*—It must add to your cost.

*Mr. Hayward.*—It does, but it saves on supervision.

*President.*—Towers don't require much supervision?

*Mr. Hayward.*—They require a good deal.

*President.*—Is it usual to manufacture sulphuric acid without any towers?

*Mr. Hayward.*—We have done it for half a century. Some of the present chambers are about 20 years old.

*President.*—What is this Carmichael process?

*Mr. Hayward.*—I don't know. We have got towers, but they are not in use.

*President.*—In answer to question 65, you say "most of our plant is made on the chemical factory". Do you mean the chambers?

*Mr. Hayward.*—Chambers and burners and the plant for the other acids, salts, etc. We get the cast iron work done outside. We do all our masonry and brick work and all lead work including the erection of chambers from imported lead sheets; and all our furnaces, we put up ourselves.

*President.*—There is nothing in this plant that you can't make here.

*Mr. Hayward.*—Practically nothing except the new high pressure plant for red lead.

## MESSRS. D. WALDIE AND COMPANY, LIMITED.

Oral Evidence of Mr. E. HAYWARD, recorded at Calcutta on Monday, the 11th March 1929.

*Freights.*

*President.*—As regards this question of freights, I think you rather misunderstood the point. If you take the present freights, either sea or rail freights, on smaller quantities, the proposition is entirely uneconomic. We were considering large scale production coupled with a reasonable reduction in freights.

*Mr. Hayward.*—In the case of acids no reduction in freight could make it an economic proposition, because the packages are so enormous.

*President.*—The question of packages doesn't arise at all. That arises after the acids leave the works. You are not going to consign sulphuric acid for instance in packages it must go in tank wagons and it must then be distributed as if it was manufactured in Calcutta or *vice versa*.

*Mr. Hayward.*—You cannot handle nitric acid in tanks.

*Mr. Mathias.*—We were told in Bombay that the custom was to charge the customer for the package.

*Mr. Hayward.*—The customer pays for the package, but the proportion of the freight compared to the value of the acid is tremendous.

*Dr. Matthai.*—If Calcutta were producing all the sulphuric acid required in India, you would be sending 1,500 tons from Calcutta to Bombay which obviously would go in tank wagons and the man in Bombay would take delivery exactly as if he was taking from the Bombay factory. It would apply also to hydrochloric acid; you will be sending fairly large quantities, will you not?

*Mr. Hayward.*—I don't think so. Hydrochloric acid and nitric acid are both handled in smaller quantities.

*Mr. Mathias.*—In that case the question is not really material. We are considering large scale production.

*Dr. Matthai.*—There is a possibility; they have begun to produce zinc chloride and it is likely that they may require 600 or 700 tons of hydrochloric acid, 100 per cent..

*Costs.*

*President.*—You have given here the works cost of sulphuric acid at Rs. 47-5-0 a ton for chamber acid.

*Mr. Hayward.*—That includes all these overhead charges, general services and depreciation.

*Dr. Matthai.*—Which is the item that includes depreciation?

*Mr. Hayward.*—Item No. 7. Works cost is the first figure.

*President.*—By depreciation, do you mean depreciation on the plant?

*Mr. Hayward.*—Yes.

*President.*—On what did you take it?

*Mr. Hayward.*—That depreciation is calculated on a percentage taken on the rupee value of the article.

*President.*—We don't include depreciation in the works cost.

*Mr. Hayward.*—This figure is not the works cost, but the total cost.

*President.*—But general services and so on we include in the works cost. So the figures are not comparable. We will put it this way. We include in the works costs all costs incurred at the works except depreciation, head office charges and interest on working capital and profit.

*Mr. Hayward.*—We have included general services, that is managing agency allowance, European supervision, Calcutta office charges, all under No. 5.

*Dr. Matthai.*—Have you included interest on working capital?

*Mr. Hayward.*—That is under No. 7.

*President.*—What percentage of acid does this contain?

*Mr. Hayward.*—65 per cent. I have made out an estimate on a moderately large scale production, that is 5,000 tons of Chamber acid a year. (Hands in.)

*President.*—Rs. 64.4 includes all the charges except profit?

*Mr. Hayward.*—Yes. It doesn't include managing agents allowance or Head Office charges or profit.

*Dr. Matthai.*—Does it include works cost and depreciation?

*Mr. Hayward.*—Yes. Without any overhead head office charges, agents commission or profit.

*President.*—There is a difference of a few rupees per ton in our estimates. We have taken 4,000 tons a year of 100 per cent. acid, and we work it out at about Rs. 75, because we have assumed a plant of a capacity of 8,000 tons. The whole point is this: supposing it came to Rs. 75 a ton on that footing including profit and everything, then if you double the output, you use a bigger unit according to our calculations which will bring down the costs by another Rs. 20, and thus bring the total cost to Rs. 55. There is a difference of Rs. 20 a ton between this output and the bigger output, but if you take your present costs and the present fair selling price, there will probably be a difference of Rs. 50 on the smaller output, i.e., if you manufacture 1,200 tons, so that it may be cheaper to manufacture 10,000 tons in Calcutta and to export say 2,000 tons to Bombay than to manufacture 2,000 tons in Bombay, 2,000 tons in Calcutta, 2,000 tons in some other place and so on, because the average price would be at a much higher level if you produce sulphuric acid in five different places than if you make it in one place and distribute to other places.

*Mr. Hayward.*—I quite see your point. But the question is which is cheaper, to manufacture in one place and distribute it by paying freight, or to make it in different places and effect a saving in freight?

*President.*—If by an adjustment of freights it is made possible to manufacture in one place and distribute to other places, in the long run the consumer would benefit, would he not? It is perfectly true that on the present freight levels, it can't be done, but supposing the freight was reduced by Rs. 25 a ton on sulphuric acid, . . .

*Dr. Matthai.*—And the question of packages doesn't arise.

*President.*—Suppose the freight is reduced by Rs. 25 a ton and you manufacture your sulphuric acid at Rs. 55 a ton; that means that in Bombay it will be sold at Rs. 80, that is to say it would be even lower than it is selling in Bombay now, and here in Calcutta you would be getting it at Rs. 65 a ton.

*Mr. Hayward.*—It is rather a unique proposition. I don't think that in any country in the world, they take sulphuric acid over 1,200 miles.

*President.*—The question of sulphuric acid would be a temporary one. It would have its own economic unit. When the market increases, each province will have its own economic centre, but till the market is developed, it is more economical to concentrate manufacturing it in one place.

*Mr. Hayward.*—If freight can be reduced sufficiently, undoubtedly it is. But the question is whether the railways would be prepared to give up their share of profits.

*President.*—The railways are making no profits at all, because they are carrying nothing just now.

*Mr. Hayward.*—The biggest single demand is the coalfields. They will take about 1,600 tons a month.

*Mr. Mathias.*—What are they using it for?

*Mr. Hayward.*—For the manufacture of sulphate of ammonia.

*Mr. Mathias.*—This is the estimated cost on a 5,000 ton basis?

*Mr. Hayward.*—Yes; it is worked out on a monthly basis.

*President.*—Is this 400 tons of Chamber acid 100 per cent.?

*Mr. Hayward.*—No. It is about 65 per cent. acid.

*Dr. Matthai.*—The total output that you have estimated here is 5,000 tons of 65 per cent. acid and you get Rs. 64.4.

*Mr. Hayward.*—Yes.

*President.*—Your estimate corresponds very nearly with our estimate. I am glad that you agree with our estimate.

*Mr. Hayward.*—I thought it probably would.

*President.*—Then we have got to take this cost of sulphuric acid and we have got to apply it to the other products. All these lists would require readjustment.

#### *Hydrochloric acid.*

*Dr. Matthai.*—This hydrochloric acid (commercial) what per cent. acid is that?

*Mr. Hayward.*—35.39 per cent.

*President.*—This price of Rs. 118.7 is not understood at all. The raw materials for its manufacture first of all include salt?

*Mr. Hayward.*—Yes.

*President.*—How much salt do you use.

*Mr. Hayward.*—These are the actual figures from the process book for the year.

*President.*—This power and fuel is rather difficult to follow.

*Mr. Hayward.*—Is this a lower estimate than you have?

*Dr. Matthai.*—We will give you the exact figures that we get from the Bombay firms. They had a production of 60 tons of hydrochloric acid of 33 per cent. and their fuel and power charges came to Rs. 75 a ton.

*Mr. Hayward.*—I am afraid I can't understand that at all. Fuel is a very small item in hydrochloric acid manufacture and so is the power.

*President.*—What do you do? You have this salt; that you mix with sulphuric acid . . . .

*Mr. Hayward.*—We put it into an iron still and mix it with the sulphuric acid and then we heat that. That is all. These are the actual figures that we have got.

*President.*—Have you taken credit here for any of the salt cake?

*Mr. Hayward.*—Yes, Rs. 742.

*Dr. Matthai.*—You have taken credit for salt cake at about Rs. 9 a ton?

*Mr. Hayward.*—Something like that.

*President.*—You get 2 tons of salt cake from a ton of hydrochloric acid.

*Mr. Hayward.*—We get about 16 or 17 cwts.

*President.*—They have taken Rs. 40 a ton for salt cake.

*Mr. Hayward.*—They are calculating on potassium sulphate. When we want potash for alum making, we use potassium chloride to make hydrochloric acid. That gives potash salt which is more valuable. If common salt is used, then the salt cake is really worth nothing.

*Dr. Matthai.*—Unless you are making soda sulphide.

*Mr. Hayward.*—Yes. I don't think they are doing it.

*Dr. Matthai.*—They make small quantities of it.

*Mr. Hayward.*—I have always been interested in soda sulphide, but I have not been able to find out the exact imports. I don't know whether the import statistics give it.

*Mr. Mathias.*—What are the details of your raw materials?

*Mr. Hayward.*—I am sorry I have not got the details with me. But I can give you what each charge is. In each charge we use 6 maunds of salt and 60 gallons of sulphuric acid and we get 80 gallons of hydrochloric acid. That is from the old still. Now we are putting in new type stills and the charge will be different, but that is what these figures are based on.

*Mr. Mathias.*—How many gallons go to the ton?

*Mr. Hayward.*—About 180 gallons of hydrochloric acid to a ton. The cost of materials is only Rs. 107-8-0 excluding coal. That is on our new still. Add about one-third of a ton of coal to that or Rs. 3 and that makes the total Rs. 110. Rs. 118 is not over the mark. It is about right.

*President.*—Can you give me more details about hydrochloric acid. The other figures don't matter so much, but it is the estimate as regards power and fuel where the difficulty arises. Power and fuel is Rs. 494 on 83 tons. That is about Rs. 6-8-0.

*Mr. Hayward.*—Yes, that is correct. No power is wanted.

*President.*—Rs. 6-8-0 represents about a ton of inferior coal.

*Mr. Hayward.*—Yes. We pay Rs. 7-8-0 a ton as a matter of fact.

*President.*—For 100 per cent. you require 3 tons.

*Mr. Hayward.*—Yes.

*President.*—Labour comes to about Rs. 7-7; raw materials comes to Rs. 79-1, that I don't understand. How much sulphuric acid have you taken? I would like to have details as regards these. What sulphuric acid do you use in this?

*Mr. Hayward.*—1,740 specific gravity.

*President.*—That would be about 80 per cent.

*Mr. Hayward.*—81.5 per cent.

*President.*—Will you please give us all details as regards the raw materials, how much salt you use and so on?

*Mr. Hayward.*—I am afraid I haven't got them here. But my clerk can go and get these in a few minutes.

*President.*—Take the sulphuric acid. In this do you take only the works cost or do you add the other charges?

*Mr. Hayward.*—Only the raw materials and labour, and the rest goes into the figure I have given in the statement.

*President.*—In the statement that I asked for, you will give the quantities used and the rates as regards these raw materials and power and fuel.

*Mr. Hayward.*—Yes. Do you agree that the figures for hydrochloric acid should bear any special depreciation on the stills?

*President.*—We don't make any allowance for any special plant at all. What we do is to take 6½ per cent. on the whole of the block value including landing, buildings and everything, and you will probably find that will give you 10 to 15 per cent. on machinery and 2½ per cent. on buildings and so on.

*Mr. Hayward.*—I see. But these hydrochloric acid stills really ought to bear something like 100 per cent. depreciation.

*President.*—That would be a very small matter. We have found on the whole this 6½ per cent. on the block value a very reasonable figure to take.

*Mr. Hayward.*—Yes.

#### *Nitric acid.*

*President.*—This nitric acid that you mention in your statement, is it 65 per cent.?

*Mr. Hayward.*—65.3 per cent. or let us call it 65 per cent.

*President.*—The question of fuel doesn't come in very much in the case of nitric acid. You use about a ton on an average I suppose.

*Mr. Hayward.*—Yes, that would be about it.



*President.*—It would be about Rs. 8 or Rs. 9.

*Dr. Matthai.*—You don't take any credit for nitre cake, do you?

*Mr. Hayward.*—No. We use sodium nitrate and we don't think that it has got any value.

*Alumina ferric.*

*Dr. Matthai.*—For alumina ferric, it is interesting that our estimate and yours are very similar and the production is identical.

*Mr. Hayward.*—I am glad it is so. Are you including in your estimate all the overhead charges?

*President.*—We use overhead in a very different sense from what you do. By overhead we mean depreciation, head office charges, agents commission, and interest on working capital.

*Mr. Hayward.*—That is what I call overhead, Nos. 5, 6 and 7 in my statement.

*Dr. Matthai.*—Your No. 5 is merely the local office charges and supervision.

*Mr. Hayward.*—No, head office as well.

*Dr. Matthai.*—We include only standing charges that are incurred at the factory.

*Mr. Hayward.*—Where do the head office expenses come in?

*Dr. Matthai.*—We add it afterwards.

*Mr. Hayward.*—I am afraid we took general services to mean head office.

*Dr. Matthai.*—We will understand your figure as including everything except profit.

*Mr. Hayward.*—Yes. As a matter of fact that includes the loss. May I ask you what is your figure for alumina ferric?

*President.*—It would come to about the same figure as yours approximately.

*Mr. Hayward.*—We sell it at Rs. 70.

*President.*—But that is below the import price.

*Mr. Hayward.*—Yes, it has to be.

*President.*—The import price is Rs. 94 a ton.

*Dr. Matthai.*—The difficulty there is to know whether this Rs. 94 is the price of alumina ferric or alumina sulphate.

*Mr. Hayward.*—Rs. 94 is even too high for alumina sulphate. On a specific import of 100 tons or something like that, it would be too high. We are selling alumina sulphate white 16 to 17 per cent. to paper mills at Rs. 80.

*President.*—It is far below the import price.

*Mr. Hayward.*—In fact they say it is not. We have to go on cutting in order to keep the business.

*Dr. Matthai.*—Messrs. Brunner Mond and Company gave us a price of Rs. 89 c.i.f.

*President.*—Then you must add Rs. 5 on to it. That brings it to Rs. 94.

*Mr. Hayward.*—That is a higher price than the Titaghur Paper Mills are buying at. May I show you the actual import figures?

*Dr. Matthai.*—You gave us a figure of Rs. 83. That was the landed price. That corresponds to Rs. 108 on this basis. If you took Rs. 89 as the c.i.f. price including landing charges and duty, it would come to Rs. 108.

*Mr. Hayward.*—We gave a price of Rs. 82-12-0 including duty and landing charges.

*President.*—I understood at the time I saw your figures that your Rs. 83 referred to alumina ferric, whilst Brunner Mond's Rs. 108 referred to the refined product.

*Mr. Hayward.*—I know there are no big buyers of alumina sulphate in Bombay, because there are no paper mills there.

*President.*—I don't think you have given us anywhere what prices you realised.

*Mr. Hayward.*—We have given that in answer to question 46 (2).

*President.*—There is a big drop. That I don't understand at all.

*Mr. Hayward.*—The reason for that is that up to 1927 we only sold it in small quantities, but in 1928 we managed to get some of the paper mills business and we have got a contract for half of their requirements for this year and we had to go down below the import figure for big quantities to get the business.

*President.*—You give the c.i.f. price at Rs. 70 for alumina ferric and about Rs. 82 for alumina sulphate.

*Mr. Hayward.*—Rs. 81.3 for alumina sulphate.

*Dr. Matthai.*—If you take alum, the figure that you give for potash alum is Rs. 162, that is the current import price.

*Mr. Hayward.*—That is the cost price, Calcutta, duty paid. When we are selling to a man, he says "I am buying at such and such a rate" and we can't say we don't believe you. We just say we do believe what you say. What will you give us the business at?

*Dr. Matthai.*—Messrs. Brunner Mond and Company have given us prices and your realised prices are considerably lower than the c.i.f. landed price suggest.

*Mr. Hayward.*—I have got a few imports here in my book. Here is 100 cwts. imported by somebody at a rate which works out at Rs. 74 per ton. That is excluding the duty. Somebody importing big quantities may pay much less than that. It is very difficult to get correct figures.

*Dr. Matthai.*—I suppose there is more local competition in Calcutta than in Bombay in alumina ferric.

*Mr. Hayward.*—I can't say. I don't know what the conditions are in Bombay.

*Dr. Matthai.*—Here in Calcutta you make it, the Bengal Chemical and Pharmaceutical Works make it and the paper mills make it.

*Mr. Hayward.*—I don't think the paper mills make it.

*Dr. Matthai.*—Does the Calcutta Corporation make any?

*Mr. Hayward.*—No, they buy theirs. That is a very cut price at Rs. 65 a ton. That is alum cake.

*President.*—We can't reconcile the prices in Bombay and Calcutta at all according to the c.i.f. price. If you get Rs. 90 a ton for epsom salt, you ought to do very well.

*Mr. Hayward.*—We can't sell it at that price.

*President.*—That is what you have given here.

*Mr. Hayward.*—On this question of alumina ferric, here is the detailed extract that we keep of exports and here is an entry in my book which shows that Messrs. Heilgers and Company imported alumina ferric at Rs. 66 a ton which is under the heading of alumina sulphate.

*Mr. Mathias.*—The difference between alumina sulphate and alumina ferric is that the sulphate doesn't contain much iron, but the process is much the same.

*Mr. Hayward.*—The process is not quite the same, because in one case you make alumina ferric from the crude bauxite and in the other you make it from the pure alumina hydrate. Bauxite is the natural alumina hydrate and the pure alumina hydrate is made from the bauxite by the Baeyer process by heating with caustic soda at high pressure. That dissolves the iron, but not the alumina. The alumina is dissolved by caustic and carbonic acid gas passed through and you get pure white alumina hydrate

which we are importing at present. Till we can afford to put in a Baeyer plant here, we shall have to import it.

*President.*—What is alum cake?

*Mr. Hayward.*—That is simply powdered bauxite mixed with sulphuric acid. It sets hard as cake. This Rs. 66 a ton for alumina ferric is actually what is being paid for big quantities.

*President.*—What is alumina sulphate?

*Mr. Hayward.*—I am afraid they are not differentiated.

*Dr. Matthai.*—Generally in the market there is a difference of Rs. 10 a ton, isn't that so?

*President.*—We get £6-15-0 for alumina sulphate from the *Trade Journals*.

*Mr. Hayward.*—Here is one consignment in my book definitely marked as alumina sulphate at Rs. 84 a ton. That is only for 100 cwts.

*President.*—That is about right.

*Mr. Hayward.*—A man who imports big lots will be able to buy cheaper.

*Dr. Matthai.*—Rs. 84 a ton for what?

*Mr. Hayward.*—That is c.i.f. I know when we tried to sell our sulphate of alumina to the paper works, we had to come down to Rs. 80 a ton to get the business, although they are getting Rs. 140 protection on what they make. That is alumina sulphate white free from iron, 16 to 17 per cent.

*Dr. Matthai.*—They will put it on the ground that your product is inferior.

*Mr. Hayward.*—Ours is really better. It is free from iron, it is 16 to 17 per cent. pure alumina hydrate.

I have now got the costs of materials for hydrochloric acid. They are as follows:—

	Rs.
Liverpool salt 44 tons at Rs. 35 a ton . . . . .	1,540
Muriate of potash 7 tons 18 cwts. at Rs. 130 a ton . . . . .	1,007
Coal 66 tons at Rs. 7-12-0 . . . . .	494
1,740 acid 95 tons 9 cwts. at Rs. 42 a ton . . . . .	4,060
<b>TOTAL</b>	<b>7,101</b>

*President.*—Supposing you used salt instead of potassium chloride, how much would you require of that?

*Mr. Hayward.*—About 5 tons.

*President.*—That is comparable. On your figures for 100 per cent. acid he would require less than 3 tons of coal.

*Mr. Hayward.*—Yes.

*President.*—If you can analyse the raw materials, quantities, price per ton and so on with regard to these commodities, it would be useful.

*Mr. Hayward.*—Yes.

*President.*—You can work it out per ton instead of giving a lump sum figure and also give the quantity of coal. Take chamber acid also at 100 per cent. and start with that, all acids expressed on 100 per cent. basis and then give us your raw material costs. We want only the raw materials and coal.

*Mr. Hayward.*—Yes, we will let you have it. We have not asked for protection on acids.

#### *Red lead.*

*Dr. Matthai.*—Nobody has. We have not had time to read your reply to the representation from Messrs. Boeman and Karain. You might tell

us the point of it. What they say is that the kind of red lead they use for their paints is red lead containing more than 33/34 per cent. of lead peroxide, and yours is below 25 per cent.

*Mr. Hayward.*—The Indian Stores Department specification for red lead is 25.1 per cent. and the British Standard specification is 25.1 per cent. Red lead has got a tremendous reputation built up on its setting qualities. That is what we all the "Classic" type. There is no doubt that you cannot make paint with the classic variety, because it remains liquid only for about 14 days, long enough however for ordinary purposes when it is mixed "on the job". As a consequence paint manufacturers are making great efforts to introduce the non-setting type as they can make extra profit on this as a paint by saving the engineer the trouble of mixing his paint "on the job". Another advantage is that they can mix the non-setting with other pigments, and sell them under a patent name. The paint makers have found that by using 32 per cent. peroxide they can make a paint which would remain liquid and there is demand for this, but I think in our opinion and in the opinion of Engineers that the non-setting has not yet proved so good as the setting type for important structures. Take the case of a bridge which has cost Rs. 1 crore. The engineer is going to be absolutely certain that it is going to be protected by the material he used, and for that reason the classic type of red lead has a tremendous sale and in the last two years we have sold 2,000 tons to Messrs. Jenson and Nicolson and also many thousands of tons to railways and engineers in India.

*Dr. Matthai.*—It comes to this: taking red lead having peroxide content of 25 per cent. it may be used by itself or it may be used as raw material for paint.

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—Red lead is used either by itself or it is used as raw material with some other kind of pigments.

*Mr. Hayward.*—When the latter is the case, you have to use the non-setting type.

*Dr. Matthai.*—For that reason supposing we propose to put a duty on red lead, then obviously the cost to these people who are making paints would go up to that extent.

*President.*—Can we differentiate that?

*Mr. Hayward.*—You can do that. I hope however we shall soon be making a non-setting type.

*President.*—Will the customs be able to differentiate between the two?

*Mr. Hayward.*—Any red lead that comes in, mixed in oil will be *ipso facto* non-setting. If it is not mixed in oil, the analysis is very simple to determine whether it is non-setting or not.

*Dr. Matthai.*—Could we say in the Tariff Schedule "containing not more than 25 per cent. lead peroxide"? Would that be a way of differentiating it?

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—As far as you are concerned, would you be safeguarded if we put a duty on red lead containing not more than 25 per cent. lead peroxide?

*Mr. Hayward.*—As we stand to-day, we should. Of course the effect of that would be to force the people to use the other variety, I think.

*Dr. Matthai.*—At present while you are not making the kind of red lead that they want, if we put a duty on other kinds of red lead, they will be at an unnecessary disadvantage.

*Mr. Hayward.*—We shall be making it soon, but until we do produce it, it can be differentiated by the quantity of lead peroxide in it.

*Mr. Mathias.*—What is the import price of red lead at present?

*Mr. Hayward.*—The last quotation we had was Rs. 384 a ton c.i.f. Calcutta.

*President.*—That is without duty and landing charges.

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—With duty it would be Rs. 445.

*President.*—Supposing your output is 625 tons, if you got the whole of the market, could you give us an estimate of how your costs will come down?

*Mr. Hayward.*—I can give you that certainly.

*Dr. Matthai.*—As regards the imports of red lead, Bengal takes 1,000 tons and Bombay 500 tons. I suppose Bombay would still buy the imported stuff.

*Mr. Hayward.*—If we send it round by sea, the freight is about Rs. 18 a ton and clearing charges about Rs. 7.

*President.*—What would be the clearing charges on this c.i.f. landed price? How much would you add?

*Mr. Hayward.*—About Rs. 7, the same as in Bombay.

*President.*—Would that include clearing, landing and cartage to godown?

*Mr. Hayward.*—Yes, Rs. 7 a ton to our Calcutta godown.

*President.*—I want your estimate on 1,500 tons production. What are the principal raw materials?

*Mr. Hayward.*—Pig lead and coal.

*President.*—How do you get the colouring matter?

*Mr. Hayward.*—The colouring matter comes from the oxygen of the air. Lead is first of all converted into yellow oxide in one type of furnace and that is put into the colouring furnace and it absorbs a further amount of oxygen.

*President.*—Why it is called peroxide?

*Mr. Hayward.*—Because of the extra amount of oxygen in it.

*Mr. Mathias.*—What is the disadvantage that you labour under?

*Mr. Hayward.*—We are not labouring under any particular disadvantage except that the stuff is being dumped on the market.

*Mr. Mathias.*—Why are they able to dump it?

*Mr. Hayward.*—Because their production is larger.

*President.*—They have no coal in Italy; how are they managing?

*Mr. Mathias.*—You said the other day that the output in Italy is not very big.

*Mr. Hayward.*—I haven't got the figure.

*Mr. Mathias.*—So that dumping cannot be proved.

*Mr. Hayward.*—They make considerably more than we make. It is being dumped, but I don't know how they are managing it.

*President.*—Red oxide ought to be dearer than litharge. That is sold at £29 delivered in Germany.

*Mr. Hayward.*—I think the demand is less for litharge.

*President.*—We want more details as regards this red lead. In this case I take it you give us everything except your profit, is that right?

*Mr. Hayward.*—Yes. It includes the loss as a matter of fact.

*President.*—What do you mean by loss?

*Mr. Hayward.*—We take No. 5 to mean the whole of the management and other charges and consequently this bears a proportion on the whole of the overhead and the loss in the year is included in this.

*President.*—Cut out the loss first. Give us the actual cost excluding profit and without taking into account the loss. That profit we calculate on the block value. You should put it in the form we have given in the questionnaire.

*Mr. Hayward.*—It is the actual cost.

*President.*—But it includes everything in it. You exclude from this all your loss, you exclude from this depreciation, head office charges and agents commission, exclude from it the interest on working capital and then give us the block value of this plant, its maximum capacity and the actual output at present. Then we get what we call fair selling price. We shall add these charges for you.

*Mr. Mathias.*—Do your customers pay for packages?

*Mr. Hayward.*—Yes.

*Mr. Mathias.*—So that is really not an item of cost in the price.

*Mr. Hayward.*—No.

*President.*—In the raw materials you will of course give us details, lead so much, coal so much, then price and so on.

*Mr. Hayward.*—Yes.

*Dr. Matthai.*—And you give us that on an output of 1,500 tons.

*President.*—First your actual cost and then your estimate. As regards the manufacture of sulphuric acid by the Indian Copper Corporation, their expert came to give evidence and he told us that they cannot manufacture any sulphuric acid at all.

*Mr. Hayward.*—In my remarks on the subject I said that it was quite a problem.

*President.*—He said that it cannot be manufactured.

*Mr. Hayward.*—But there is that amount of sulphur going up the chimney.

*Dr. Matthai.*—Are you in a position to give us an estimate of the cost of manufacturing superphosphate from imported rock phosphate?

*Mr. Hayward.*—Certainly. That would be Red Sea phosphate. I would have to cable to London to get the price of 1,000 tons of rock phosphate. We have imported that, but only in small quantities. What size of unit shall we say?

*President.*—5,000 tons of superphosphate a year.

*Dr. Matthai.*—As regards your estimate of copper sulphate on what output is that based?

*Mr. Hayward.*—100 tons a year. Did you notice my estimate of the total requirement of sulphuric acid in Bengal?

*President.*—Yes, 5,400 tons of 65 per cent. acid excluding the coalfields and the coke ovens. That would be 3,500 tons of 100 per cent. acid. The Bengal Chemical and Pharmaceutical Works claim that they make 1,200 tons of alumina sulphate and alum cake.

*Dr. Matthai.*—Roughly if we take 4,500 tons as the consumption of sulphate of alumina and alum in Bengal, that would be very close.

*Mr. Hayward.*—Yes.

**THE BENGAL CHEMICAL AND PHARMACEUTICAL WORKS,  
LIMITED.**

**Oral Evidence of Messrs. RAJSHEKHAR BOSE and A. CHATTERJI  
recorded at Calcutta on Friday, the 1st March, 1929.**

*Introductory.*

*President.*—Mr. Bose, what position do you hold in this Company?

*Mr. Bose.*—I am the Manager and Secretary and also one of the Directors.

*President.*—What is your position Mr. Chatterji?

*Mr. Bose.*—He is my assistant.

*President.*—Where is your principal sulphuric acid plant?

*Mr. Bose.*—In Manicktala.

*President.*—Is that the one we came to see?

*Mr. Bose.*—Yes. There is another plant under construction at Panihati. That is not complete yet.

*Dr. Matthai.*—When do you expect to start work?

*Mr. Bose.*—After a year or so.

*President.*—Are you going to manufacture your sulphuric acid in that place or at Manicktala?

*Mr. Bose.*—In both places. The fact is, the old plant will have to be demolished. It has been working for the last 20 years. After a year or so we will stop the plant and work the new set. We have three sets at the old place; one will be demolished and two will continue to work.

*Dr. Matthai.*—Each consists of how many chambers?

*Mr. Bose.*—One set consists of three, one of two and one of one. We are closing the one with two chambers.

*President.*—And the remaining four chambers you would work?

*Mr. Bose.*—Yes.

*President.*—What would be the capacity of the new one?

*Mr. Bose.*—Ten tons a day.

*President.*—That would be more than enough, would it not, for you?

*Mr. Bose.*—We expect that the consumption of acids by ourselves will grow and then there will be stoppages.

*President.*—You have given the production of acids as 2,500 tons. How much of that is sulphuric acid?

*Mr. Bose.*—Sulphuric acid alone may be taken as 2,500 tons. The other acids are made from sulphuric acid.

*President.*—Is that chamber acid?

*Mr. Bose.*—That is 100 per cent.

*Dr. Matthai.*—Is that your outturn per annum?

*Mr. Bose.*—Yes.

*President.*—I take it that most of it is used in your drugs and chemicals?

*Mr. Bose.*—About one-third of the acid is sold as sulphuric acid and of the remaining about a sixth or so is converted into nitric acid and hydrochloric acid and the rest is converted into sulphates.

*President.*—Which are the principal sulphates that you make?

*Mr. Bose.*—Alum, alumina sulphate, magnesium sulphate and iron sulphate or copperas.

*President.*—You have got 2,500 tons of sulphuric acid; of that, say, 800 tons you sell as such, and nitric acid how much do you make?

*Mr. Bose.*—150 tons a year.

- President.*—That would take about 160 tons of sulphuric acid?
- Mr. Bose.*—Yes.
- Dr. Matthai.*—What per cent. is that?
- Mr. Bose.*—Approximately 100 per cent.
- President.*—If it is 100 per cent. it would perhaps require 200 tons of sulphuric acid?
- Mr. Bose.*—Yes.
- President.*—And in hydrochloric acid?
- Mr. Bose.*—About the same quantity as nitric acid.
- President.*—What per cent. is that?
- Mr. Bose.*—That is also 100 per cent.
- President.*—That will take about 300 tons of sulphuric acid.
- Mr. Bose.*—Yes.
- President.*—All the acids are sold as such more or less?
- Mr. Bose.*—Yes.
- President.*—That would leave you 1,200 tons for other products. Of that how much would you use for heavy chemicals? How much alum do you produce?
- Mr. Bose.*—The average production of potash alum during the last years has been 200 tons per annum.
- President.*—That means about 100 tons of sulphuric acid. What about alumina sulphate?
- Mr. Bose.*—800 tons.
- President.*—That would mean 400 tons of sulphuric acid. What other sulphates do you make?
- Mr. Bose.*—Ferrous sulphate 500 tons.
- President.*—That means about 25 tons of sulphuric acid.
- Mr. Bose.*—Yes.
- President.*—What about magnesium sulphate?
- Mr. Bose.*—We produce 150 tons.
- President.*—Is this commercial or pharmacopœia?
- Mr. Bose.*—This is pharmacopœia.
- President.*—That would take about more than half.
- Mr. Bose.*—Yes, about 80 tons of sulphuric acid.
- President.*—These are the sulphates that you manufacture?
- Mr. Bose.*—Yes.
- President.*—That means 600 tons of sulphuric acid?
- Mr. Bose.*—Yes.
- President.*—The other 500 tons you use in your other chemicals.
- Mr. Bose.*—Yes, for various purposes.
- Dr. Matthai.*—Is sulphuric acid directly used for any of your pharmaceutical preparations?
- Mr. Bose.*—Very small quantity is used but it has other uses. We use it in the workshops; we consume large quantities in treating surgical instruments and so forth.
- Dr. Matthai.*—Do you make disinfectants?
- Mr. Bose.*—We do, but they don't require any sulphuric acid.
- Dr. Matthai.*—Do you use 600 tons for your surgical instruments and so forth? You say you manufacture 2,500 tons. 800 tons out of that go to acids and heavy chemicals.
- Mr. Bose.*—We sell some sulphuric acid as such.



*Dr. Matthai.*—That will absorb 1,300 tons; the sulphates would take about 600 tons. But you say you manufacture about 2,500 tons. Where does the remaining 600 go?

*Mr. Bose.*—We make surgical cotton and we consume a fairly large quantity of sulphuric acid for bleaching. That is one of the purposes for which sulphuric acid is used. Some is used for making various chemicals on a small scale total quantity of each is not much—and all taken together we consume about 500 tons.

*Dr. Matthai.*—What do you mean by saying that you manufacture potash nitrate?

*Mr. Bose.*—We buy the crude stuff and purify it.

*Dr. Matthai.*—Do you use it or sell it?

*Mr. Bose.*—Some quantity we use ourselves and some we sell.

*Dr. Matthai.*—How much do you have to pay for the crude potassium nitrate? Is it from Bihar?

*Mr. Bose.*—Yes. We pay for crude about Rs. 310 per ton.

*Dr. Matthai.*—Is it crude?

*Mr. Bose.*—About 95 per cent. pure. We don't buy very crude stuff.

*Dr. Matthai.*—After it is purified how much do you sell it at?

*Mr. Bose.*—For our own use we do not require such pure stuff. When we sell it, it is 95 per cent.

*Dr. Matthai.*—Is it not more expensive to use potassium nitrate?

*Mr. Bose.*—It pays us to use potassium nitrate because the residue that we get is used for making alum. Whenever we are in need of potassium sulphate we use potassium nitrate.

*Mr. Mathias.*—You get potassium sulphate as by-product?

*Mr. Bose.*—Yes.

*Dr. Matthai.*—Did you ever try to make fertilizers?

*Mr. Bose.*—In fact the only fertilizer that we can speak of is bone superphosphate on a small scale.

*Dr. Matthai.*—What is the biggest quantity that you have made so far in a year?

*Mr. Bose.*—Not more than 20 tons a year.

*Mr. Mathias.*—Can you sell it at a profit?

*Mr. Bose.*—Yes, but the difficulty is that there is no big market for bone superphosphate because it is expensive.

*President.*—How much per ton do you sell it at?

*Mr. Bose.*—Something like Rs. 8 a cwt.

*President.*—That is nearly twice as much as the price of rock phosphate.

*Mr. Bose.*—Yes.

*Mr. Mathias.*—To whom do you sell?

*Mr. Bose.*—To the tea gardens.

*Mr. Mathias.*—Do you think they prefer it?

*Mr. Bose.*—I don't think they do but sometimes they want bone superphosphate.

*Mr. Mathias.*—Is it a sort of accommodation order: when they happen to be short they use it?

*Mr. Bose.*—I think so. I think bone superphosphate is more expensive.

*Dr. Matthai.*—What is the total amount of your turnover including your pharmaceutical and other things?

*Mr. Bose.*—About Rs. 30 lakhs a year.

*Dr. Matthai.*—Out of that acids and sulphates would constitute how much?

*Mr. Bose.*—I should think about Rs. 5 or 6 lakhs.

*Mr. Mathias.*—Most of your output is confined to drugs and medicines?

*Mr. Bose.*—Yes.

*President.*—These works costs that you have given in form I do they refer only to heavy chemicals?

*Mr. Bose.*—Yes.

#### *Costs.*

*President.*—Which are these?

*Mr. Bose.*—Nitric acid, sulphuric acid, sulphate of ammonia and some of the smaller chemicals which are manufactured on a small scale.

*President.*—From our point of view these costs that you have given us do not throw much light. You have not given us Form 11 at all which is the more important.

*Mr. Bose.*—The difficulty is that we have so many items. Most of them are manufactured on a small scale.

*President.*—If you had given us the costs of the principal acids and sulphates that would have served our purpose.

*Mr. Bose.*—We can send them if you give us time. I will send you details of the more important chemicals that we make.

*President.*—Give us for any of the four sulphates and these acids.

*Mr. Bose.*—Yes.

*Dr. Matthai.*—It is really sulphuric acid, hydrochloric acid, nitric acid, potash alum, alumina sulphate, epsom salt and copperas that we are concerned with.

*Mr. Bose.*—We will send you.

#### *Profit.*

*Mr. Mathias.*—Approximately what profit is the firm making at present?

*Mr. Bose.*—For the last two years we have been paying 15 per cent. and the profit is about 3 lakhs or so.

*President.*—In the profit do you include depreciation?

*Mr. Bose.*—No, it is nett profit.

*President.*—Your capital is about Rs. 20 lakhs?

*Mr. Bose.*—Yes.

*President.*—That will give you 15 per cent.? What is the market price of your shares?

*Mr. Bose.*—We have ordinary shares and preference shares—ordinary shares of the face value of Rs. 100 and the market price of these is Rs. 145. The preference shares are at a discount, Rs. 8-12-0 for Rs. 10 shares.

*President.*—How is that?

*Mr. Bose.*—The fact is that these preference shares belong to a few persons who want to dispose of these shares at any price as they want money, but when they are scattered I am sure their price will rise again.

*Mr. Mathias.*—What interest do they carry?

*Mr. Bose.*—7½ per cent.

*President.*—Are these preference shares redeemable at all?

*Mr. Bose.*—No.

*President.*—What is the highest price your shares have reached?

*Mr. Bose.*—The present price is the highest.

*President.*—Have the ordinary shares generally been at par?

*Mr. Bose.*—They had been at par before 1919, but since 1919 the price of the shares has been increasing.

*Dr. Matthai.*—Is it possible for you to say approximately how you stand financially as regards chemicals?

*Mr. Bose.*—The approximate profit that we make on our sale of chemicals is not more than 6 or 7 per cent.

*Dr. Matthai.*—That is acids only?

*Mr. Bose.*—Sulphates also.

*Dr. Matthai.*—You are able to make profits on sulphates also?

*Mr. Bose.*—Yes.

*Dr. Matthai.*—You are not proposing to make any superphosphate.

*Mr. Bose.*—We have a mind. Our pharmaceutical department we are expanding and ultimately we will expand our present works and remove the manufacture of chemicals to the new site at Panihati. The oldest plant has been completely written down but the other sets are still earning depreciation.

*President.*—How much depreciation do you allow on sulphuric acid?

*Mr. Bose.*—10 per cent.

*President.*—It is now more than 20 years old so you have written it down twice over!

*Mr. Mathias.*—Does it pay you to turn out Epsom salt?

*Mr. Bose.*—Not always, but when there is dearth of supply in the market it does.

*Mr. Mathias.*—Your manufacture of Epsom salt is really meant to supply occasional deficiencies in the market, is that right?

*Mr. Bose.*—That has been the case for the last two years. Before that we were able to manufacture regularly.

*Mr. Mathias.*—Is it because the price of imported Epsom salt has fallen?

*Mr. Bose.*—Yes.

*President.*—Do you buy commercial Epsom salt?

*Mr. Bose.*—We both manufacture and import some quantity. That is pure stuff. There is difference between commercial Epsom salt and pure Epsom salt.

*President.*—You import to do what?

*Mr. Bose.*—We simply re-sell it.

#### *Alumina sulphate.*

*Dr. Matthai.*—In what form do you make alumina sulphate?

*Mr. Bose.*—We make alumina sulphate in two varieties, one is fairly pure with only a small quantity of alum and the other is alum cake. It contains about 10 per cent. insoluble matter.

*Dr. Matthai.*—This purer form is used for paper manufacture?

*Mr. Bose.*—Yes, but mostly it is used for water works.

*Dr. Matthai.*—Are you able to get a better price for the purer kind?

*Mr. Bose.*—Yes, Rs. 10 per ton more.

*President.*—As regards alum I don't understand why there should be so little use. What is the average requirement of the Calcutta Corporation?

*Mr. Bose.*—They use alum cake.

*President.*—Do they buy it from you.

*Mr. Bose.*—They buy partly from us and partly from Messrs. D. Waldie & Co. and their total requirements are from 600 to 700 tons a year.

*President.*—I suppose the filtered water supply is very limited here. You have got two systems?

*Mr. Bose.*—Yes.

*President.*—Can you tell me how much alum you would require to filter a thousand gallons of water, taking the Hughly water?

*Mr. Bose.*—I could not tell you definitely but I have an idea that in winter when the water is fairly pure they don't sometimes use any alum at all, but in the rainy season when the water is very dirty they use something like one grain per 100 gallons. I am telling it only from memory.

*President.*—Do they use any chlorine here?

*Mr. Bose.*—Only occasionally as far as I know.

*President.*—Do you think that the demand for alum and sulphate of alumina will increase in future when there are more water works?

*Mr. Bose.*—Yes. In fact it has been steadily increasing for the last three or four years.

*Dr. Matthai.*—Have you tried to make any estimate of the total market in Bengal for these salts in terms of sulphuric acid used in the making of it?

*Mr. Bose.*—I can make an estimate roughly.

*Dr. Matthai.*—You say you sell about 800 tons of sulphuric acid as such D. Waldie & Co. told us that they sell annually about 400 to 500 tons. That makes a total 1,300 tons. Then the import of alumina sulphate is 2,400 tons; you make about 800 tons and Messrs. Waldie & Co. make about 600 tons; that would be nearly 4,000 tons. That leaves straightaway 3,200 tons of sulphuric acid. Then there are the other miscellaneous salts, so that if we suggest that approximately 4,000 tons of sulphuric acid is consumed in the Bengal market, I think it will be fairly correct?

*Mr. Bose.*—Yes.

*President.*—Why do you manufacture sulphuric acid and salts separately would it not be more economical for you to manufacture in one place?

*Mr. Bose.*—It would have been but the difficulty is that at the old place at Manicktala there is no possibility of our getting more land.

*President.*—Our investigation more or less shows that the difficulty of the industry very largely arises from the fact that the units are small for the production of sulphuric acid.

*Mr. Bose.*—That is one of the reasons no doubt, but so far as the situation of the old factory is concerned there is no possibility of extending it in the near future.

*President.*—Would it not be better to establish your factory near the river?

*Mr. Bose.*—Our idea is that ultimately the whole of the chemical works will be removed to Panihati and only the pharmacy will remain at the old place. If the Grand Canal scheme matures then it may be possible for us to remove the old factory altogether and have the whole factory at the new place.

*President.*—That will take some time because you would see for yourself that there is not room for two works manufacturing the same sort of acids and salts.

*Mr. Bose.*—No.

*President.*—Is there any possibility of your Company and Messrs. D. Waldie & Co. working together, or are you contemplating to manufacture yourselves on a larger scale?

*Mr. Bose.*—Already there is some negotiation going on with Messrs. D. Waldie & Co. but the terms have not been settled yet.

*Dr. Matthai.*—What is the scale on which Bose's laboratory produces these chemicals?

*Mr. Bose.*—As far as I know their capacity is 5 tons a day.

*Dr. Matthai.*—How much actually are they making?

*Mr. Bose.*—I don't know.

*President.*—They have been making drugs chiefly I suppose?

*Mr. Bose.*—Yes.

*President.*—We are not concerned immediately with drugs in this enquiry because the question of drugs has its own difficulties. You have got to make so many drugs in such small quantities that it is a very difficult problem.

*Mr. Bose.*—Exactly. In fact some of the chemicals we are making on a small scale come to only a few pounds in a year.

*President.*—Does that pay you?

*Mr. Bose.*—It does.

*President.*—You get a sort of local market for these?

*Mr. Bose.*—Yes. We are making 300 to 400 kinds of different chemicals on a very small scale—sometimes it is 10 tons a year and sometimes it is 10 lbs. a year.

*President.*—As regards heavy chemicals you agree that it would be more economical if only one plant worked?

*Mr. Bose.*—It would be.

*Dr. Matthai.*—There are small producers of acids in Bengal, aren't there?

*Mr. Bose.*—Not many besides Messrs. D. Waldie & Co. and Bose. There are two more but they are not working now. They are practically buying from one of the bigger manufacturers.

*Dr. Matthai.*—For practical purposes we can confine ourselves to the production of these three firms?

*Mr. Bose.*—Yes.

*President.*—Dr. Bose has not appeared before us at all.

*Mr. Bose.*—It is a limited company too.

*President.*—Is Sir P. C. Roy still connected with your works?

*Mr. Bose.*—Yes, he is one of the directors.

*President.*—He was the original founder of this company?

*Mr. Bose.*—Yes.

#### *Carmichael plant.*

*President.*—You say that your plant is a Carmichael plant. What is that? Is it the chamber process?

*Mr. Bose.*—It is, but it is partly chamber and partly towers. Most of the re-action is completed in the towers and the remaining re-action is finished in the chamber.

*Dr. Matthai.*—That is how the thing works in the ordinary chamber system.

*Mr. Bose.*—The principle is practically the same in every system, but sometimes most of the re-action is finished in small towers. In the older systems most of the re-action is finished in chamber, but in the newest system more reliance is placed on the towers than on the chambers. There are systems also which dispenses altogether with chambers.

*Dr. Matthai.*—Actually in the construction how does the Carmichael system differ from the other?

*Mr. Bose.*—In the older system there is a big chamber and there is a tower at the entrance of the chamber and another tower at the exit. These towers are very small compared with the capacity of the chamber. There are other systems in which there are no chambers at all. There are series of towers and the Carmichael system is an intermediate system between the two. There are three towers at the entrance and there are two chambers in the middle portion and there are three more towers at the exit and these are supposed to give better results.

*President.*—Is there any saving in cost?

*Mr. Bose.*—Yes. There is less wear and tear on the plant. The towers are all so small that the whole of the re-action naturally takes place in a small space. By intermediate chambers you spread out the re-action over a large area.

*President.*—The capacity of that is going to be 10 tons a day, or about 3,500 tons a year.

*Mr. Bose.*—Yes, but the actual output will be less because there will be stoppages.

*President.*—That will be a small unit.

*Mr. Bose.*—Yes, compared with what they have got in Europe.

*Dr. Matthai.*—Could you give us the cost of the Carmichael plant that you are erecting now?

*Mr. Bose.*—It cost us something like Rs. 3 lakhs.

*Dr. Matthai.*—Did you order it last year?

*Mr. Bose.*—We ordered it about five years ago but the plant has been lying idle because the demand for sulphuric acid has not been increasing to the extent that we expected. It was just after the war that we ordered the plant when the market was very bright and we thought that if we ordered a new plant it would be profitable.

*Dr. Matthai.*—The price has come down very much: it will now cost about Rs. 1,50,000.

*Mr. Bose.*—It will be about one-third less.

*Dr. Matthai.*—That will be about Rs. 2 lakhs. We got an estimate in Bombay that the plant including land and everything else could be erected for about Rs. 5 lakhs with a capacity of 8,000 tons. Would that be about right?

*Mr. Bose.*—Yes, it is possible to do so now.

*President.*—Do you sell this sulphuric acid as chamber acid or as rectified?

*Mr. Bose.*—Acid is sold in various strengths but the most popular is 85 to 88 per cent.

*Mr. Mathias.*—Whom do you sell your acids to mostly?

*Mr. Bose.*—Some take it for galvanizing. The Government telegraph works take a good quantity for galvanizing their telegraph poles.

*President.*—Where do they galvanize these?

*Mr. Bose.*—At the Alipore telegraph works.

*President.*—Do they make the posts here?

*Mr. Bose.*—Yes. They have a big galvanizing works. The mint buys a certain amount. Then there are various small industries, e.g., tanneries and metal workers and aerated water manufacturers.

*President.*—The telegraph department buys the ordinary black sheet do they?

*Mr. Bose.*—They buy black sheets, rivet them and galvanize them.

*President.*—This liq. ammonia what do you manufacture it from?

*Mr. Bose.*—We make it from ammonium sulphate. We get the ammonia from the gas works or the various collieries.

*President.*—That is rather an expensive way of manufacturing it.

*Mr. Bose.*—It is the only way of making it now.

*President.*—At what price do you get the ammonium sulphate?

*Mr. Bose.*—Rs. 198 per ton. That is the lowest price we have paid so far.

*President.*—Is that delivered at the works?

*Mr. Bose.*—F.o.r. at the colliery.

*President.*—How much does that work out at Panihati?

*Mr. Bose.*—The extra charges would be about Rs. 3 or Rs. 4 per ton. The price varies very much.

*President.*—You paid Rs. 198. I think since this federation of sulphate of ammonia manufacturers has been started the price has been uniformly moderate?

*Mr. Bose.*—Still there are some variations. We don't buy directly from them. We buy in small quantities.

*President.*—How much do you buy in a year?

*Mr. Bose.*—About 100 tons.

*President.*—Would it not be cheaper for you to get tar and make it?

*Mr. Bose.*—It would be more expensive. We use tar in making disinfectants.

*President.*—Then what do you do with the sulphate of ammonia?

*Mr. Bose.*—We treat it with lime, get ammonia gas and dissolve that gas and get liquor ammonia.

*President.*—That is used for what?

*Mr. Bose.*—Mostly used medicinally; some of it is used for various industries but the largest use is for medicinal purposes.

*Dr. Matthai.*—Do you sell most of your things in Bengal or outside?

*Mr. Bose.*—Mostly in Bengal.

*Dr. Matthai.*—With regard to alum and alumina sulphate have you a market in Upper India?

*Mr. Bose.*—Yes, we have but not a very large one because Messrs. D. Waldie & Co. are competing with us. But still we have some market.

*Mr. Mathias.*—I think Waldie's works at Cawnpore has been closed.

*Mr. Bose.*—No.

*Dr. Matthai.*—Taking your total production of alumina sulphate, say, about 8,000 tons, how much of that would be sold in Bengal?

*Mr. Bose.*—About two-thirds.

*President.*—As regards the up-country markets who supplies these?

*Mr. Bose.*—So far as the Indian product is concerned I think it is Messrs. D. Waldie & Co.

*President.*—This large quantity that is now being imported must be going to the up-country markets, isn't that so?

*Mr. Bose.*—Yes. My information is that up-country is a larger consumer of alum and the other sulphates than Bengal because there are big mills there.

*Mr. Mathias.*—What do they use it for?

*Mr. Bose.*—For dyeing.

*President.*—There are a fairly large number of textile mills up-country.

*Mr. Mathias.*—Do you supply the Nagpur Mills with any chemicals?

*Mr. Bose.*—Only occasionally. We cannot compete with Bombay because they get imported alum and magnesium sulphate cheaper from Bombay than our stuff from Calcutta.

#### *Superphosphate.*

*President.*—When did you last manufacture these superphosphates?

*Mr. Bose.*—About a year and half ago.

*President.*—Will you tell us at what price you got your bones? Are there local markets for bones?

*Mr. Bose.*—I think we paid something like Rs. 90 a ton for bonemeal. We purchased the bonemeal and converted that to bone superphosphate.

*Mr. Mathias.*—That would correspond to about Rs. 80 for bones?

*Mr. Bose.*—Yes.

*Dr. Matthai.*—You have never considered the question of making superphosphate from rock phosphate, have you?

*Mr. Bose.*—We have considered that. We are still making enquiries for a suitable source of supply for rock phosphate.

*Dr. Matthai.*—Have you got any kind of estimate?

*Mr. Bose.*—No because we are not yet sure of the raw materials.

*Mr. Mathias.*—Where are you thinking of getting your raw materials from?

*Mr. Bose.*—The latest information is that we can get phosphate from the Madras Presidency.

*Mr. Mathias.*—Is it from the Trichinopoly side?

*Mr. Bose.*—Yes.

*President.*—That is not considered very satisfactory.

*Mr. Bose.*—It is full of fluorides that is the difficulty.

*President.*—And also carbonates and things like that. Have you considered the question of importing African rock phosphate?

*Mr. Bose.*—Yes. We have written to Egypt, but we have received no reply yet. We would like to use the Indian stuff.

*President.*—But it will cost you more because the distance is more than 1,000 miles from Bengal. Will you also give us the costs if you can find them of the superphosphates?

*Mr. Bose.*—Yes.

*President.*—It is a very simple process, the manufacture of superphosphates, is it not?

*Mr. Bose.*—Yes. So far as the chemical re-action is concerned it is quite simple but actually there are some difficulties. You simply mix powdered bonemeal, wait for sometime and make them dry. But you have to make special arrangements when mixing large quantities and for getting out the noxious fumes.

*Mr. Mathias.*—But the plant is not a very elaborate or expensive one?

*Mr. Bose.*—You can devise a very simple plant, and you may rely on hand labour. But if you want an automatic plant it will be expensive.

*Mr. Mathias.*—Is that chiefly for crushing?

*Mr. Bose.*—For mixing. For small lots the hand plant will be better.

*President.*—Supposing you were to manufacture 2,000 or 3,000 tons a year?

*Mr. Bose.*—Even up to 2,000 tons I think a semi-automatic plant partly run by machinery and partly run by hand will be all right, but for larger outputs a purely mechanical plant will be required.

*President.*—If we had partly mechanical and partly worked out by manual labour, it would require more supervision.

*Mr. Bose.*—Yes.

*President.*—You would require more skilled labour also?

*Mr. Bose.*—Yes.

*President.*—On the whole it would be very much cheaper to get a wholly automatic plant.

*Mr. Bose.*—It is difficult to say without actual experiments. In fact we have not been able to proceed in the matter without being assured of the materials.

*President.*—Have you taken any expert advice on that?

*Mr. Bose.*—No.

*President.*—Now very large quantities of superphosphates are made out of import rock phosphates in most countries.

*Mr. Bose.*—That is so.

#### *Coal tar.*

*President.*—How much coal tar do you use per annum? Is that chiefly for disinfectants? You manufacture about 600 tons of disinfectants, don't you?

*Mr. Bose.*—We require about 1,800 tons of coal tar.

*President.*—Do you get it from the local gas works?



*Mr. Bose.*—Yes.

*President.*—How much per ton have you to pay for it?

*Mr. Bose.*—Just now we are paying Rs. 2-6-0 per maund or Rs. 64 to Rs. 65 per ton.

*President.*—They are getting a very good price!

*Mr. Bose.*—Yes, we could get coke oven tar at a much lower price but it is not suitable for our purpose. It is deficient in creosotes.

*President.*—It seems a very big price to pay.

*Mr. Bose.*—Yes.

#### *Freights*

*Dr. Matthai.*—What freight do you pay on your bauxite.

*Mr. Bose.*—We pay Rs. 10 per ton from Katni to Howrah.

*Dr. Matthai.*—And for magnesite?

*Mr. Bose.*—Rs. 1-3-3 per maund from Salem. The f.o.r. price is Rs. 8 per ton and the arrived cost is Rs. 45 per ton.

*Mr. Mathias.*—You would not call the freight from the Central Provinces too high, would you?

*Mr. Bose.*—Still it is high. The cost at the mine for bauxite is Rs. 6-8-0 and the arrived cost is Rs. 20-8-0.

*Dr. Matthai.*—Besides the railway freight there are other transport charges?

*Mr. Bose.*—Yes, everything is included.

*Dr. Matthai.*—The railway freight is Rs. 10.

*Mr. Bose.*—Yes.

*Dr. Matthai.*—Rs. 10 plus Rs. 6-8-0 plus Rs. 4 for other charges?

*Mr. Bose.*—Yes.

*President.*—The railways always say that they give a lot of encouragement to the indigenous industries. Do you agree with that statement?

*Mr. Bose.*—We don't. We are still quarrelling with the Great Indian Peninsula Railway for the freight on bauxite. Formerly Katni belonged to the East Indian Railway and we succeeded in getting a reduction. Then the line was transferred to the Great Indian Peninsula Railway.

*President.*—They have raised the freight?

*Mr. Bose.*—That is the Bengal Nagpur Railway. The rate is Rs. 10 per ton.

*President.*—In answer to question 20 you say "It may be possible in future to replace imported sulphur by Indian pyrites or even gypsum". There is not much evidence to show that there are Indian pyrites available.

*Mr. Bose.*—The point of course is that Indian pyrites is inferior to Spanish pyrites which has more of sulphur and less of arsenic.

*President.*—But as regards gypsum there is evidence that there are large quantities available in India.

*Mr. Bose.*—Yes. And the quality also is very good.

*President.*—But the process will be different.

*Mr. Bose.*—Yes, different as well as difficult.

*President.*—Do you know the process?

*Mr. Bose.*—Roughly you convert gypsum into calcium sulphide by heating it with coal and then roasting it. The sulphide is burnt and the lime remains as calcium oxide.

*President.*—It is then the same thing as burning sulphur except that you require more fuel in this?

*Mr. Bose.*—Yes. It gives a purer sulphuric acid than pyrites.

*President.*—What do you do with the lime that remains?

*Mr. Bose.*—It is thrown away or sold.

*President.*—Would it have any commercial value?

*Mr. Bose.*—Yes, but it would be partly pure lime and partly Calcium carbonate. It can be re-ignited and used for other purposes. Since this will be available as a by-product it will be possible to use it for commercial purposes and find a market for it.

*Mr. Mathias.*—Lime is produced so cheaply in India that this lime will not be able to compete. It might help to carry something for the overhead charges.

*Miscellaneous.*

*Dr. Matthai.*—How many chemists have you altogether in your works?

*Mr. Bose.*—We have above 15 but we have more chemists who are concerned with pharmaceutical preparations.

*Dr. Matthai.*—What is the labour force in your works?

*Mr. Bose.*—About 1,200.

*Dr. Matthai.*—Including the old mill?

*Mr. Bose.*—Yes.

*President.*—As regards coal your price at the colliery is Rs. 4-4-0 per ton. What coal is this that you are using.

*Mr. Bose.*—Ranigunge and Jharia.

*President.*—Is it second class?

*Mr. Bose.*—Mostly first class.

*President.*—Do you find it economical to use first class coal?

*Mr. Bose.*—Yes.

*President.*—How much do you require in a year?

*Mr. Bose.*—About 3,000 tons a year.

*President.*—This charge of Rs. 6-4-0 from the colliery to the works is rather a lot.

*Mr. Bose.*—It is.

*President.*—Do you get it in wagon loads?

*Mr. Bose.*—Yes, but we have not got any siding. We have to cart the coal from the railway station.

*President.*—You can't get a siding there?

*Mr. Bose.*—No.

*Mr. Mathias.*—How much does the cartage cost?

*Mr. Bose.*—Something like Rs. 2-8-0 a ton.

*President.*—Are these prices that you have given in answer to question 46, recent?

*Mr. Bose.*—Yes. They are mostly from quotations received from manufacturers.

*President.*—Who are the principal manufacturers of alumina sulphate?

*Mr. Bose.*—Messrs. Peter Spence.

*President.*—You got the quotations from them.

*Mr. Bose.*—We got them from some of the middlemen.

*President.*—And the quotations for alum?

*Mr. Bose.*—Those are also from middlemen.

*President.*—This magnesium sulphate that you mention is German is it not?

*Mr. Bose.*—Yes.

*President.*—In answer to question 43 you say you have been obliged to lower your prices for sulphates to such an extent that profit has practically disappeared. Can you give us figures to show what has actually taken place?

*Mr. Bose.*—Up till a year ago our price was Rs. 5-8-0 per cwt. Now we have been obliged to bring it down to something like Rs. 4-12-0.

*Dr. Matthai.*—That is in the course of the year?

*Mr. Bose.*—Yes.

*President.*—Will you give us your drop in prices during the last three or four years of all these sulphates?

*Mr. Bose.*—We will send you the prices. I shall give you the lowest sale prices every year for the last four or five years.

*Mr. Mathias.*—You are able to sell your magnesium sulphate at Rs. 95 per ton in quantities.

*Mr. Bose.*—We can't. It doesn't pay us to make it at the price that it now carries.

*Mr. Mathias.*—What is the current price of magnesium sulphate at Calcutta?

*Mr. Bose.*—Rs. 4-12-0 a cwt. That is Rs. 95 a ton. Without casks it will be about Rs. 75 a ton.

*Mr. Mathias.*—How do you supply your magnesium sulphate?

*Mr. Bose.*—Mostly in casks, but sometimes in wooden cases.

*Mr. Mathias.*—What is the price of the cask?

*Mr. Bose.*—Rs. 1-4-0 a cwt.

*Mr. Mathias.*—Rs. 95 in casks would be somewhere about Rs. 65 without casks?

*Mr. Bose.*—Yes.

*President.*—That is about the price. You will tell us when giving these figures whether it is in bags or casks.

*Mr. Bose.*—Yes.

*Dr. Matthai.*—Your total capital expenditure is somewhere about Rs. 46 lakhs.

*Mr. Bose.*—Yes.

*Dr. Matthai.*—Your capital is about Rs. 19 lakhs and debenture Rs. 1 lakh. The rest is I suppose out of the surplus.

*Mr. Bose.*—Yes.

*President.*—Your reserve fund is Rs. 8,22,000. That is from the depreciation fund.

*Mr. Bose.*—Partly accumulated out of surplus profits and partly out of the premium.

*Mr. Mathias.*—Did you recently issue any shares?

*Mr. Bose.*—No, 10 years ago.

*Mr. Mathias.*—At what premium did you issue?

*Mr. Bose.*—30 per cent. premium.

*Mr. Mathias.*—When would you be able to send your works cost?

*Mr. Bose.*—Within a week.

*President.*—You ask for a duty of 30 per cent. on imported mineral acids and sulphates. What do you mean by mineral acids?

*Mr. Bose.*—Sulphuric acid and so on. We have also heard that a good deal of nitric acid is being imported into Bombay.

*President.*—That was a big order for the mint.

*Mr. Bose.*—I don't know the details, but I only heard a rumour that large quantities were being brought from Germany.

*President.*—That was in connection with the mint, but we have not heard of any other import on a large scale.

*Dr. Matthai.*—At present on the acids that you sell as such, you don't need any assistance, do you?

*Mr. Bose.*—So far as commercial acids are concerned, we have nothing to complain about competition from foreign makers. It is negligible. But there is a quantity of pure acid coming from Europe.

*Dr. Matthai.*—I think your real fear is the importation of synthetic nitric acid.

*Mr. Bose.*—Yes.

*Dr. Matthai.*—At what rate do you sell your nitric acid?

*Mr. Bose.*—For the absolute acid the price would be As. 4-6 a lb. or Rs. 630 a ton.

*President.*—Is that 100 per cent. acid?

*Mr. Bose.*—Yes.

*Dr. Matthai.*—The price at which the mint at Bombay is getting its supplies is about Rs. 315 a ton—60 per cent.

*President.*—How do you sell your sulphuric acid?

*Mr. Bose.*—The strength that is mostly in demand is 80 to 83 per cent. and the lowest price now is Rs. 84 a ton.

*President.*—Do you sell R. O. V.?

*Mr. Bose.*—Yes.

*President.*—What price do you get for it?

*Mr. Bose.*—Only Rs. 10 or so higher.

*President.*—It will be about Rs. 110 a ton.

*Mr. Bose.*—Yes.

*President.*—The trouble now is that you are working small units and therefore your costs are high and a higher duty is required, say 30 or 40 per cent., if we allow these small units to work. But if we assume that you would work a larger unit for which there is room in the country, the costs would go down so much that you could almost do with the present duty.

*Mr. Bose.*—I think so too. The difficulty is that the two go together; unless we get some protection to start with, we can't venture into going in for a larger plant. If we have a large plant and succeed in creating a market for the whole of the outturn then ultimately no protection would be necessary, because we would have crossed the limits.

#### *Scale of protection.*

*President.*—What are we to say? Can we say that as you cannot make up your minds to start a big plant, therefore you must have protection to the extent of 30 per cent. or should we say that if you can produce 4,000 or 5,000 tons of sulphuric acid and other salts, you require 15 per cent.? In what form do you suggest that we should state the case?

*Mr. Bose.*—I think if you grant us protection for a limited period say 10 years or so, it would be enough.

*President.*—We must determine what protection is required. If we take your present costs working small units, the amount of protection required is enormous.

*Mr. Bose.*—You need not base your protection on the present costs, but you can make certain allowances. You will be able to form some conclusions from the statements that we will send you.

*President.*—I can tell you that as far as we can see if you are running up to a capacity of say 4,000 tons, then you would probably not require any protection as regards most of these chemicals except perhaps epsom salt and nitric acid, assuming that the German acid comes. The moment you say you are able to manufacture 4,000 tons you need no protection. On what is our recommendation to rest then?

*Mr. Bose.*—It can be judged this way. I shall make up a table stating the cost for the materials alone the cost of treatment and the indirect costs. When the quantity increases, then the cost of treatment and indirect cost will be automatically much less and hence the manufacturing cost will be lower. For your calculations you can take the full cost of the materials and half of the other costs.

*President.*—I will give you a concrete instance. Take magnesium sulphate. Supposing your works costs come to Rs. 70 and you require say Rs. 30 for your depreciation and selling charges and profit and so on, that makes it Rs. 100.

*Mr. Bose.*—Yes.

*President.*—Then I say when your production of sulphuric acid goes up, and the production of magnesium sulphate also goes up, the total comes to Rs. 70 instead of Rs. 100. Assuming that the foreign price is Rs. 70 including all the charges, when you reach Rs. 70 a ton, you don't require protection; you can do with the 15 per cent. duty. Now you require Rs. 30 a ton in addition to the present duty of 15 per cent.

*Mr. Bose.*—That is simply to help us to extend our works.

*President.*—What proposals do you think we ought to make? At present with a duty of 15 per cent. the foreign epsom salt is sold at Rs. 70 and your costs including profit comes to Rs. 100. Therefore in addition to the duty of 15 per cent. we have got to impose an additional duty of Rs. 30, because you are manufacturing on a small scale.

*Mr. Bose.*—I wouldn't ask so much. I would ask you to meet us half way. To enable us to expand our works to some extent you can help us by giving us some protection for a short period. Instead of helping us to the extent of the full difference, you can help us to the extent of half the difference.

*President.*—That is no good. If we give you protection at all it must be adequate.

*Mr. Mathias.*—On the other hand if we give full protection that the present small works demand, the result will be to increase the number of small works which will not be advantageous to the country.

*Mr. Bose.*—It will be worse.

*President.*—We are between two fires here. Government is entitled to say to you why do you have these small units.

*Mr. Bose.*—These are small units compared to what they have in Europe.

*President.*—We are only talking of units which will more or less suffice for your purposes. A unit producing 4,000 or 5,000 tons. That is not too big a unit to assume, is it?

*Mr. Bose.*—No.

*President.*—You have got two works in Bombay and there are two works in Calcutta and there is the same difficulty. The works costs of all the works are higher, because the output in each case is uneconomic. What do you suggest now?

*Mr. Bose.*—If the help from Government could be in a different shape that is in the form of a bounty, then you could insist upon having a works of a particular capacity, but since it is only the duty we are concerned with I am afraid you will have to meet us half way.

*Dr. Matthai.*—I suppose the kind of half way arrangement you suggest is that we take the total market on this side of India, and take your present production and then take the average of the two and base our costs on that output. Is that right?

*Mr. Bose.*—Yes, that would be one way of calculating.

*Mr. Mathias.*—Another way would possibly be to increase your market by stimulating the demand for fertilisers for instance.

*Mr. Bose.*—In fact it is our interest to have as big a market as possible, but the difficulty is not so much about the demand, but competition with the imported products.

*President.*—I would like also to tell you that we are considering one other proposal. There are two ideas underlying that proposal. The first is that the manufacture of sulphuric acid should be increased in the country, so that it becomes cheap. The other idea is that the largest consumer practically of sulphuric acid in the world is superphosphate, and one way

of increasing the manufacture of sulphuric acid would be to encourage the manufacture of superphosphates. That would bring down the price of sulphuric acid and at the same time the price of superphosphates.

*Mr. Bose.*—Yes, undoubtedly.

*President.*—The point we are considering is, at present there is not much demand for superphosphates and in order to create that demand, the first thing to do is to cheapen the superphosphates. One of the ways suggested is that a bounty should be paid on the manufacture of sulphuric acid used in the manufacture of superphosphates. Do you think that might help you?

*Mr. Bose.*—That would be one way of solving the difficulty, but I think some similar arrangement should be made as regards the manufacture of aluminium sulphates and alum.

*President.*—When you work out the cost of production on the 4,000 tons basis, you will find that you won't require more than 15 per cent.

*Mr. Bose.*—After we have reached that quantity, not before that.

*Dr. Matthai.*—Supposing as a result of a bounty on sulphuric acid used in the manufacture of superphosphates, you, in your works, have been able to increase your output of sulphuric acid by 1,000 or 2,000 tons, the benefit of the reduction in the cost of sulphuric acid will apply also to the sulphates that you are manufacturing.

*Mr. Bose.*—Quite true, but is not only the reduction in the cost of sulphuric acid, but also a reduction in the cost of sulphates that is necessary.

*Dr. Matthai.*—But sulphuric acid is the chief item.

*Mr. Bose.*—It is one of the items but there is also the additional cost of making the sulphate itself.

*President.*—But each one of these sulphates takes at least half a ton of sulphuric acid. If you bring down your total all-in cost by Rs. 30 or Rs. 40 a ton in each of the sulphates, is not that sufficiently large?

*Mr. Bose.*—I don't think that will be quite enough.

*Mr. Mathias.*—That with the present 15 per cent. duty will come to what you ask for.

*Dr. Matthai.*—What is the possibility as far as your own works is concerned? Supposing a bounty was sanctioned, would you be able to undertake the production of superphosphates?

*Mr. Bose.*—Yes. It would have been a better position, if we could enjoy that protection as regards all the sulphates as well.

*President.*—The difficulty in our minds is this and it is a difficulty that has to be faced by you. We can't encourage the growth of small units in the country and therefore we must take a unit which will lead to economic production and that unit appears to us to be somewhere near 4,000 to 5,000 tons. If we were to base our estimate on that production, and we found that you still required protection we would consider it. But if you ask us to protect you on a small production, there is the danger that more small units might spring up.

*Mr. Bose.*—Certainly there is that danger. But at the prices that are now ranging, it is not possible for any small manufacturer to meet the demands of the market and even if the prices were slightly better, they won't be in a position to compete.

*President.*—You just examine the position for yourself and take a modern unit of 4,000 to 5,000 tons capacity and calculate for yourself and see what results you get.

*Mr. Bose.*—It is not the increase in the size of the unit that would help us immediately. Some experience will be necessary.

*President.*—You have much longer experience of this industry than anybody on the Bombay side. Messrs. D. Waldie & Co. have more experience; they started 50 years ago. Supposing we made this proposal for a bounty and you undertook to manufacture also superphosphates, you would find that it might help you in both ways.

*Mr. Bose.*—To some extent it would lower the cost of sulphuric acid supposing we can create a market here for superphosphates but I am afraid that won't reduce the cost to the extent that is necessary.

*President.*—Please give us your costs first and then we will see.

*Dr. Matthai.*—Have you got any information about rock phosphate from Egypt? If you have, you might send it on to us.

*Mr. Bose.*—Yes, we will.

## MESSRS. PARRY AND COMPANY, LIMITED.

Oral Evidence of Mr. W. O. WRIGHT, recorded at Ootacamund  
on Friday, the 19th April, 1929.

*Superphosphates.*

*President.*—We are very much obliged to you, Mr. Wright, for coming up again in connection with this enquiry. We have been seriously considering this question of superphosphates since we met last time and we have taken a good deal of evidence about it. We attach a good deal of importance to your opinions on this point and we thought we might trouble you again. We have received estimates from two Bombay firms which very closely correspond to yours. Though of course you ask us to treat your figures as confidential, and we shall do so, I can tell you that their figures and yours are not very different and you will gain little by our treating yours as such.

*Mr. Wright.*—The figures that we particularly wanted you to keep confidential are the figures that we gave of our actual working costs of other chemicals.

*President.*—They will be kept confidential.

*Mr. Wright.*—We have no objection to the others being published.

*President.*—We are seriously considering this question of superphosphates and it would help us if we are able to say that your estimates agree with theirs.

*Mr. Wright.*—I have no objection to your publishing the costs I sent you on 19th March.

*President.*—The most important item is the cost of rock phosphate. You have given 4½d. as the f.o.b. price of 75 to 76 per cent. phosphate. Did you get a quotation for this or did you take it from the trade journals?

*Mr. Wright.*—This was an actual quotation and might be very slightly reduced for actual business.

*President.*—When was that received?

*Mr. Wright.*—I think we received it about two years ago. I think this remains fairly constant.

*President.*—The Bombay people gave us 5d. a unit. 4½d. would be about the right figure to take, would it not?

*Mr. Wright.*—Yes.

*President.*—You think this Moroccan rock phosphate is the best to use for making superphosphate?

*Mr. Wright.*—I think the Algerian and other African phosphates do not produce quite such a high grade of superphosphate, namely 18/20 per cent.

*President.*—The importers claim that theirs is 18/20 per cent. and therefore in order to get that quality you have to use the best rock phosphate which is Moroccan?

*Mr. Wright.*—That is so.

*Dr. Matthai.*—As a matter of fact do you pay higher freight from Algeria or from the Red Sea ports?

*Mr. Wright.*—We buy c.i.f. in small quantities. To work on a big scale the idea would be to charter a small steamer.

*President.*—This freight of 15 shillings, what is it based on? We have got a quotation for the freight. For a consignment of 500 tons they say 25 shillings but if you took 3,000 tons it would be 7s. 6d.

*Mr. Wright.*—We simply got quotations without any engagement and they said probably they would be able to get freight at 15 shillings for 3,000 tons. It would be a small steamer.



*President.*—It does happen that between 500 and 3,000 tons there is a substantial difference.

*Mr. Mathias.*—For importing a small quantity of rock phosphates from Morocco it might be difficult for a steamer to obtain any other freight. It might be necessary to charter a whole steamer?

*Mr. Wright.*—Yes.

*Mr. Mathias.*—You might not be able to import unless you chartered a small steamer?

*Mr. Wright.*—That is right.

*Mr. Mathias.*—And even then it would mean probably going from Morocco to Port Said in ballast if it was a small quantity of 500 tons so that your freight would be very high for small quantities?

*Mr. Wright.*—Yes.

*President.*—It might be safe for us to take 25 shillings for small quantities and 15 to 20 shillings for larger quantities?

*Mr. Wright.*—I think 25 shillings is rather on the low side for smaller quantities. It varies tremendously. If a steamer were to come out here and they knew that they were going to secure homeward cargo again we would pay very much cheaper freight. The freights vary tremendously also at different seasons dependent upon the demand existing at the time for transport facilities.

*Mr. Mathias.*—For a portion of the journey it would mean that whatever the quantity you purchased you would probably have to charter a steamer—from Morocco to Port Said?

*Mr. Wright.*—Yes, and then tranship. There must be steamers working for coastal trade.

*President.*—I think it would be easier to get freight from the Mediterranean port than from a Red Sea port because it is the busier side.

*Mr. Wright.*—Yes.

*President.*—I was thinking that we might take 25 shillings to start with and then for larger consignments of 5,000 tons or so 15 shillings.

*Mr. Wright.*—We have worked on 15 shillings throughout for larger quantities.

*Mr. Mathias.*—If you were turning out 5,000 tons of superphosphate a year what would be your normal order for rock phosphate at a time?

*Mr. Wright.*—I would go in for the whole quantity required at once because the interest on the money invested is very unlikely to be more than the advantage in freight.

*Mr. Mathias.*—Does it not deteriorate in any way?

*Mr. Wright.*—No.

*Mr. Mathias.*—Is there any special storage necessary for which you have to pay godown charges and so on?

*Mr. Wright.*—No. I think we could stock it anywhere.

*Mr. Mathias.*—So that really if you were producing 5,000 tons of superphates you would place an order for the requisite amount each year?

*Mr. Wright.*—Yes.

*Dr. Matthai.*—What is the minimum consignment for which you would have to charter a steamer?

*Mr. Wright.*—It is very difficult to get a steamer for small quantities.

*President.*—About 4,000 tons is quite a small steamer?

*Mr. Wright.*—Yes. We worked on 5,000 tons at a time.

*Mr. Mathias.*—Have you placed any orders for rock phosphates?

*Mr. Wright.*—No. We buy at the present moment *via* Belgium where it is crushed and then it comes out at very cheap freight from Antwerp. We have no crushing plant at present.

*President.*—This price that you give is for lump. I remember reading that the rock phosphate people also supply crushed phosphate.

*Mr. Wright.*—I have just heard that too, that there is a small plant for crushing in Tunis, not in Morocco. There is a small crushing plant there but it produces a lower grade of a phosphate from which you could only obtain a lower grade superphosphate which would not compete with the ordinary imported super.

*President.*—I take it that so far as phosphate rock is concerned there is a sort of international market for it and there will be no variation as regards particular markets, that is to say they will sell at the same price to everybody.

*Mr. Wright.*—I think so. I believe there is an arrangement between the Moroccan Company and French Producers but that this arrangement only covers sales to Europe.

*President.*—On page 1 of your statements, dated 19th March, you give a figure of Rs. 7-12-0. Does that include railway freight? You give £2-3-6 to c.i.f. to Ranipet.

*Mr. Wright.*—That £2-3-6 includes steamer freight to Madras.

*President.*—Rs. 7-12-0 is clearing and landing, etc.?

*Mr. Wright.*—Yes, clearing, landing and railage from Madras to Ranipet.

*Dr. Matthai.*—How much is the railage?

*Mr. Wright.*—Between Rs. 2-8-0 and Rs. 3.

*President.*—Is this rock phosphate classified as manure?

*Mr. Wright.*—It should be.

*President.*—Then it is .1 of a pie per maund.

*Mr. Wright.*—Yes.

*President.*—What is the distance from Madras to Ranipet?

*Mr. Wright.*—70 miles.

*President.*—What about this wastage of 2½ per cent.?

*Mr. Wright.*—It would be bought in bulk and we allow 2½ per cent. as a safe figure for importing anything in bulk.

*President.*—And this cart hire, that is from Ranipet station to the works?

*Mr. Wright.*—Yes.

*President.*—Cost of crushing comes to nearly Rs. 7? That I take it is an estimate?

*Mr. Wright.*—That is an estimate but with our experience of crushing other materials I think you can take it as fairly accurate.

*President.*—It is rather a large percentage.

*Mr. Wright.*—It is fairly hard stuff to crush and you want it very fine.

*Dr. Matthai.*—Would you be able to manage with such a small quantity of fuel as would cost only 8 annas?

*Mr. Wright.*—We would crush it in a crusher driven by an oil or gas engine.

*President.*—What sort of crushers do you use?

*Mr. Wright.*—At present we have a small Titan crusher and two disintegrators for crushing bones and for crushing oil cakes. We have got nothing suitable for crushing phosphates.

*President.*—What is the price of bones just now?

*Mr. Wright.*—Very high indeed. It is something like Rs. 70 a ton.

*President.*—Is that the price for bones or bone meal?

*Mr. Wright.*—Raw bones.

*Dr. Matthai.*—What about bone meal?

*Mr. Wright.*—Between Rs. 86 and Rs. 90.

*President.*—At Rs. 70 it would compare well with the imported rock phosphate if you got the value for the nitrogen. It contains about 3 per cent. nitrogen. That is equivalent to about Rs. 20.

*Mr. Wright.*—Yes.

*President.*—But you don't get Rs. 20.

*Mr. Wright.*—No.

*President.*—If you made a compound fertiliser and used bone superphosphate with sulphate of ammonia, would you not then get the equivalent?

*Mr. Wright.*—Yes. That is what we do in actual practice. We don't sell a compound fertiliser, because we have not got the facilities for making it.

*President.*—It is mechanically mixed.

*Mr. Wright.*—Yes.

*President.*—In that case wouldn't you get the equivalent?

*Mr. Wright.*—Yes.

*President.*—Take sulphate of ammonia which contains 20 per cent. of nitrogen and bone superphosphate which contains 3 per cent. Instead of taking 20 parts of sulphate of ammonia you can take 17 parts. The remaining three parts come from the superphosphate. In that way you may be able to recover something for your nitrogen content in the bone superphosphate.

*Mr. Wright.*—You will of course be able to guarantee that but 20 per cent. won't be available.

*President.*—Supposing you did it that way.

*Mr. Wright.*—Even then the nitrogen in the bones would not be available.

*Mr. Mathias.*—Why is it not available?

*Mr. Wright.*—I am not a chemist to answer that.

*Mr. Brodie.*—I don't see why it should not be available. Any organic nitrogenous matter is available. For example take farm yard manure. It is not soluble like ammonium sulphate, but still it is available.

*President.*—Probably the sulphate of ammonia people have discarded it and therefore they don't get any equivalent for it. It doesn't seem to be economic to make compound fertiliser from bone at Rs. 70 a ton.

*Mr. Wright.*—Here you can sell oil cake which contains 3 per cent. nitrogen and see the result when you use it.

*Dr. Matthai.*—Is the cost that you have given here for 100 per cent. sulphuric acid?

*Mr. Wright.*—Yes. 100 per cent.  $H_2SO_4$ .

*President.*—This cost of sulphuric acid that you have given on 5,000 tons basis is also an estimate.

*Mr. Wright.*—Yes.

*President.*—That includes, I take it, everything except depreciation.

*Mr. Wright.*—Yes, everything except depreciation.

*President.*—And profit. Does it include your head office and agents' commission.

*Mr. Wright.*—No, it doesn't.

*President.*—Practically then it is the works cost.

*Mr. Wright.*—Yes.

*President.*—Supposing we recommended any special form of assistance to the manufacture of superphosphate, we must take the price of sulphuric acid based on a certain output. That is to say, if a man makes only 1,000 tons of sulphuric acid, it is no good his having a bounty for the price of sulphuric acid will be so high that he will never be able to produce superphosphate at an economic price. For that reason we must assume an economic unit in the manufacture of sulphuric acid and then we must ascertain

what the cost of that sulphuric acid ought to be. Supposing we said that 4,000 tons would be the economic unit: we may base our calculation on 4,000 tons, but the man may still have a unit of 1,000 tons. He will be able to make 2,000 tons of superphosphates and to earn the bounty, but that would not be economical.

*Mr. Wright.*—No.

*President.*—Therefore don't you think it would be necessary for us to consider whether we should not stipulate for a minimum production of sulphuric acid before he can claim the bounty. Supposing we said that we gave a bounty of Rs. 20 a ton on superphosphate, and we based our calculation on a plant of sulphuric acid, say, 4,000 tons, but the man says "I am going to get this bounty; I have got an old plant of sulphuric acid; I will make 1,000 tons of sulphuric acid out of this plant and 2,000 tons of superphosphates", that would not be economical for the country.

*Mr. Wright.*—No.

*President.*—Because the industry would not be established on an economic basis. Therefore would it not be necessary to say that the man should not earn any bounty?

*Mr. Wright.*—Unless the plant is an economic one.

*President.*—Yes, unless he produces 4,000 tons of sulphuric acid which he either uses in this or something else, don't you think so?

*Mr. Wright.*—Yes.

*President.*—It is not necessary for him to use all the sulphuric acid in making superphosphate. What we want to do is this: if the industry gets any assistance, eventually it must be able to do without protection. Therefore to begin with they must start production on an economic scale and how else can we enforce it unless we said that he must produce so much sulphuric acid.

*Mr. Wright.*—Unless you are going to encourage the erection of large plants, you are not going to establish the industry.

*President.*—Therefore there must be some minimum as regards the production of sulphuric acid in any case before any bounty is paid.

*Mr. Wright.*—We have given you a figure of 5,000 tons which we regard as the minimum.

*President.*—I will say 4,000 tons by way of illustration. Unless you had that, the cost of sulphuric acid would be so high that eventually you would still want protection. There would be no rhyme or reason from the public point of view. I will put it to you this way: supposing you are manufacturing other chemicals besides superphosphate, you might use 2,000 tons of sulphuric acid for your other chemicals and 2,000 tons for superphosphate which will give you 5,000 tons of superphosphate. Alternatively you might say that you are going to manufacture only superphosphate, then in that case you may start with 10,000 tons and go up to 20,000 tons. In that way if you started with 10,000 tons, you would require 3,500 tons of sulphuric acid and for 20,000 tons you would require 7,000 tons.

*Mr. Wright.*—Yes.

*President.*—You have taken the works cost of acid at Rs. 60 naked.

*Mr. Wright.*—Yes.

*Dr. Matthai.*—Actually your phosphate ought to be entered here at Rs. 45.

*Mr. Wright.*—Yes.

*President.*—It would make a difference of about Rs. 4.

*Mr. Wright.*—Yes.

*Dr. Matthai.*—This estimate is based on an output of 15,000 tons, that is to say corresponding to 5,000 tons of acid.

*Mr. Wright.*—Not actually, because if we were producing 5,000 tons of acid, we have got other outlets for 1,500 tons of acid, so that we would be working on a production of roughly 10,000 tons of superphosphate.

*Dr. Matthai.*—Roughly we may take it that it corresponds to 10,000 tons of superphosphate.

*Mr. Wright.*—Yes. Only 3,500 tons of acid would be used for superphosphate.

*President.*—Taking your works cost, your cost above materials come to Rs. 4.

*Mr. Wright.*—Yes. It is really mixing and bagging.

*President.*—What we have to do is to take the 12 cwts. at Rs. 38-8-0 and then we have to add the cost of 12 cwts. at Rs. 7, is it not so?

*Mr. Wright.*—Yes.

*President.*—That is 4-2?

*Mr. Wright.*—Yes.

*President.*—Plus Rs. 4-4-0 or Rs. 4-25. It comes to Rs. 8-45.

You are not contemplating mechanical dens?

*Mr. Wright.*—Yes.

*President.*—That is considerably lower than the estimate which these people have given.

*Mr. Wright.*—Perhaps they have taken depreciation on the dens.

*President.*—Apart from that, there cost is higher.

*Mr. Wright.*—Perhaps there is a difference in crushing.

*Dr. Matthai.*—Rs. 8 they enter for crushing and mixing.

*President.*—Your estimate is rather nearer the mark than theirs. What is your total cost for fuel? I think the Sturtevant plant is worked by electricity.

*Mr. Wright.*—I think the whole of it is worked by electricity, but we haven't got electricity.

*Mr. Brodie.*—What are you going to do if you have that plant? You will have to do away with motors and you must have a steam engine. There is no reason why electricity should not be used if it is cheaper.

*Mr. Wright.*—No.

*Mr. Brodie.*—These people have taken electricity at As. 2-0 a unit.

*Mr. Wright.*—I haven't got here a complete estimate for the plant.

*President.*—The makers give an incredibly low figure for power. I am rather sceptical about the opinion of makers of machinery as to what it can do. This estimate of the plant that you have given in the last page, is that a Sturtevant plant?

*Mr. Wright.*—Yes, that is the whole thing.

*President.*—That is for a complete crusher and mixer. Does it include motors and everything?

*Mr. Wright.*—This is with no mechanical refinements. If I remember rightly, it is a complete Sturtevant plant. I shall confirm this by letter.

*President.*—You have given £6,250 for 10,000 ton plant. That is equal to about Rs. 83,000. That more or less corresponds with the estimates that these people have given including everything of Rs. 1,40,000 for 10,000 ton plant.

*Mr. Wright.*—Yes.

*President.*—Supposing you add 25 per cent. for freight and other charges, Rs. 40,000 for building, it would come to Rs. 1,40,000.

*Mr. Wright.*—Yes, it would be much the same.

*President.*—Is Rs. 1,40,000 a recent quotation?

*Mr. Wright.*—About a year or two old.

*President.*—I have seen the American costs. They reckon about \$2 a ton for a 100,000 ton plant.

*Mr. Wright.*—We took the cost of the plant at Rs. 1,50,000.

*President.*—That is near enough.

*Mr. Wright.*—That is of course without the acid plant.

*President.*—Is it to produce 18 per cent. of superphosphate?

*Mr. Wright.*—Yes.

*President.*—They call it 18/20 per cent. But when it is sold do they calculate on the 18 or 20 per cent. basis?

*Mr. Wright.*—Out here we simply guarantee that it is not below 18 per cent. When you buy at home you buy on the 18 per cent. basis and pay something extra if it is 20 per cent.

*President.*—When they say 18/20 per cent. what do they mean?

*Mr. Brodie.*—On the basis we are assuming we can take it to be about 18 per cent. I have worked it out at 19.3 per cent. of which you can allow one per cent. as insoluble.

*President.*—You will calculate on the 18 per cent. and if by any chance it contains 20 per cent. you will be paid something extra for the two per cent.

*Mr. Wright.*—But it cannot be sold like that to the ryot. You will have to give him a fixed price.

*President.*—We have to compare your fair selling price with the import price. You suggest that we should take 18 per cent. when they say 18/20 per cent. Is that right?

*Mr. Wright.*—Yes.

*President.*—It makes a difference of Rs. 7 or Rs. 8.

#### *Packing.*

*Dr. Matthai.*—Another item in which they differ is packing. Your double gunnies cost you Rs. 8-12-0, whereas they give only Rs. 5 for packing.

*President.*—What I want to know is this. When they sell superphosphates in Europe, do they have these gunnies or is it sold in bulk or naked or what? It is rather an important point.

*Mr. Wright.*—I think that it is sold to the consumers direct in single gunnies. I don't think that it is necessary to pack it in double gunnies when selling it straight to the consumer.

*President.*—I think so too. As a matter of fact just now if you take the sulphate of ammonia, I think that the Steel Company has only single bags when it sends it direct to the consumer.

*Mr. Wright.*—Yes.

*President.*—But when it has to be kept in depôts, then it is in double bags. In Europe also I take it that ordinarily it would be in single bags.

*Mr. Wright.*—Yes. We ordinarily send it in single bags when sending it direct to the consumer.

*Dr. Matthai.*—Imports come in single bags and then are put in double gunnies, are they not? Or generally how is it done?

*Mr. Wright.*—In double bags.

*President.*—I was told almost invariably they rebag it.

*Mr. Wright.*—Yes. They take the outer gunny off if it is bad.

*President.*—Do they take it off?

*Mr. Wright.*—Yes, and then put on a new gunny.

*Mr. Mathias.*—It requires three gunnies then.

*Mr. Wright.*—Sometimes it comes to four. Generally you get service out of one when there are two bags. What we do in actual practice is we

do not rebag any more than we can possibly help at the port of entry. We send that to our works. So much of superphosphate is used in Madras which is not rebagged.

*Mr. Mathias.*—You import superphosphates, do you?

*Mr. Wright.*—Yes.

*President.*—When it comes, you sometimes have to rebag it.

*Mr. Wright.*—Yes, a certain percentage of it on the wharf.

*Dr. Matthai.*—Roughly what percentage of it do you rebag?

*Mr. Wright.*—I am afraid I cannot tell you off-hand.

*President.*—It is such a substantial percentage of the f.o.b. price. The f.o.b. price given to us by Messrs. Shaw Wallace is £2-13-6; that is in double bags.

*Mr. Wright.*—The manufacturers in this country have a great advantage.

*President.*—That is what we are trying to assess. One man whom I examined told me that it was the invariable practice to rebag it.

*Mr. Wright.*—The whole lot?

*President.*—Yes. What I want to know is: is it necessary to rebag the whole thing and double bag it?

*Mr. Wright.*—He was probably looking at it from the point of view of importing superphosphate and sending it to depôts in which case it will probably be necessary to rebag the whole lot.

*President.*—If we take that into account, you get a tremendous advantage.

*Mr. Wright.*—Yes.

*President.*—I think that we must assume for the time being that they rebag the whole lot.

*Dr. Matthai.*—It is perfectly true that the fertilisers which they send to depôts would be rebagged, but where they are able to send them straight from the ship to the consumer?

*President.*—It is only very, very little that they will be able to send direct to the consumer.

*Mr. Mathias.*—Even then some percentage will require rebagging.

*Dr. Matthai.*—Instead of taking the rebagging cost on the whole lot we must knock off a certain proportion.

*President.*—Superphosphate will come in large quantities. Either they have got to store it in godowns at the ports or they have got to store it in upcountry markets. It will be very seldom that they will be able to send direct consignments *ex-wharf* because it is sold in small quantities.

*Dr. Matthai.*—Supposing there is a fair increase in the consumption, it might make a difference.

*Mr. Mathias.*—Even then they will have to send it to upcountry depôts. Supposing they take it to the United Provinces, they would have depôts there from which the agriculturists would draw their supplies. It could not be sent straight from the wharf to the ryot.

*Dr. Matthai.*—Otherwise you allow Rs. 15 on the import price.

*President.*—Rs. 7-8-0 is included in the f.o.b.

*Dr. Matthai.*—Then you have to add another Rs. 7-8-0.

#### *Seasonal demand.*

*President.*—Yes. Can you tell me what is the season for the use of superphosphate. There is a seasonal demand for manures.

*Mr. Wright.*—Yes.

*President.*—What do you reckon is the season?

*Mr. Wright.*—Just before the monsoon.

*President.*—And then right through the monsoon?

*Mr. Wright.*—I don't think that very much is put down during the monsoon.

*Mr. Mathias.*—At the time of preparing the ground for the next crop after the reaping of the first and before the sowing of the next.

*Mr. Wright.*—Yes.

*President.*—You will have to manufacture superphosphate and keep it. In that case, there might be deterioration.

*Mr. Wright.*—I don't think that there would be deterioration if you keep it in a dry place. There are two monsoons—South West and North East—and manuring takes place at different times.

*President.*—I just wish to know what would be the times in Madras because Madras has taken to it.

*Mr. Wright.*—I can give you the percentage month by month.

*President.*—Can you let me have it very soon?

*Mr. Wright.*—I shall send it to you.

*President.*—As regards the rest of India, it would be a very short season.

*Mr. Wright.*—I have no knowledge of the rest of India.

*Mr. Mathias.*—In the United Provinces and in the Central Provinces the season for manuring would be from April to the middle of June.

*President.*—In temperate climates they have two seasons. Can you keep superphosphates in stock for six months?

*Mr. Wright.*—Yes.

*President.*—Without deterioration?

*Mr. Wright.*—Yes, without deterioration. You can even keep it longer in a dry climate in dry godowns.

*President.*—That is to say you will probably have to construct special godowns for superphosphates in that case.

*Mr. Wright.*—An ordinary rain proof dry godown would do.

*President.*—What about the atmospheric moisture?

*Mr. Wright.*—That would not affect it much.

*President.*—Supposing you had a plant for 10,000 tons, you will have to manufacture and keep it to be ready in time for June. For the next two months you can go on manufacturing for sale, but for the third month, you will have to manufacture and keep it. You will have 3 months' sale in the season. And for nine months you will have to either close down or accumulate your stock.

*Mr. Wright.*—I shall send you the figures. I think that we are selling superphosphates for about 7 months of the year but I will get you the exact figures.

*President.*—The Board would be obliged if you could send those figures.

*Mr. Wright.*—I will also let you know from experience for how long we can store it.

*President.*—What it really means is that you have to have your capital on seven or eight months turnover locked up.

*Mr. Wright.*—I think that we would keep the plant working continuously.

*President.*—Can you?

*Mr. Wright.*—I think so.

*President.*—Would you be able to dispose of your superphosphates?

*Mr. Wright.*—Yes, as long as the market runs for seven or eight months of the year.

*Mr. Mathias.*—When do the tea gardens take their superphosphate?

*Mr. Wright.*—It depends on the season, whether they are buying a fertiliser to dig in or apply as a top dressing.



*Mr. Mathias.*—Do they use it fairly constantly?

*Mr. Wright.*—They almost all manure at the same time. It depends when they get the rainfall. Take sugarcane. If we grow it ourselves, we manure the crop three times. We manure at the time of preparation of the land, then at a certain stage after the cane has germinated and then we put in a stimulant later on.

*Mr. Mathias.*—Although for a particular crop the demand might be at one particular point in the year—April to May, considering other crops, the demand would be spread over the year.

*Mr. Wright.*—Yes.

*Mr. Mathias.*—So that it is possible that your sale of superphosphates for other crops would keep you going throughout the year.

*Mr. Wright.*—I think it would.

*Mr. Mathias.*—I suppose your price of superphosphate is regulated by the price of imported superphosphate.

*Mr. Wright.*—Yes.

*Prospects of Indian manufacturer.*

*President.*—It does seem to me that you ought to do well if you had a large plant in the country for superphosphates, and I want your opinion on that. We have got the f.o.b. price. That price is considerably lower than the price at which they sell at home. I find that the price at home is £3 per ton f.o.r. works.

*Mr. Wright.*—Yes.

*President.*—That means you must add 5 shillings to bring it to the ship. Then they do not have double bagging there. So it is clear that the export price is considerably lower than the home price, but we must take the export price. Having taken the export price, you find that first of all there is the advantage of the freight which has been given as 22/6.

*Mr. Wright.*—That is for importing home superphosphates into India.

*President.*—Yes. I am trying to find out whether you agree with me or not. Twenty two shillings and six pence is equal to about Rs. 15.

*Mr. Wright.*—You are taking the cost *ex-works* at £2-13-6.

*President.*—That is the f.o.b. price. Then you have to add 22/6 for freight, that is Rs. 15. Then we are given Rs. 5 as the landing charges, that makes it Rs. 20. Then we are given as Rs. 7-8-0 as the rebagging charges.

*Mr. Wright.*—Yes.

*President.*—Then, we are given one rupee for wastage.

*Mr. Wright.*—Our actual figure for wastage is Rs. 1-4-9.

*President.*—At present the Indo-Agri are charging Rs. 7-8-0 per ton for re-bagging. We have got to consider whether as much as this is required. Then they give Rs. 7-8-0 for commission which is much more than we find in any other importing business. Rs. 2-8-0 would be nearer the thing if there was competition.

*Mr. Wright.*—Rs. 7-8-0 has got to cover all their overhead and all their selling charges.

*President.*—Then they have got sub-agencies; that is added. That Rs. 7-8-0 would include locked up capital; that I agree.

*Mr. Wright.*—Yes, and all their propaganda expenses.

*President.*—No. They calculate Rs. 5 to upcountry markets. No superphosphate is sold at the ports. They allow Rs. 5 to upcountry markets. They allow Rs. 3-2-0 commission to the sub-agent and Rs. 2 for propaganda. We leave that out for the moment because you may have to do the same. Supposing we cut this commission down even to Rs. 2-8-0, that gives you an advantage of Rs. 31 per ton, which is nearly 80 per cent. of the f.o.b. price. Whatever your disadvantage in the making of sulphuric acid, that

disadvantage so far as the price of sulphur is concerned is not really large because I find that the c.i.f. price of sulphur in England is £6-5-0 which is the same as here.

*Mr. Wright.*—Yes, but they don't usually use sulphur in England.

*President.*—They use pyrites but the price of sulphur would be so regulated that it could compete with pyrites.

*Mr. Wright.*—I think they can actually produce sulphuric acid at home at somewhere about £2 a ton.

*President.*—That is for 65 per cent. acid your works cost is Rs. 60; take two-thirds of that Rs. 40 on a small plant. Then you add Rs. 15 for your profit and other things; that gives you Rs. 55. But they don't sell at £2. It is quite possible that £2 is their works cost for 65 per cent. It would at least make £3 if you added all the charges.

*Mr. Wright.*—Yes.

*President.*—You use about half a ton of this acid so your disadvantage would be about Rs. 5 or Rs. 7.

*Mr. Wright.*—Yes.

*President.*—This brings this c.i.f. landed price of superphosphate to about Rs. 66 a ton.

*Mr. Wright.*—Yes, including re-bagging and the commission of Rs. 2-8-0.

*President.*—If you give them full commission it will come to Rs. 71 and in the upcountry market it would be Rs. 76 or Rs. 77 because of the sub-agents' commission and propaganda.

*Mr. Wright.*—Yes.

*President.*—So you ought to be able to sell your superphosphate f.o.r. works at Rs. 66 in order to be able to compete.

*Mr. Wright.*—Yes.

*President.*—That you can only do if you bring down the cost of sulphuric acid and have a big plant for the manufacture of superphosphates.

*Mr. Wright.*—Yes.

*President.*—Your present estimate is Rs. 61-14-0. Even on these figures you are near enough.

*Mr. Wright.*—On page 4 of our figures working on the main plant, correcting the cost of phosphate, the cost at Ranipet comes to Rs. 62, without any margin at all.

*Dr. Matthai.*—That is taking double gunnies?

*Mr. Wright.*—Yes. Reducing it we might say Rs. 60. Then there is depreciation on Rs. 5 lakhs; the income-tax people allow 7½ per cent. on chemical works plant. We would require something like Rs. 15 I think.

*President.*—The cost of your acid is a little too high I think.

*Mr. Brodie.*—The cost of the acid differs a lot from our figures owing to the large amount of nitric acid used.

*President.*—There is a lot of fuel also.

*Mr. Brodie.*—For nitric acid they have got Rs. 7-12-4, a difference of Rs. 5. On 4,000 tons production I reckon nitre at .01 ton. Do you use nitric acid as such here?

*Mr. Wright.*—No. We use nitrate of soda.

*Mr. Brodie.*—We are taking the price of nitrate of soda as Rs. 180.

*Mr. Wright.*—Slightly less, about Rs. 176.

*Mr. Brodie.*—Say Rs. 7-8 at Rs. 180 a ton, that is .04 tons roughly, 4 per cent. of your output of sulphuric acid, a figure that I cannot find in any reference book.

*Mr. Wright.*—Does not Lunge give 3-7 per cent. as the best practice; that is, on 100 tons of sulphur you burn 3-7 tons of nitrate of soda.

*Mr. Brodie.*—That will come nearer my figure.

*Mr. Wright.*—That is supposed to be the best theoretical working. Out here we consider anything in the neighbourhood of 5 per cent. as good. That is the best we have done.

*Mr. Brodie.*—5 per cent. per ton of sulphur?

*Mr. Wright.*—Yes.

*Mr. Brodie.*—Even so we come to less than this. How much sulphur are you reckoning here. You have got Rs. 39.

*Mr. Wright.*—I have got some actual production figures here for chamber acid—316 tons 9 cwts. of sulphur, 5 tons 14 cwts of nitrate of soda producing 1,048 tons  $H_2SO_4$ .

*Mr. Brodie.*—What is the price of your sulphur?

*Mr. Wright.*—I can send you all these figures, and give you our actual technical results in both sulphur and nitrate of soda in a year.

*Mr. Brodie.*—You are using towers I suppose?

*Mr. Wright.*—Yes. We can give you these actual figures and we might ask our consulting chemist to note on that cost of Rs. 7-12-0. Does sulphur agree with those of other people?

*Mr. Brodie.*—It is just about the same.

#### *Compound fertilisers.*

*President.*—We have heard that there is this compound chemical fertiliser which has come into vogue. As far as we can see by the production of sulphate of ammonia and superphosphates, they have not been affected by the new chemical fertilisers.

*Mr. Wright.*—No.

*President.*—Last year there was an increase of more than a million tons of sulphate of ammonia, and superphosphates have been increasing also. But supposing it happened that eventually this chemical fertiliser was found to be more convenient because they would contain both nitrogen and phosphoric acid, and supposing we recommended a bounty on superphosphates based on the phosphoric acid content, there would be nothing to prevent anybody else from making the compound fertiliser in India and claiming the bounty on the phosphoric acid content of that. Do you see any objection to his claiming it? It would be a step in the right direction because whatever happens afterwards India would be sure of its supplies of superphosphate. We are assuming that there will always be a demand for a certain quantity of superphosphates by themselves.

*Mr. Wright.*—I think there will be, when you say that the world demand for superphosphate has gone on increasing in spite of the manufacture of these compound fertilisers. I don't think it applies here locally, because we have got to increase the demand for fertilisers and we aim at increasing the demand for superphosphates, this demand does not exist to any extent now. But if very powerful companies are going to spend a lot of money on propaganda for introducing these compound fertilisers the demand for superphosphates would not increase. To take specific figures roughly I think last year Messrs. Shaw Wallace and Company and the Imperial Chemical Industries each imported into Southern India something like 2,000 tons each, say 4,000 tons and we imported or manufactured 1,500 tons; then Messrs. Pierce Leslie and Company you can put down at 500 tons or more; for Stanes and Company you can put down another 200 tons at least. All these and our own purchases and sales of superphosphates were mostly used in mixtures.

*President.*—That is to say mechanical mixtures.

*Mr. Wright.*—Part of these mixtures go into the planting districts, so that they don't come into the argument at all. What it boils down to is that the four thousand tons is pushed on to the market by people who make compound fertilisers.

*President.*—There is no objection to the compound fertilisers being manufactured here.

*Mr. Wright.*—None at all.

*President.*—You have got the by-product sulphate of ammonia already in the country.

*Mr. Wright.*—Yes.

*President.*—Either you may import rock phosphate or superphosphate and therefore it may be advisable taking the larger view that while superphosphates may be assisted to a certain extent as such, there should also be simultaneously some encouragement to the production of the compound fertilisers on the footing that it contains also phosphoric acid.

*Mr. Wright.*—Yes.

*President.*—I put it this way that the manufacturer of superphosphate gets so much bounty per unit of phosphoric acid while the manufacturer of the compound fertiliser also gets the same bounty on the phosphoric contents of his compound fertilisers.

*Mr. Wright.*—Yes.

*President.*—Do you think that is a way of getting over the difficulty for the future?

*Mr. Wright.*—As far as I know the manufacture of these compound fertilisers is quite a different proposition from making a mechanical mixture of sulphate of ammonia and superphosphate, and the plant required is gigantic. The capital required to starting a factory for manufacturing compound fertilisers would be enormous in this country.

*President.*—That is what the Imperial Chemicals (India), Limited, say, but I don't say that that has been followed by other countries.

*Mr. Wright.*—I certainly think in the interests of this country that you should give the bounty on both, but whether it will have the desired effect, one cannot tell.

*President.*—That of course one can't tell. We are immediately concerned with superphosphates. There is room for a certain quantity of superphosphates whatever compound fertilisers you may have. But there is a big superphosphate industry in the world just now as also the sulphate of ammonia industry. They will make an effect before they allow themselves to be destroyed by the compound fertiliser.

*Mr. Wright.*—Yes.

*President.*—And therefore the price of sulphate of ammonia and the superphosphates will go down gradually in competition against this and to that extent it may be of advantage to have superphosphates in the country.

*Mr. Wright.*—Yes.

*President.*—Because the more the price of sulphate of ammonia goes down and the more the price of superphosphate goes down, the more the price of other compound fertiliser has to go down and we have no evidence that they will be able to reduce the price of the compound fertiliser so much that it will really be cheaper.

*Mr. Wright.*—My point is in the immediate future the development by these large Corporations of the sale of compound fertilisers may diminish the sales at once of superphosphate in Southern India.

*President.*—Therefore it would be better for us to guard ourselves by saying that the manufacture of the compound fertiliser also should be assisted.

*Mr. Wright.*—Yes. I think that is most likely to be the effect of these big Corporations adopting the compound fertilisers. They will be pushing them and the sales of superphosphates will go down. This doesn't encourage anybody here even with a bounty to put up a big plant for the manufacture of superphosphate. This is a possible outcome.

*President.*—So far we have no figures to suggest what is going to happen.

*Mr. Wright.*—No, it is all hypothetical.

*Mr. Mathias.*—There will always be a demand for a decent sized factory manufacturing superphosphates.

*Mr. Wright.*—I think so.

*Mr. Mathias.*—Probably for about 10,000 tons superphosphate.

*Mr. Wright.*—Possibly all over South India. One central factory will really displace all the stuff that is coming out from home.

*President.*—Is this not the position that the Imperial Chemicals are carrying on propaganda through Nitrams? At present Imperial Chemicals do not manufacture superphosphate.

*Mr. Wright.*—No.

*President.*—They don't manufacture any compound fertilisers at present on a large scale. They contemplate doing that. Therefore naturally their propaganda takes that form.

*Mr. Wright.*—You have got to go further back than that. Imperial Chemicals want to sell sulphate of ammonia at the present moment. They are really interested in sulphate of ammonia.

*President.*—They are advocating the use of compound fertiliser.

*Mr. Wright.*—They have found that in this part of the world they don't get results from the sulphate of ammonia alone.

*Mr. Mathias.*—If they are going to sell sulphate of ammonia as such, they will always sell a certain proportion of superphosphate.

*Mr. Wright.*—Their intention I believe is not to sell sulphate of ammonia as a simple fertiliser, but as a compound fertiliser with phosphoric acid introduced.

**MESSRS. BRUNNER, MOND AND COMPANY (INDIA), LIMITED.**

**Oral Evidence of Mr. R. M. HUGHES recorded at Bombay on  
Thursday the 13th December, 1923.**

*Preliminary.*

*President.*—We are very much obliged to you for having come down all the way from Calcutta to assist us in this enquiry. We felt that we should examine you on some of the points that arise in the enquiry, because allegations have been made by these applicants and it would be to your advantage to come forward and state your case.

*Mr. Hughes.*—Yes.

*President.*—You are the Chairman of Messrs. Brunner, Mond and Company (India), Limited.

*Mr. Hughes.*—Yes.

*President.*—That is one of the daughter companies of the Imperial Chemical Industries.

*Mr. Hughes.*—Yes. As a Subsidiary Company of Brunner Mond & Co., Ltd.

*President.*—This is a Rupee Company, I suppose.

*Mr. Hughes.*—Yes. As I said in my letter the shares are mainly held by Brunner Mond & Co., Ltd.

*President.*—It is simply a means of dealing with the Indian market.

*Mr. Hughes.*—Yes. It was formed with the idea of decentralising control. Brunner, Mond's business was too big and they created a series of foreign Companies, each one of which is responsible for its market. There is a Company in China, Japan, Australia, South America and India.

*Dr. Matthai.*—When was this Messrs. Brunner, Mond and Company (India) Limited formed?

*Mr. Hughes.*—At the beginning of 1923.

*President.*—Is this part of Brunner Mond's (England) ?

*Mr. Hughes.*—They are the main shareholders. Brunner, Mond and Company are one of the constituent Companies of Imperial Chemical Industries, i.e., one of the merging companies.

*President.*—I take it that Imperial Chemical Industries would hold the controlling interest in Brunner, Mond's.

*Mr. Hughes.*—It holds practically all Brunner, Mond's shares.

*President.*—But the difference is that Imperial Chemical Industries is a Public Company. And that Brunner, Mond is a private Company.

*Mr. Hughes.*—Brunner, Mond and Company is a public Company and Messrs. Brunner, Mond and Company (India), Limited is a private Company.

*President.*—Brunner, Mond and Company, Limited is still a public Company. Imperial Chemical Industries hold practically all the shares.

*Mr. Hughes.*—The Company is still kept alive as a manufacturing Company.

*President.*—But they would only share the dividends earned by Imperial Chemicals.

*Mr. Hughes.*—Imperial Chemical Industries would get dividends according to the shares held. The shareholders of Brunner, Mond's were in invited to exchange their shares for shares in Imperial Chemical Industries. It was the same with the United Alkali Company, Nobel Industries Limited and British Dyestuffs Corporation.

*President.*—We really want to study something about Imperial Chemical Industries. Is there any literature on the subject which would explain its objects, its policy, its financial conditions and so on?

*Mr. Hughes.*—There is no literature on the subject.

*President.*—There must be prospectuses.

*Mr. Hughes.*—I haven't any available here.

*President.*—Could you get them for us?

*Mr. Hughes.*—I think I could get hold of the circular letter that was sent by the Chairmen of the four merging Companies to their respective shareholders.

*President.*—Of course there would be annual statement of accounts, balance sheet and things like that officially published and the Chairman's speech.

*Mr. Hughes.*—Yes, but we haven't got them here.

*President.*—We have read extracts in the papers, but the best thing would be to get the original circular letters and the statement of accounts with the Chairman's speech which are usually printed. We have got these special numbers of the *Times Trade Supplement* but, really there may be statements that may not be quite accurate for our purpose. It is much better for us to get the statements officially made by the Chairmen of the Companies themselves.

*Mr. Hughes.*—I can write for them.

*Dr. Matthai.*—I expect that Imperial Chemical Industries are represented in India entirely by Messrs. Brunner, Mond and Company.

*Mr. Hughes.*—We buy their products. We are the marketing Company in India. We do not actually represent them in the sense that we are agents in any shape or form.

*Dr. Matthai.*—At any rate all the sales of their products are done by you in India.

*Mr. Hughes.*—Not entirely. They have still got agents for different products which we have not yet touched.

*President.*—What about the other Company like Nitram Limited?

*Mr. Hughes.*—We are joint agents for Nitram with Messrs. Shaw Wallace and Company.

*President.*—And also for the Federation?

*Mr. Hughes.*—Nitram, Limited is a Company which was created to attend to the sale of sulphate of ammonia and propaganda in connection with sulphate of ammonia on behalf of the British Sulphate of ammonia Federation. Nitram, Limited is a non-profit making Company.

*President.*—That is purely for propaganda purposes to carry on their sales.

*Mr. Hughes.*—Their sales in India are attended to by Messrs. Shaw Wallace and Company and ourselves as joint agents.

*President.*—Have you divided the market amongst Shaw Wallace and yourself?

*Mr. Hughes.*—We have equal status in the market. We sell at the same price.

*President.*—We may examine you instead of asking Messrs. Shaw Wallace and Company to appear and give evidence.

*Mr. Hughes.*—Just as you please.

*Sulphate of Ammonia.*

*President.*—As regards sulphate of ammonia do you purchase all the sulphate of ammonia produced in the country or do you take it over for sale?

*Mr. Hughes.*—The Indian producers are members of the British Sulphate of Ammonia Federation and on behalf of Nitram, Limited we and Shaw Wallace and Company attend to sales for a commission.

*President.*—But the prices are fixed by Nitram.

*Mr. Hughes.*—Yes.

*President.*—I understand that the prices ordinarily are a sort of world price.

*Mr. Hughes.*—They are fixed on the world price of sulphate of ammonia.

*President.*—That is to say so far as India is concerned, the price would approximate to the import price from the United Kingdom.

*Mr. Hughes.*—Yes. It is based on the prices quoted by Germany, America and Great Britain. These constitute the world price.

*President.*—Is there any serious competition in sulphate of ammonia between Germany and yourself?

*Mr. Hughes.*—They have not to my knowledge interfered as direct sellers in this market, but importers in India have imported from Germany and the United States. There is no German organisation actually selling sulphate of ammonia in this country.

*President.*—But that I suppose they would sell more or less at your prices.

*Mr. Hughes.*—Supplies can sometimes be obtained at a slightly lower price. To the world price fixed by Nitram must be added selling commission and if supplies can be obtained from other sources this commission might be obviated.

*President.*—Is there larger export of sulphate of ammonia from Germany?

*Mr. Hughes.*—Occasionally there is some but not very much. Lots are coming from America into Calcutta.

*President.*—I take it this is very largely the coke oven product from Germany.

*Mr. Hughes.*—Very little comes from Germany. What competition there is, is mainly from the United States and that may be either coke oven or synthetic.

*President.*—What is your production chiefly?

*Mr. Hughes.*—Synthetic, but the Indian production is coke oven.

*President.*—What I was suggesting is that Germany doesn't make very much coke oven product.

*Mr. Hughes.*—They were the leaders in the synthetic production.

*President.*—But even so there is apparently not so much competition in the synthetic production of sulphate of ammonia so far as these markets are concerned anyhow.

*Mr. Hughes.*—We have not come across much competition.

*Dr. Matthai.*—Practically all sulphate of ammonia imported now into India from the United Kingdom is synthetic ammonia.

*Mr. Hughes.*—Yes, but then it would not be imported in India were making more.

*Dr. Matthai.*—I notice that the imports are steadily going up.

*Mr. Hughes.*—Yes, because of the breakdown of Tatas. Owing to the prolonged strike at Tatas Works, we had to get supplies from home.

*Dr. Matthai.*—We had a statement from Messrs. Shaw Wallace and Company yesterday giving us figures of imports and I notice that in 1928 up to



October, the imports came to nearly 13,000 tons which is the annual average for the four previous years.

*Mr. Hughes.*—Was there as much as that imported from the United Kingdom in previous years?

*Dr. Matthai.*—They have given the total imports. That shows a very considerable increase.

*Mr. Hughes.*—It is entirely due to the prolonged strike at Tatas. Who are the principal Indian producers.

*President.*—Under this arrangement I take it Java is a very fairly big consumer of synthetic sulphate of ammonia.

*Mr. Hughes.*—It is.

*President.*—It may happen in this way that you may find it more economical to export sulphate of ammonia from India to Java.

*Mr. Hughes.*—Sulphate of ammonia is being exported from India because India has not been able to consume everything it produces. Whatever is left over is sent to Ceylon, Japan and Java on the instructions of Nitram and before Nitram, the British Sulphate of Ammonia Federation.

*Dr. Matthai.*—At present the position is that all the Indian production is consumed in the country.

*Mr. Hughes.*—It is just reaching that stage.

*President.*—At present what is the immediate interest of the Nitram in sulphate of ammonia? Does it simply control prices?

*Mr. Hughes.*—They aim at developing markets for fertilisers, principally sulphate of ammonia.

*President.*—I take it the idea is that eventually Nitram Limited would absorb that part of the market which the Indian sulphate of ammonia cannot supply.

*Mr. Hughes.*—Yes that is the idea.

*President.*—So that it is quite possible that eventually you may import sulphate of ammonia to India and export the Indian sulphate of ammonia to the nearer markets.

*Mr. Hughes.*—I do not think there would be any object in that. If India could take the entire output of Tatas, The Indian Iron and Steel Company, the Bengal Iron Company and other producers there would be no need to export sulphate of ammonia.

*President.*—What is the total Indian production?

*Mr. Hughes.*—I should say roughly 17,000 tons per annum.

*President.*—That is the production of India.

*Mr. Hughes.*—Yes.

*Dr. Matthai.*—The quantity produced in India in 1927 was 13,450. In 1927 the imports were roughly about 2,000, whereas in 1928 up to October, the local production in India was 12,600 and the imports about 13,000. That gives you a total consumption of about 25,000 tons.

*Mr. Hughes.*—That is not all consumed.

*Dr. Matthai.*—Roughly we might say that 25,000 tons is consumed in India, is that right?

*Mr. Hughes.*—I say that is too high a figure as a lot of sulphate of ammonia has gone into stock in depôts in districts where sales are being developed.

*Dr. Matthai.*—What roughly is your idea of the present consumption?

*Mr. Hughes.*—The present consumption I should put at 17,000 to 18,000 tons.

*President.*—When we were first enquiring into this, even Tatas had to export sulphate of ammonia.

*Mr. Hughes.*—Tatas would export sulphate of ammonia on the instructions of Nitram when their surplus production could not be consumed in India.

*President.*—It is only recently that India has been able to absorb the whole of the production.

*Mr. Hughes.*—We are just now reaching that stage.

*President.*—Is it largely due to your propaganda?

*Mr. Hughes.*—Yes. The tea gardens are very big consumers. They are an organised community and take a considerable quantity of sulphate of ammonia, but the rest of the business depends on real donkey work done amongst the ryots persuading them, and teaching them to use it by demonstrations.

*Dr. Matthai.*—Is the position improving as regards the ryots?

*Mr. Hughes.*—Yes, down in Southern India, but not to any great extent anywhere else. They use it for paddy and sugarcane.

*Dr. Matthai.*—Have they to use it with other fertilisers?

*Mr. Hughes.*—Not necessarily. It varies according to the soil. In Madras they use sulphate of ammonia and superphosphate. On this side they use very little superphosphate.

*Dr. Matthai.*—In Madras they use the combination for paddy.

*Mr. Hughes.*—Yes.

*Dr. Matthai.*—As far as Madras is concerned, can we take it that an increased consumption of sulphate of ammonia would mean also an increased consumption of superphosphates.

*Mr. Hughes.*—Yes at the moment.

*Dr. Matthai.*—Because the two things apparently go together.

*Mr. Hughes.*—Some people say that superphosphate is not necessary.

*Mr. Anstead, Director of Agriculture, Madras,* says that superphosphate is necessary. There is a conflict of views.

*President.*—Does Nitram import superphosphate as well?

*Mr. Hughes.*—Yes. It has to be purchased from Holland.

*President.*—Why don't you manufacture?

*Mr. Hughes.*—We are not manufacturers of anything.

*President.*—Do Imperial Chemicals Industries Limited manufacture?

*Mr. Hughes.*—They don't manufacture superphosphate.

*President.*—I remember to have read something very recently of a scheme for the production of superphosphates.

*Mr. Hughes.*—I have not heard of it. Holland is the main source of supply and they make it principally from Algerian rock phosphate, crushed and treated with sulphuric acid.

*President.*—May I take it at present at any rate Imperial Chemical Industries are not interested in superphosphates?

*Mr. Hughes.*—Not as manufacturers. Nitram buy on the Continent and ship at our request.

*President.*—If superphosphate is manufactured in India, then Nitram would be willing to market it.

*Mr. Hughes.*—Probably. None is being made except bone superphosphate which costs much more.

*President.*—As you know there is a lot of agitation about the export of bones from the country. It is quite possible that Government may take some steps by which bones could be utilised in the country.

*Mr. Hughes.*—Who is going to sell them or use them when they are not in demand.

*President.*—That is the point.

*Mr. Hughes.*—The ryot has not reached that stage.

*Dr. Matthai.*—But the two things hang together, don't you think, if you want to persuade people to use bone superphosphate, you have got to make it cheaper and if you want to make it cheaper, you have got to try and bring down the price of raw bones. If you allow the bones to be exported, the price of bones goes up.

*Mr. Hughes.*—Those buying the bones have to pay the Indian price plus the freight and all charges. There is no bone superphosphate coming to India to my knowledge.

*President.*—The whole point is that people have not learnt to use bone superphosphate.

*Mr. Hughes.*—Who is spending money to teach them the use of fertilisers Nitram! These factories talk very glibly about being able to make fertilisers, but it costs a lot of money to coax the Indian ryot to use them. It is not a question of going to him and saying that the stuff is good for the crops. We have to put down demonstration plots and prove to the ryot that it will benefit his crop and not spoil it and to do that in all parts of the country costs a lot of money.

*President.*—What we are considering is can these things be manufactured in the country or not?

*Mr. Hughes.*—They may be manufactured but not sold. It is an indefinite situation for the manufacturers.

*President.*—If we find that there is no market whatsoever for a thing that they can manufacture, we will say that it is no good manufacturing a thing which cannot be sold.

*Mr. Hughes.*—I suppose they will call upon the Government of India to sell the fertilisers for them or to compel the ryot take them.

*President.*—What would be the position of Nitram in case this country decided to manufacture superphosphates?

*Mr. Hughes.*—Bone superphosphates?

*President.*—Yes.

*Mr. Hughes.*—The position of Nitram would not be affected in any way. Superphosphate merely furnishes phosphoric acid whereas nitrogen is mainly required.

*President.*—We have made a beginning.

*Mr. Hughes.*—I know.

*President.*—I was looking at these figures. There are 200,000 tons of bones exported. That is a considerable quantity. As you know in the bone superphosphate the two things are bones and sulphuric acid chiefly.

*Mr. Hughes.*—Yes.

*President.*—Now there is a proposal to cheapen sulphuric acid by means of bounties or in other ways. If that is done, there is a reduction in the cost. The question then arises whether if costs are reduced there would be a sufficient market in the country to absorb these bones which are being exported and I want to have the benefit of your experience.

*Mr. Hughes.*—Do you honestly think that there are any great hopes of cheapening the price of sulphuric acid to such an extent that bone superphosphates could really be cheap to the cultivator?

*President.*—As you told me just now bone superphosphates at present are used in very small quantities. Messrs. Parry and Company are manufacturing.

*Mr. Hughes.*—They manufacture mainly for export.

*President.*—At what price do you think that bone superphosphate would sell in India?

*Mr. Hughes.*—I have no experience of it.

*President.*—At what price does the rock superphosphate sell?

*Mr. Hughes.*—Rs. 4-8-0 per cwt.

*President.*—How would the rock phosphate compare with the bone superphosphate?

*Mr. Hughes.*—It depends on the analysis. Superphosphate ordinarily used in this country contains about 18 to 20 per cent. phosphoric acid. But I do not know what the bone superphosphate contains. I am not a technical man.

*President.*—The whole point is this. If the fertilisers are to be marketed in India, from your point of view they should be under a single organisation judging by your own policy.

*Mr. Hughes.*—They need not be. There is another organisation called the Chilean Nitrate Committee. They are introducing nitrate of soda wherever they can.

*President.*—That competes more against sulphate of ammonia.

*Mr. Hughes.*—In certain respects it does; in other respects it does not. It is suitable for certain plants and for certain others it is not suitable. A lot of work has to be done by way of scientific experiments.

*President.*—They are going to have an Agricultural Research Council. One does not know what that Council is going to do. But in the meanwhile what are you doing by way of propaganda?

*Mr. Hughes.*—There is a propaganda Company in India called Fertiliser Propaganda of India, Limited. Of which we are the Secretaries. This is financed by Nitram.

*President.*—Its main function is to carry on propaganda.

*Mr. Hughes.*—Yes, in connection with fertilisers.

*President.*—Who supplies the funds?

*Mr. Hughes.*—Nitram, Limited.

*President.*—Can you tell me how much money they spend in a year?

*Mr. Hughes.*—From the rate at which they have been spending it will be about £45,000 a year. This year it will be about that.

*Dr. Matthai.*—When was this company started?

*Mr. Hughes.*—About 2½ years ago.

*Dr. Matthai.*—What kind of fertilisers have they in view? Is it mainly sulphate of ammonia?

*Mr. Hughes.*—From one point of view, it is. But they are willing to try out any form of fertilisers. They have a scientific expert named Mr. Hutchinson, who has a very great reputation.

*President.*—Have you got a laboratory?

*Mr. Hughes.*—We have not got a laboratory now, but we shall in due course have one.

*President.*—Did not the Company make a proposal to Government—I forget exactly what the proposal is?

*Mr. Hughes.*—I do not know the exact terms. I think it was Nitram, Limited, that made a proposal to Government.

*President.*—I have some recollection of it. As regards fertilisers, I take it that there are two things to be done. First of all, you want to educate the people generally to understand the use of fertilisers and secondly to make fertilisers suitable to the soil.

*Mr. Hughes.*—Yes, and the crop.

*President.*—The second part which is to make fertilisers that would suit the soil would require an enormous amount of research.

*Mr. Hughes.*—It does but one must generalise to a certain extent. If certain fertilisers are found to be suitable for certain soils and crops, one

must go on with them, but then the Agricultural Department is considering this question all the time.

*President.*—Are you in touch with all the Agricultural Departments?

*Mr. Hughes.*—Yes.

*President.*—Supposing you want to make a special fertiliser for a certain crop, do you approach the provincial agricultural advisers?

*Mr. Hughes.*—Yes, and experiments are carried out in experimental farms.

*President.*—Do you mean Government farms?

*Mr. Hughes.*—Yes. The Agricultural Departments want to make sure before they recommend any particular fertiliser that it will be profitable to the cultivator.

*President.*—The soil differs so much in India.

*Mr. Hughes.*—Yes, it may differ every hundred yards.

*President.*—Therefore it seems to me that it would take a very long time before you can prove that particular fertilisers generally speaking are good for different kinds of soil.

*Mr. Hughes.*—If you stick to pure science, it means that you would have to test every field, to analyse the soil of every field. That cannot be done: it is impossible.

*President.*—In a country where you have small holdings, it is not very easy. Even in America where they have got very large holdings, they find it difficult. It may be much easier there than here. What I want to know is: Have Nitram, Limited got a scheme by which they can steady the soil conditions and provide the kind of fertiliser required?

*Mr. Hughes.*—They have got a rough and ready soil tester. There is an apparatus by which they can make a very simple test of the soil to find out whether it is acid or alkaline, whatever the case may be. That is a rough and ready test, suitable for general purposes.

*President.*—Have Nitram, Limited, got figures to show how the consumption of fertilisers has been increasing? The import figures do not give us correct information.

*Mr. Hughes.*—They do not give you figures of consumption.

*President.*—The Fertiliser Propaganda of India, Limited, might have some figures.

*Mr. Hughes.*—They can give you figures regarding sulphate of ammonia, but not Chilean nitrate.

*President.*—Chilean nitrate comes in large quantities I think.

*Mr. Hughes.*—A lot of it may be lying in depôts.

*President.*—We suppose that it will be consumed. We only want to know how it is developed.

*Mr. Hughes.*—I can obtain these figures in respect of sulphate of ammonia.

*Dr. Matthai.*—Is there any kind of fertiliser for which you can give us figures?

*Mr. Hughes.*—Nothing reliable beyond sulphate of ammonia.

*President.*—You cannot give us any figures for superphosphate.

*Mr. Hughes.*—No.

*President.*—Is there any possibility of your being able to make a fairly reliable estimate of what sort of market is expected for superphosphate say in the next few years?

*Mr. Hughes.*—I was asked all sorts of questions like this in London last year but I declined to make an estimate because I know how fallacious the figures would be. Take Japan which is a much smaller country than India.

Japan is consuming about 600,000 tons of sulphate of ammonia annually. Approximately it makes half its own requirements and the rest has to be imported. India is a much more gigantic country and an agricultural country too. It only consumes about 17,000 tons annually.

*President.*—Supposing the demand for sulphate of ammonia has increased in the country there should be no difficulty in sulphate of ammonia being synthetically produced.

*Mr. Hughes.*—That I could not say.

*President.*—Has your Company investigated that?

*Mr. Hughes.*—No, because the market is not big enough to consider it. Imperial Chemical Industries have a plant which is producing now about 750 tons of sulphate of ammonia a day by the synthetic process.

*President.*—In the synthetic process, no question of natural advantage arises. But in the case of coke ovens, there is the question of limit. You must have raw materials available in the country.

*Mr. Hughes.*—Far more sulphate of ammonia is produced synthetically now than from coke ovens.

*President.*—What I am suggesting is that supposing the demand increases at a rapid rate in India, then there is a possibility of that being manufactured here instead of being imported.

*Mr. Hughes.*—Yes, when the market is big enough, I have not the slightest doubt that Imperial Chemical Industries will put up a factory in India.

*Dr. Matthai.*—As regards ammonia products, it is not a question of one country possessing any natural advantage over another. It is simply a question of the scale on which you are producing.

*Mr. Hughes.*—I should say so. But it depends I think on the cost of electric power.

*Dr. Matthai.*—The cost of power would depend on the quantity you are producing.

*President.*—The power will be much cheaper here than anywhere else, if it is produced from coal. That proposition of course has not been investigated. If the price of coal at the pitsmouth is 7s. 6d. against £1 in England it stands to reason that power will be cheaper here. It has been proved in the Steel Industry for instance.

*Mr. Hughes.*—It is no good putting up a gigantic plant unless you have a market.

*President.*—We are looking ahead.

*Mr. Hughes.*—The market has to be educated to take these products before anybody can consider the question of putting up a factory of a reasonable size.

*President.*—There is nothing in the way provided there is a market.

*Mr. Hughes.*—Nitrogen is obtained from the air. But I do not know about the other essentials.

*President.*—Anyhow we have got some evidence on that point from other people. Now there is a proposal to cheapen sulphuric acid.

*Mr. Hughes.*—To cheapen sulphuric acid?

*President.*—There is a proposal that a bounty should be given on the production of sulphuric acid. The point arises in this way. The Sulphate of Ammonia people produce sulphate of ammonia from coke ovens and they use a considerable quantity of sulphuric acid.

*Mr. Hughes.*—They are already getting a bounty on steel.

*President.*—There is no bounty on steel now. As your prices are world prices, we rather feel that if we give any bounty on the production of sulphuric acid which is used in the manufacture of sulphate of ammonia, it

simply increases the profits of steel makers, and the price of sulphate of ammonia is not cheapened.

*Mr. Hughes.*—Practically all the makers of sulphate of ammonia are in the Sulphate of Ammonia Federation. Here is a list showing the names of members (handed in).

*President.*—None of them has appeared before us except Tata's. At first sight it appears to me that we should exclude them. Supposing we accepted the principle of giving some bounty on the manufacture of sulphuric acid, no one would benefit except the manufacturer. The idea of giving a bounty on sulphuric acid is to cheapen the products in the manufacture of which sulphuric acid is used. But in the case of sulphate of ammonia, the bounty on sulphuric acid will not result in any lowering of price.

*Mr. Hughes.*—I suppose it would be very hard to differentiate.

*President.*—Not very hard. The idea is that if sulphuric acid is cheapened, other industries which use sulphuric acid will not require so much protection.

*Mr. Hughes.*—Sulphuric acid is being cheapened by competitive imports.

*President.*—Where?

*Mr. Hughes.*—Here in India.

*President.*—The point is rather this. At present the demand for sulphuric acid is not sufficient to make the use of large units economic.

*Mr. Hughes.*—Yes, I understand.

*President.*—Their point is that if the price of sulphuric acid is lowered, more sulphuric acid will be used in the production of other chemicals.

*Mr. Hughes.*—I cannot quite see how the price of sulphuric acid can be lowered under a protective tariff.

*President.*—We are examining it. Whether there is anything in it or not, we cannot say yet. If a bounty is given on the production of sulphuric acid, their case is that sulphuric acid will be cheaper than it is now and therefore all the products in the manufacture of which sulphuric acid enters on a large scale will be cheapened. This will enable them in course of time to produce cheap sulphuric acid without the help of bounty.

*Mr. Hughes.*—How will the bounty be derived—from the protective duty?

*President.*—That is Government's business. The bounty has to come from the general revenues. It does not matter from which source it comes. It does not necessarily follow that it must come from the same substance. In the case of steel, it so happened that, the bounty was given from the protective duty on steel.

*Mr. Hughes.*—It has already been pointed out that these two companies aim at making sulphuric acid as their main product.

*President.*—The idea is not to make it a main product, but an auxiliary product for the purpose of manufacturing other chemicals. That is their intention. In order to encourage that, their case is that until they have a unit of 8,000 tons a year of 100 per cent. sulphuric acid, they cannot produce sulphuric acid cheaply, and so they require protection until they are in a position to do so.

*Mr. Hughes.*—May I know at what price they are selling sulphuric acid now?

*Dr. Matthai.*—The prices vary such a lot. You give us a figure which strikes me as extraordinarily low. That comes to Rs. 105 a ton. What percentage of acid is it?

*Mr. Hughes.*—It is just commercial acid. I do not know what the percentage is.

*President.*—There is no question of their asking for any assistance as regards the sale of sulphuric acid as such. That is not the point at all. The assistance is required to make other products cheap.

*Dr. Matthai.*—One of the firms which have applied for protection has given us a figure of about Rs. 220 a ton in 1923 as their realised price for 1·84 sulphuric acid.

*President.*—That is the purest stuff.

*Mr. Hughes.*—The price I have mentioned is for commercial acid.

*Dr. Matthai.*—That is 1·7. Even that is considerably lower than this figure.

*Mr. Hughes.*—Prior to the selling arrangements between the two companies the imports of sulphuric and hydrochloric acids had practically ceased.

*President.*—So far as the three ports, Madras, Bombay and Calcutta are concerned, the imports are negligible.

*Mr. Hughes.*—The Madras manufacturers are quite satisfied.

*President.*—So is the case in Calcutta and in Bombay.

*Mr. Hughes.*—We had an enquiry from Madras asking us to obtain home quotations for sulphuric acid as they thought that the local price was high. We said that we were not interested in sulphuric acid. We knew very well that if we obtained the quotation, it would if favourable be used to lower the price in Madras.

*President.*—As regards the bounty on sulphuric acid, I think that it will be idle to give any bounty on sulphuric acid used in the manufacture of sulphate of ammonia so long as the price of sulphate of ammonia is the world price.

*Mr. Hughes.*—I should say so.

*President.*—You would not reduce the price of sulphate of ammonia in the country because bounty is being paid on sulphuric acid. It may be that if the price is lowered there will be more sulphate of ammonia sold in the country.

*Mr. Hughes.*—The price of sulphate of ammonia has been considerably lowered, during the last few years.

*President.*—What is the present price?

*Mr. Hughes.*—Rs. 160 per ton.

*Dr. Matthai.*—That is rather higher than last year's price, is it not?

*Mr. Hughes.*—No. It is lower than last year's price.

*Dr. Matthai.*—That corresponds to a price of £10 in England?

*Mr. Hughes.*—I should think so.

*President.*—It is good for these people to get Rs. 160, but obviously if sulphate of ammonia is sold at £10 people would use more than if they had to pay Rs. 160.

*Mr. Hughes.*—If it is £10 in England; there are freight, insurance and import charges to be added.

*President.*—The whole point is this. This world price is a very good thing for the manufacturer, but there is always this complaint here in this country that whenever an industry is protected, it does not get the benefit of the cheaper article. That is exactly what is happening in sulphate of ammonia.

*Mr. Hughes.*—You are suggesting that it might be made very much cheaper? You are now taking the point of view of the consumer and not of the manufacturer.

*President.*—What I am suggesting is that it should not be more expensive than it is in countries where they are produced. This price of Rs. 160 per ton is at any port?

*Mr. Hughes.*—Yes, because at this world price it can be placed at all the ports at more or less the same rate of freight.



*Dr. Matthai.*—If you are sending sulphate of ammonia to Cochin from Calcutta it has to be delivered at Rs. 160 a ton?

*Mr. Hughes.*—Yes. It can be obtained from America or Great Britain or Germany at that price.

*President.*—You send sulphate of ammonia by rail?

*Mr. Hughes.*—By rail and by sea.

*President.*—Is it treated at the same footing as manure?

*Mr. Hughes.*—Yes, it is charged under the special rate for manure; that is the lowest rate.

*President.*—What about the coastal steamers? Do they allow you a lower rate?

*Mr. Hughes.*—1/10th of a pie per maund per mile is the special rate allowed to us by the railways. As regards the freight rate on coastal steamers, I cannot say, because I have never come in contact with them. The transfer of stocks from Calcutta to other ports is done by Messrs. Shaw Wallace and Company for the British Sulphate of Ammonia Federation. They look after the Indian supplies.

*President.*—We are examining this question of freight and it is rather important for us to know where the markets are from the ports. At the ports nobody would use sulphate of ammonia; it must go into the interior and, therefore, we would like to know the principal markets in which this would be sold so that we can determine the burden thrown on the consumer.

*Mr. Hughes.*—The principal market for sulphate of ammonia is the tea gardens in Assam.

*President.*—Does it go by rail?

*Mr. Hughes.*—It goes mostly by boat.

*President.*—What about the sugarcane people; do they use it?

*Mr. Hughes.*—Yes.

*President.*—Where?

*Mr. Hughes.*—It is used for sugarcane in the Poona and Sholapur Districts as well as in other parts of India.

*President.*—Do you rail it all the way from Calcutta?

*Mr. Hughes.*—It is railed from Tatanagar to Poona. There is a special rate from Tatanagar to Poona.

*President.*—That would be one-tenth of a pie, I take it?

*Mr. Hughes.*—We have a special rate.

*President.*—It would be partly Great Indian Peninsula Railway and partly Bengal Nagpur?

*Mr. Hughes.*—Yes.

*President.*—We are examining both. Do you think if the freight is cheapened it would help the use of sulphate of ammonia?

*Mr. Hughes.*—I rather think it is about as cheap as we could reasonably expect.

*President.*—I don't think you are interested in any of these chemicals that we are enquiring into?

*Mr. Hughes.*—None except sodium sulphide.

*President.*—I take it Imperial Chemicals Industries manufacture all these chemicals?

*Mr. Hughes.*—They make the acids, principally for their own use but do not export them to India. If they did we would buy from them.

*Dr. Matthai.*—These other chemicals that you occasionally import into India, you buy from somebody in the open market, that is to say these might be people not concerned with Imperial Chemical Industries?

*Mr. Hughes.*—Exactly. They are not concerned in the least with Imperial Chemicals.

*President.*—Are there imports from the United Kingdom?

*Mr. Hughes.*—Alum is made by Messrs. Peter Spence Limited. They are not connected in any way with Imperial Chemicals.

*President.*—Except sodium sulphide there is no chemical in which you are interested?

*Mr. Hughes.*—That is so.

*Dr. Matthai.*—I suppose your main interest is alkalies.

*Mr. Hughes.*—Yes, and dyes.

*President.*—You import sodium sulphide?

*Mr. Hughes.*—Yes.

*President.*—Does your company quote a c.i.f. price?

*Mr. Hughes.*—We buy from Imperial Chemicals at their price and on the top of that we have to make our own profit.

*President.*—We would like to know how this price is fixed.

*Mr. Hughes.*—It is fixed by competition. Germany, Great Britain, Japan are all participating in the sodium sulphide trade. One steals a march over the other and the price goes down.

*President.*—Therefore it would not be correct to take the price at home and calculate.

*Mr. Hughes.*—I think that would give you a higher basis.

*President.*—That is precisely these people's point that you under-sell them in this country because you get a higher price at home. I am not quarrelling with the system but it is a little difficult for the younger companies. They argue in this way, that they cannot be expected to sell an article at a lower price than that at which it is sold in the country of manufacture, and what is the answer to that? After all if you have an industry in your own country, the people of the country are entitled to say "we must get the thing as cheap as possible", but the reverse is the case. When you tell a young industry in India that you must compete at prices at which the goods are imported into the country, their answer is "these are not the prices in your own country: look at the prices at which you sell in your own country. If we can manufacture these articles and sell them at the price at which you do at home we would be just as well off as you are". What is your answer to that? The whole question arises like this. You say that the prices must be low, the quantities must be available, and the quality must be good. They say "very well, but why should we accept a smaller price than you do in your own country"?

*Mr. Hughes.*—The local manufacturers have nothing to do with it. In fact they have never been thought of.

*President.*—But there is competition from other countries. The whole point is this. Government has laid down certain principles as regards the question of protection. One of the conditions is that the industry must ultimately be able to do without protection, that is to say it must be able to sell in the world market at world price, but they say they cannot do it because—

*Mr. Hughes.*—They are not equipped to do it.

*President.*—Even if they are equipped. Their answer is that they can sell at a price at which you sell at home but not at a price at which you sell in this country.

*Mr. Hughes.*—That depends on the cost of manufacture.

*President.*—Obviously not. Whereas at home you charge a higher price, you charge a lower price here. It is obvious that the price is not determined by the costs. Either it is too far below here or too far above there, so that the question of costs does not come in at all.

*Mr. Hughes.*—The question of costs does come in to this extent that we cannot say whether the producers are losing money on their Indian business.

*President.*—It may be losing money here. But you have got 100 markets. After all you live on the average price. If on the whole you don't lose, it does not matter a scrap to you what price you get in India or what price you get at home. That is their contention, and therefore this argument that this country is not equipped and therefore the consumer must suffer is not established on these figures because if the Indian consumer is not worse off than the British consumer he has no reason to grumble. The principle of business I am not quarrelling with but the whole point is that there is something in the argument of the Indian manufacturer that he cannot be expected to sell at the import price though he may be expected to sell at the domestic price in the country of origin.

*Mr. Hughes.*—There is something in the argument but I also argue that they can only do the local business, I mean in Bombay.

*President.*—Once you start with Bombay they are on the same footing as you yourselves are because they pay the same freight as you do.

*Mr. Hughes.*—A boat sailing from Liverpool will put supplies down in Calcutta or Bombay at the same rate of freight.

*President.*—That is perfectly true. But they will say "we will have one unit in Bombay and another at Calcutta".

*Mr. Hughes.*—That will be adding to their costs.

*President.*—Supposing an economic unit could be established in each of the two places then you are in the same position as they?

*Mr. Hughes.*—We asked Imperial Chemicals whether they could give their opinion as to an economic unit for the manufacture of sodium sulphide. In the opinion of their experts it would not be economic to manufacture less than 10,000 tons per annum.

*President.*—It is not an impossible figure for India to attain some day.

*Mr. Hughes.*—No.

*President.*—I take it that most of these chemicals come from Germany.

*Mr. Hughes.*—Yes.

*Dr. Matthai.*—A good deal of these chemicals also come from the United Kingdom from firms with whom Imperial Chemicals, I take it, are not concerned?

*Mr. Hughes.*—A good deal of publicity has been given to the statements during this enquiry as regards the operations of the British and German combines and you have invited us to answer the allegations made regarding Imperial Chemicals. I have answered these allegations by proving them to be unfounded.

*President.*—This magnesium sulphate mainly comes from Germany, does it not?

*Mr. Hughes.*—Yes. We obtain quotations from friends in England who buy in the continent.

*President.*—Can you tell us where this ferrous sulphate comes from?

*Mr. Hughes.*—That is German and English.

*President.*—Who are principal manufacturers of ferrous sulphate in Great Britain?

*Mr. Hughes.*—We don't know.

*President.*—What about potash alum?

*Mr. Hughes.*—The principal manufacturers as regards the Indian market are Messrs. Peter Spence and Company.

*President.*—What about aluminium sulphate?

*Mr. Hughes.*—It comes mainly from Great Britain.

*President.*—Sodium sulphide is yours.

*Mr. Hughes.*—Yes.

*President.*—And zinc chloride?

*Mr. Hughes.*—It is German.

*President.*—Copper sulphate?

*Mr. Hughes.*—Now mainly British. The German had the market a year or two ago.

*President.*—Who are the principal manufacturers of copper sulphate in the United Kingdom?

*Mr. Hughes.*—The British Sulphate of Copper Association. This association comprises three manufacturers:—

(1) The Mond Mikel Co., Ltd.

(2) J. N. Dennis & Co., Ltd.

(3) McKechnic Bros., Ltd.

It has nothing to do with Imperial Chemical Industries, though Lord Melchet is the Chairman.

*President.*—Glauber's salt?

*Mr. Hughes.*—Mostly from Germany.

*President.*—We asked Haverø Trading Company who are the agents of the I. G.

*Mr. Hughes.*—There are no detailed statistics regarding the imports of Glauber's salt, as they are merged with other article under the heading of soda compounds, other sorts. They are not, I think, very great. The imports in 1926-27 were 22,000 cwts. and out of that 15,000 cwts. came from Germany.

*Dr. Matthai.*—I suppose with regard to these other salts that you buy occasionally in the open market in London, there is a certain amount of competition from British manufacturers.

*Mr. Hughes.*—We really do not know. We make use of some friends of ours in Glasgow, if we ever want any of these things. As general chemical supplies, we like to have them in stock. We cable to them for the price and if the price is favourable in accordance with the local market conditions we import 5 or 10 tons as the case may be.

*Dr. Matthai.*—From your experience as buyers in the open market, is there any competition among these manufacturers?

*Mr. Hughes.*—Yes, there is very keen competition.

*President.*—We must really get these prices from somebody.

*Mr. Hughes.*—Do you want the prices of these articles?

*Dr. Matthai.*—Could you give us the price of these articles even if they are not manufactured by Imperial Chemical Industries? What is the price of Sodium Sulphide in Great Britain?

*Mr. Hughes.*—The general price in Great Britain is £9 a ton delivered at any station.

*President.*—Here what is the price?

*Mr. Hughes.*—The selling price is Rs. 147-8-0 a ton.

*President.*—I find sodium sulphide crystals delivered at £7-15-0. That is for home consumption.

*Mr. Hughes.*—The export article is solid.

*President.*—Is solid more expensive?

*Mr. Hughes.*—The solid has to be fused and put into drums.

*Dr. Matthai.*—Is Rs. 147-8-0 landed in India?

*Mr. Hughes.*—That is the selling price in Bombay to-day.

*Dr. Matthai.*—Does that include duty and everything?

*Mr. Hughes.*—Yes.

*Dr. Matthai.*—Have you recently imported any of these chemicals?

*Mr. Hughes.*—Yes. The selling price of epsom salt in Bombay is Rs. 70 a ton. The c.i.f. price is £3-15-0.

*Dr. Matthai.*—Could you give us a statement showing the recent prices of these articles?

*Mr. Hughes.*—We can give you information regarding the local prices of all these chemicals.

*President.*—I think it would be useful if you did. Please also indicate which of these chemicals you import?

*Mr. Hughes.*—Yes.

*President.*—We would like to know the prices at which you have imported.

*Mr. Hughes.*—Is it not a fact that epsom salt is a by-product in the Potash industry.

*President.*—It is stated by some people and contradicted by others.

*Mr. Hughes.*—I had a chat with an Indian Chemist in Calcutta recently. He is in favour of granting protection to Indian Industries. But he said that unless a plant was completely modern, in his opinion, it would be wrong to protect it, chemical research never ceases, and is always progressing and something invented to-day may be superseded next year by something better. He also said that if a plant is antiquated, it would be wrong to protect it, because it would be inflicting a permanent injury on India. He talked about the activities of the German Combine in magnesium chloride. It was reported in the papers that the Indian industry was offered 25 per cent. or 30 per cent. of the Indian Trade by the German Trust. The Indian Chemist said that this offer was quite generous as that if they liked, they could give the product away for the cost of freight and packages.

*President.*—I wish that he would appear before us and satisfy us on that point.

*Mr. Hughes.*—The Indian Chemist says that it is purely a by-product in the Potash industry.

*Dr. Matthai.*—In a sense he is right. The term by-product can be applied to magnesium chloride in a way. But once you get potassium chloride from the Stassfurt deposits, the residue has got to be fairly treated. It is not a by-product that you could put on the market as such.

*Mr. Hughes.*—It is a by-product like calcium chloride in the ammonia soda process, as regards which the requirements of the ice factories are solidified and sold at a very cheap rate, but thousands of tons are turned down the drains.

*Dr. Matthai.*—This is a by-product in a different sense from calcium chloride.

*President.*—In the same way magnesium chloride is the by-product of the salt here.

*Mr. Hughes.*—It seems to me that if magnesium chloride is a by-product of salt, they are in an advantageous position in India, because they are within the customs barrier and they have no customs duty nor freight and insurance to pay.

*President.*—They are not asking for protection. They only want to be protected against the variation of prices for which we ought to know the conditions at home.

*Mr. Hughes.*—However I am not here to take up the German case.

*President.*—If you will give us the most recent prices, they will be of use to us.

*Mr. Hughes.*—Very well.

*President.*—I take it the alkalies are very largely under the control of Imperial Chemicals. I have here some prices in the Chemical Trade Journal.

*Mr. Hughes.*—Those are merchants' prices.

*President.*—What I don't understand is this: sodium carbonate, soda ash is £6 and sodium carbonate crystal is £5. How is that?

*Mr. Hughes.*—Soda crystals are made by the addition of 60 per cent. of water of crystallisation.

*President.*—I take it the idea is that you do not want to encourage the manufacture of soda crystals.

*Mr. Hughes.*—Where?

*President.*—Anywhere from Soda ash.

*Mr. Hughes.*—They make it here.

*President.*—I find that they can't do it.

*Mr. Hughes.*—That is not correct. We are actually selling soda crystals on behalf of an Indian Soap Works in Calcutta. They buy our soda ash and make soda crystals. If anybody wants soda crystals, we get it from the soap factory and supply.

*President.*—The point is that you pay more freight on soda crystals.

*Mr. Hughes.*—Because they contain 60 per cent. water. I think the Eastern Chemical Company are making Crystals.

*President.*—They are making small quantities.

*Mr. Hughes.*—We could not persuade Imperial Chemical Industries to give us a lower price for soda crystals, so we dropped it. The price at which they sell would not enable us to compete with the Indian made soda crystals.

*President.*—We are not immediately concerned with alkalies, but generally the question does arise. As regards that I understand that Imperial Chemical Industries would adopt a very different attitude.

*Mr. Hughes.*—That remains to be seen. I suppose you are referring to Dhranghadra. Dhranghadra has not yet made any carbonate of soda.

*President.*—There is a considerable quantity of soda ash imported into the country.

*Mr. Hughes.*—Yes, we do the bulk of the business. We have spent lakhs of rupees in creating the business.

*President.*—There is a proposition on foot that it should be manufactured here. I wish to know whether the Imperial Chemical Industries have got a policy as regards that.

*Mr. Hughes.*—When the market is big enough, their policy or perhaps our policy will be to put up a factory.

*Dr. Matthai.*—As far as alkalies are concerned, don't you think that the market is big enough?

*Mr. Hughes.*—No.

*Dr. Matthai.*—When you import about Rs. 80 lakhs worth taking all kinds of soda.

*Mr. Hughes.*—We are importing over 50,000 tons annually.

*Dr. Matthai.*—Is that not big enough?

*Mr. Hughes.*—No.

*Dr. Matthai.*—What sort of unit do you think would be necessary?

*Mr. Hughes.*—I cabled to Imperial Chemical Industries for information of that nature recently and asked what they would regard as the minimum output for the economic working of a soda ash plant and they replied that the lowest economic unit would be 350 to 400 tons daily.

*President.*—That is 100,000 tons a year.

*Mr. Hughes.*—The Dhranghadra people obtain their salt lime locally, but I doubt whether they have weighed up every contingency in manu-

facture of ammonia soda. Their supplies of ammonia are obtained from sulphate of ammonia. I imagine that it is a very dear way of getting ammonia.

*President.*—In England they use synthetic ammonia?

*Mr. Hughes.*—They may use synthetic ammonia, but I am not really sure of that, I know that they had a regular system of distillation plants at collieries, not far away from the work and they also brought large quantities of ammoniacal liquor from various gas works by tank wagons and steamers. I imagine that is very much cheaper than buying either Indian or imported sulphate of ammonia as a source of ammonia.

*Dr. Matthai.*—Do you import soda ash from Africa?

*Mr. Hughes.*—Yes.

*Dr. Matthai.*—Would it be cheaper to import from Africa?

*Mr. Hughes.*—Yes, but it is not pure.

*Dr. Matthai.*—It occurs more or less as a natural deposit.

*Mr. Hughes.*—Yes. It undergoes a certain amount of refining and it is being consumed by the glass factories.

*President.*—Which are the industries that use soda ash on a large scale?

*Mr. Hughes.*—Textiles, paper, glass and soap. There is scarcely an industry in which it is not consumed. The biggest consumers are dhobies. They use a large quantity of soda ash.

*Dr. Matthai.*—The Dhranghadra people have got to get their coal from Bengal and they get their ammonia in the shape of ammonia sulphate.

*Mr. Hughes.*—Yes.

*President.*—What is the policy of Imperial Chemical Industries as regards the establishment of alkali factories? They have not worked long enough to know, but is it their policy always to export from Great Britain?

*Mr. Hughes.*—When a market reaches a certain figure, I have not the slightest doubt that they would consider the erection of a plant in this country.

*President.*—Have they established any factory in foreign countries?

*Mr. Hughes.*—Brunner, Mond & Co. erected a factory in Canada and I. C. L. are contemplating the erection of a plant in Australia.

*President.*—Will there be any Australian capital in it?

*Mr. Hughes.*—I do not know but if a factory were started in India, Indian capital would be invited, but they would retain control.

*Dr. Matthai.*—In Australia is there a bigger market for alkalies than there is here?

*Mr. Hughes.*—I don't think so.

*Dr. Matthai.*—You have started your works.

*Mr. Hughes.*—I don't think it has been started, but it is contemplated.

*President.*—Australia has got a bigger market than India?

*Mr. Hughes.*—I can't really say. I have not had access to the figures.

*Dr. Matthai.*—It is on that sort of thing that we should like to have a little information. Although at present in Australia there is not a market bigger than in India for alkalies, yet Imperial Chemical Industries have thought it worth their while to put up a factory.

*Mr. Hughes.*—I am under the impression that they are contemplating the erection of an ammonia soda factory.

*Dr. Matthai.*—On what ground would they have the factory in Australia?

*Mr. Hughes.*—I believe it is the wish of the Australian Government as shipments in time of war were very disturbed. By the way what happens to the Indian industry relying on imported sulphur?

*Dr. Matthai.*—The answer to that would be that sulphur comes to India from three different corners of the world. It is difficult to conceive of a war in which America, Sicily and Japan would all be cut off from India.

*President.*—Could you give us more particulars as regards this Australian Company?

*Mr. Hughes.*—I am afraid, I can't.

*President.*—Are there any Australian Directors on the Company?

*Mr. Hughes.*—I do not know. The factory is only under contemplation.

*President.*—Could you send for papers regarding that Company?

*Mr. Hughes.*—I can get that information for you.

*President.*—Because it is rather important.

*Mr. Hughes.*—I can read to you what Imperial Chemical Industries say in reply to an enquiry about the economic unit. This is what they say:—

“ So far as we know at present the natural resources of India do not permit of the economic production of alkali or ammonia and on our present calculations a tariff of 40 to 50 per cent. would not establish economic production.”

If these premises are wrong, they are prepared to co-operate fully both in respect of capital and technical management. Subject to the control being in their hands, they would agree to Indian representation on the Board of any new Company that might be formed in India.

*President.*—We would like to know what they are doing in Australia. Would it be difficult for you to get those papers?

*Mr. Hughes.*—I can write to them and ask for the information. The Australian Government was very desirous that the industry should be established locally and a commission was appointed to examine the matter. Their conclusion was that it would not be workable as it was not a commercial proposition. I gather that they now intend to meet the wishes of the Commonwealth Government and put up an ammonia soda factory.

*President.*—This cabled information would be very useful to us, but it doesn't give us sufficient information as to why they think that Australia is more favourably situated than India. It is very difficult to follow.

*Mr. Hughes.*—Would you care to see a Director of the Imperial Chemical Industries who is arriving in Bombay and staying here from 16th February to 19th February? He would be quite willing to lend any possible assistance in this enquiry.

*President.*—We have not yet fixed up our programme. It is quite possible that we might be in Bombay till the middle of February, 1929, when we shall examine him. His evidence would be very useful to the Board. In the meantime you may write to the Company at home and ask for particulars.

#### *Mr. Vakil's allegation.*

*Mr. Hughes.*—Yes. I should like to mention something in connection with we shall examine him. His evidence would be very useful to the Board. In Director of Messrs. Brunner, Mond and Company went into their office and stated that if they went in for the manufacture of caustic soda they would not allow them to stand on their feet. I was the man who went to see Mr. Vakil in London after hearing that a project had been formed for the manufacture of caustic soda in India. This is the letter which I wrote on the subject to our Bombay Office in November, 1924:—

“ On the 25th of September, the undersigned called on Mr. Vakil and found that he had a room in the offices of Kestner Evaporator and Engineering Company, Limited, London. Before he would discuss anything, he



called in Mr. Macnall who apparently belonged to the Kestner firm, and both of them then asked what the precise object of our visit was. We said that we had heard of Mr. Vakil's project to manufacture caustic soda in India and that as anything connected with the heavy chemical industry was of interest to us, we should naturally like to have some information. We intimated that if there were any possibilities in the scheme, our company might be willing to participate in the venture. Mr. Vakil said that the scheme was quite a serious one and that in addition to caustic soda they intended to manufacture soda ash, soda crystals, bicarbonate of soda and silicate of soda; that they had all the capital they required; that they had given the matter very careful consideration and were quite sure of its ultimate success and that to convince us of their belief in it he could inform us that they had already spent £50,000 in preliminary expenses. He had inspected some of Solvay's works on the Continent and ammonia soda plants in the United States and orders for plant had already been placed with various firms in the United Kingdom. We asked him if he thought it was possible to manufacture ammonia soda in India in view of the high temperatures prevailing and he said that everything of this nature had been duly considered. We then enquired if they were relying on the Government of India to give their industry protection and he replied that this would readily be granted to them when the time arrived for them to make an appeal."

This was the letter written after the interview. The interview itself took place on the 25th of September, 1924, and from the contents of the letter I read out to you it would appear that I did not go into that office and say that we would not allow them to stand on their legs.

*President.*—We generally do not attach much importance to expressions. But we cannot altogether ignore the fact that Imperial Chemical Industries are much interested in this soda business.

*Mr. Hughes.*—That is quite true.

*President.*—To use a common expression, they might not take it lying down when the time came for them to compete with a local industry.

*Mr. Hughes.*—That is our business. We are a selling company in India.

*President.*—Therefore it is important for the Board to know what is the general line of policy that Imperial Chemical Industries adopt towards a country which wants to go in for the manufacture of similar articles. It is for that reason that I am asking for this information.

*Mr. Hughes.*—I suppose they have a policy. As I have already said, if the market warrants it, they will put up a factory in this country.

*President.*—The question is what interest the country will get in it. Take the Magnesium Chloride controversy. The Pioneer Magnesia people were offered 25 per cent. of the business. If Imperial Chemical Industries were to do the same, it is not likely that the country would accept it without a little protest.

*Mr. Hughes.*—Is it your suggestion that Imperial Chemical Industries should not compete with an Indian industry?

*President.*—That is not the suggestion. The suggestion is that every country should have a substantial interest in every industry in the country.

*Mr. Hughes.*—I know the wishes of the Government of India.

*President.*—The Government of India said publicly in their resolution on our Match report that they would watch the activities of the Swedish Company and that if they felt that the Swedish Company were trying to obtain more or less a monopoly, the whole question would be reopened. It is for that reason I am anxious to know what Imperial Chemicals are likely to do in the event of their interests coming into conflict with an Indian industry.

*Mr. Hughes.*—Before they establish their works?

*President.*—Not that. If anybody started a big alkali industry in the country, the normal procedure would be that they would come to the Board and say "we have started, our costs are so much, the foreign articles are sold at so much and we want protection".

*Mr. Hughes.*—That is just what they should not do. If the natural resources are in favour of the industry and the plant is going to be modern, and if the factory is properly equipped and conducted in a proper way, then I grant you that they should be entitled to protection if they cannot stand up against foreign competition.

#### *Unfair competition.*

*President.*—The whole point of this enquiry is that they do not want protection against ordinary normal competition. Protection is only required in respect of what they call unfair competition. Whether competition is unfair or not is a point which has to be decided.

*Mr. Hughes.*—No company which has a trade relinquishes a market without a struggle.

*President.*—When a little fellow has to fight with a big giant he is handicapped.

*Mr. Hughes.*—At the same time you have to consider the interests of consumers.

*President.*—We consider all that. Having considered all that if competition is normal, that is to say, if the products are sold at a price which bears some relation to the cost of production or in the neighbourhood of process in the country of manufacture, it is not objected to. But when there is a big difference, say between the prices at home and in India, as I said a little earlier, that is not fair competition. You cannot expect any industry to be established in any part of the world where there is a big trust operating.

*Mr. Hughes.*—What is the position if they are selling at a lower price and still making a profit?

*President.*—That may be very well from your point of view. From the local man's point of view, it simply means this that he cannot establish anything at all. Take the case of chemicals. No country in the long run which has an industrial organisation can do without a chemical industry.

*Mr. Hughes.*—If a foreign company were selling here at a certain price and yet making a profit, the local industry also should be making a profit if it is economically sound.

*President.*—Does it make a profit on what it sends to India?

*Mr. Hughes.*—Supposing it sells here at a price which may be low but yet yields some profit?

*President.*—Let the foreign manufacturer come and establish that.

*Mr. Hughes.*—If the Indian manufacturer were established on the same basis he would also be making profit.

*President.*—In every enquiry, that is the sort of information we wanted. But no foreign manufacturer has come and told us "here are my costs in my country".

*Mr. Hughes.*—I don't think he would.

*President.*—Then we have to presume that he is not making any profit.

*Mr. Hughes.*—I don't think that.

*President.*—The whole point is that you must establish that if you sell your products at the same price all over the world as you do here, you make a profit.

*Dr. Matthai.*—The problem would arise this way. Supposing an alkali industry was started and prices of imported alkalies were lowered in view

of the local competition—of course you are operating in a great many markets and you can adjust prices according to local conditions—then we would have to consider giving some kind of assistance to the local industry.

*Mr. Hughes.*—If a product is sold in a country at a loss to the producer, then I regard that as unfair competition, but so long as an article is produced and sold at a profit, it cannot be unfair competition.

*Dr. Matthai.*—That has to be established.

*Mr. Hughes.*—He may make a profit of £1 in one country and a profit of £5 in another country.

*President.*—Supposing you sell an article at £5 and if you can show that £5 leaves you what we consider a reasonable profit on your investment—we do not allow any extravagant profit in our reports—then you establish that there is no unfair competition. But if you sell it at £5 here, £10 in the United Kingdom, £7 in Australia and £3 in some other country and say that you make a profit on the whole you establish nothing.

*Mr. Hughes.*—Our costs remain just the same.

*President.*—You must show that the price of £5 covers all your costs and leaves you a reasonable profit. Until you do that, how can we say that you are selling at a fair price? They must show that their costs are lower than the Indian manufacturers' costs. You simply cannot say by looking at the Indian manufacturers' costs that their costs are high. You must produce your own costs and then submit yourself to examination by us. Are you prepared to do it?

*Mr. Hughes.*—I could not say.

*President.*—That is the point.

*Mr. Hughes.*—But there has not been so far any application before you for the protection of soda ash. You can hardly consider that before it is produced in the country.

*President.*—Though we cannot deal with that in any great detail, yet we must take that into account.

*Mr. Hughes.*—What did Mr. Vakil himself say? He said that the Soda Ash Industry did not require any protection, but that the Bhrughadra people may ask for protection because they have spent nearly one crore of rupees on a factory which ought to have cost them only about Rs. 37 or 38 lakhs.

*Dr. Matthai.*—When we estimate what is a fair cost for a local industry, we do take into account that the industry is fairly well organised, efficiently equipped and so on. If it is over-capitalised, that is a fact for which we make due allowance.

*President.*—We cut down the block value of the Steel Company from Rs. 22 crores to Rs. 12½ crores. That is a fact which we must, and do, take into account. Supposing there is a price war after an industry has been started in the country and you charge a price for your product which simply covers your works cost?

*Mr. Hughes.*—We could not do that. We are an expensive company in India.

*President.*—We cannot merely go on general arguments. That no one would do anything except at a profit is a proposition which nobody would dispute.

*Mr. Hughes.*—Just for the sake of argument: what would be the position if we as a trading company sold at different prices in India?

*President.*—What do you mean?

*Mr. Hughes.*—Supposing we sold a particular article at Rs. 8 in Bengal, at Rs. 7 in Southern India and at Rs. 5 in Kathiawar what would be your attitude towards that?

*President.*—We have to consider with what object you are doing that.

*Mr. Hughes.*—We are traders.

*President.*—If it is your object to sell at Rs. 5 in Kathiawar until the factory in Kathiawar is dead and buried and then to raise the price up to Rs. 8, naturally we will say that we do not like the look of it.

*Mr. Hughes.*—We should be doing business as traders.

*President.*—That is precisely my point. Supposing you sell at a price which is below what we consider a fair selling price?

*Mr. Hughes.*—An ordinary trader sells at any price he can get.

*President.*—We do not deal with any general propositions.

*Mr. Hughes.*—What I suggest is that this point has not arisen.

*President.*—It will arise.

*Mr. Hughes.*—During the course of this enquiry?

*President.*—Yes.

*Mr. Hughes.*—Before soda ash is produced?

*President.*—It will arise in this way. There is the German Trust (I. G.). They are interested in this. The question arises as to what is to be done. We are not going to say that we will only deal with the I. G. and not with Imperial Chemical Industries. We can say "Here are these two big trusts operating in all parts of the world. Their policy is to fix their prices in such a way that if there was any competition in any country, they would lower their prices in that country. That is the line they are likely to adopt, and it is not to the interest of our country. They must be stopped from doing that." In that way, it would arise, and whatever is applicable to one is also applicable to the other.

*Mr. Hughes.*—I take it that you deal with product by product. Soda ash has not been mentioned in this enquiry.

*President.*—There is no question of any protection of soda ash at present; that is admitted. But when we deal with the operations of the trust, we must go into this question.

*Mr. Hughes.*—But you have yourself suggested the formation of such a trust to Tata's, by urging them to co-operate with the Bhadravati Iron Works instead of competing with them.

*Dr. Matthai.*—We have no objection to trusts as such.

*President.*—As a matter of fact we suggested it in the case of another industry. In the case of cement we went out of our way to point out to them that they should combine.

*Mr. Hughes.*—Yes, and not cut each other's throats.

*President.*—If a foreign manufacturer cuts the throat of the Indian manufacturer, it is objectionable?

*Mr. Hughes.*—I quite see your point of view.

*Dr. Matthai.*—Take the hypothetical case you mentioned. Suppose you charged one price in Bengal, another price in Southern India and a specially low price in Kathiawar. If we were satisfied that the local industry fulfilled all the conditions laid down by the Fiscal Commission, we would take into account the price at which imports were being sold in their natural market in giving them protection.

*Mr. Hughes.*—I am raising this as a matter of interest. When an industry which is established in a State that does not form part of the Government of India asks for protection, is it reasonable to grant it when protection might penalise the whole of the industries under the Government of India. It is not contributing to the revenues of the country.

*Dr. Matthai.*—That is a point which must be considered.

*Mr. Hughes.*—They have their own Customs and they have their own ports. They do not contribute any revenues to the Government of India.

*President.*—That question we have not considered because there is no application before us. But in this enquiry we are not concerned with Kathiawar or any particular place or with alkalies. The question arises only in this way: Here are two powerful organisations—I. G. and I. C. I. Both of them are interested in chemicals. The moment there is serious competition in India against them, they would follow the normal policy of big combines which is to enter into competition. If that competition arises we will have to consider whether it is fair or unfair competition. If it is fair, nothing can be done. But if it is unfair and if it is to last only till the local industry is extinguished, and then prices are to go up, we have very little hesitation in saying that it should be stopped.

*Mr. Hughes.*—At the same time you must consider the economic aspect of the Indian factory.

*President.*—We presume that we have examined and that we are satisfied that the Indian factory is well equipped, has expert advice and is not over-capitalised.

*Mr. Hughes.*—A modern chemical factory is a very highly organised institution.

*President.*—Every country has to make a beginning and it would be impossible for any industry to be started if we were to apply to the same standard to an infant industry as to a grown-up one. You would admit that it is impossible. Therefore, we must take a reasonably well-equipped factory—reasonably well managed, and so on—and then we must decide what sort of competition it has to face. If the competition is reasonable we say the industry does not require assistance from the State. But if competition is unfair, then this Board must make proposals which would stop it.

*Mr. Hughes.*—However this point has not arisen yet.

*President.*—I am warning you that it will arise in connection with alkalies. As regards the general issue whether we will go into it or not we cannot say yet, but the point may arise and it is for that reason that I want this information as to the policy of Imperial Chemicals as regards foreign countries where new industries are being established and whose interests are against theirs. If you want 75 per cent. interest or some such thing by way of control, it is not likely that it will go down with the Government or with the people or even with this Board.

*Mr. Hughes.*—What would be your attitude if Imperial Chemicals established a factory in this country and invited Indian capital to participate?

*President.*—If this Board made a recommendation for the protection of this industry and the Government accepted that, it may be assumed that the Government would provide against every contingency which would lead to the extinction of the Indian industry or which would lead to the creation of a monopoly in the country. It is obvious that if the scheme of protection is accepted by the Government, the Government must see that it is made effective. If you establish an industry here and the country as a whole is not interested the country may not have it.

*Mr. Hughes.*—What do you mean by "the country as a whole"? I said Indian capital would be invited.

*President.*—That is the point. When you say Indian capital will be invited, what do you mean?

*Mr. Hughes.*—The Imperial Chemicals say that they would require control of the works. Supposing they retained 51 per cent. and allowed India to subscribe 49 per cent. of the capital?

*President.*—That is the sort of information we require—what the attitude of the Imperial Chemical Industries is going to be.

*Mr. Hughes.*—That can only be disclosed when the actual situation arises.

*President.*—Supposing we came to the conclusion that this industry—we don't mention any chemicals, we simply say the heavy chemical industry—is to be protected, it can only be protected if this foreign competition takes an unfair form. If I am not in a position to say what form foreign competition will take in this country in case protection is granted, I can't do anything else but say that we must rule them out, whereas if I have a proposition which states what their attitude is likely to be we should be prepared to consider it and modify our proposals accordingly.

*Mr. Hughes.*—I cannot go beyond what they said, namely that if the position of the market justified such a step they would put up a factory here and invite Indian capital, but they would keep the control in their hands.

*President.*—It would be better if you could give us more information than that.

*Mr. Hughes.*—That means drawing up a prospectus when the point has not yet arisen.

*President.*—It is just as well for me to tell you what is exactly in my mind, because afterwards when the report leaves my hands, I have no control over it. I hope that you would do your best to get me all the information that you can as regards the general policy of Imperial Chemical Industries in foreign countries where it establishes its works, as to what sort of control it would require, what interest it would give to the foreign country where it establishes itself, as regards shareholders, management, directorate and so on.

*Mr. Hughes.*—If the company established a factory and made a stipulation in advance that they would retain 51 per cent. of the capital in their own hands and offer 49 per cent. to be subscribed, by the general public, they would have control.

*President.*—You can have control with 5 per cent. capital for that matter?

*Mr. Hughes.*—However I am not in a position to say how much capital they would require and how much they would call for in India.

*President.*—Will you write to your company and find out?

*Mr. Hughes.*—I cannot because they will reply that the situation has not yet arisen.

*President.*—You know what the feeling is in the country at present?

*Mr. Hughes.*—Supposing we held an exhaustive enquiry into the possibilities of erecting a factory here and came to the conclusion that it would not be a commercial proposition, what would be the position then?

*President.*—Supposing we were satisfied that the materials exist and that it is a good industry to start and that under given conditions it would do well, then in spite of your opinion there is nothing to prevent us from making that recommendation and therefore there is no harm in your giving us an expression of opinion by Imperial Chemical Industries.

*Mr. Hughes.*—If after examining costs and considering all contingencies they proved definitely that it was not a sound commercial proposition.....

*President.*—They can prove it definitely by giving their own costs but not by a mere general expression of opinion.

*Dr. Matthai.*—Suppose at the end of this enquiry we came to the conclusion that the heavy chemical industry in India should be protected and we decided to give them a measure of protection which in the circumstances we considered adequate and further we proposed that if there was going to be unfair competition on the part of importing interests the duties we proposed should be correspondingly raised what would be the attitude of Imperial Chemical Industries?

*Mr. Hughes.*—You will first have to apply specific duties to specified products?

*Dr. Matthai.*—Assume we proposed a moderate amount of protection and sufficient safeguards against dumping for, say, 10 years or 15 years, then obviously the whole position must bear a different aspect to you?

*Mr. Hughes.*—We have then to consider whether to drop out of the market or establish a factory here?

*Dr. Matthai.*—Therefore, if that position arose, don't you think it is worth while for I. C. I. more or less to outline their policy?

*Mr. Hughes.*—I don't think it is likely to arise as regards our own products.

*Dr. Matthai.*—It affects you to the extent of sodium sulphide just now?

*Mr. Hughes.*—Yes.

*President.*—So that in any case the problem would arise on that. In this enquiry, which is now confined to those particular chemicals and chemicals of a similar kind, supposing we come to the conclusion that there is a case for protection, the need for protection arising out of several causes, one of them being the operation of this foreign Trust in this country—Imperial Chemicals, the I. G. F. or any other Trust—and if our proposals are accepted then Government must make up its mind to make the scheme effective, if necessary by raising the duties if dumping takes place. If this principle is accepted in the case of these chemicals it is not very unlikely that the same course will be adopted in the case of alkalies when the question arises. Therefore, it is important for Imperial Chemical Industries to come forward and state its case even though it has not actually arisen. The point is this. If the Government of India accept our proposals that protection is to be granted, we must also clearly establish the point if protection is granted it must be made effective—it does not matter who the competitor is. If that is done in the case of these chemicals and then in the case of alkalies similar problems arise, do you think that Government would adopt a different attitude? It is for that reason that I am suggesting to you that it is now time for Imperial Chemical Industries to come forward and give their considered opinion.

*Mr. Hughes.*—I really don't see why they should make a definite statement.

*President.*—Supposing we hold that a case has been made out for the protection of this industry and we say this is our scheme, and that if that scheme is made ineffective by dumping or unfair competition Government should do so and so, and Government says "yes we will do it". The Government and we and the country have committed ourselves to a principle, and it may be applied to you when the question arises in connection with that industry. Now you say there is no reason why you should . . . . .

*Mr. Hughes.*—Not until the time has come.

*President.*—But the time has come so far as the general principle is concerned.

*Mr. Hughes.*—The general position has not yet affected the products of Imperial Chemical Industries.

*President.*—It is for you to consider, but if the question arose in connection with any foreign organization and the country adopted a general policy of making the scheme of protection effective, when you come up again to place your case before the Board when it arose, it is very unlikely that any serious departure would be made from that principle.

*Mr. Hughes.*—You mean to say that they would not be allowed to come in later?

*President.*—Yes, you would be, but it would be very unlikely that the country would follow two different lines of policy.

*Mr. Hughes.*—Take the point of view of Imperial Chemical Industries. They don't consider that the market just now warrants the establishment of a modern factory here. You want them to declare what they will do in the event of your putting on a prohibitive tariff?

*President.*—That is not my point. My point is this, that if the country made up its mind to protect heavy chemicals. . . .

*Mr. Hughes.*—And you eventually make that tariff prohibitive if dumping took place?

*President.*—Effective.

*Dr. Matthai.*—Effective in this sense that you would not be able to charge what we considered an uneconomical price. It does not absolutely prohibit.

*Mr. Hughes.*—Then I suggest that it is wholly a question for Imperial Chemicals to decide at that time whether it would be worth their while to put up a factory in India regardless of the consumption in the country or whether they should stand out of the market altogether?

*President.*—It is not for me to dictate to the Imperial Chemicals what line they should adopt.

*Dr. Matthai.*—The general question would be this: supposing it was decided to foster the Chemical industry in India and if Government made that their policy, can we count upon reasonable co-operation on the part of Imperial Chemical Industries?

*Mr. Hughes.*—What do you mean by reasonable co-operation?

*Dr. Matthai.*—Not to compete in an unfair way. Supposing the protection that we decide to give to the Indian Chemical industry took the form of a bounty, it is possible for us to say that this bounty should not be given to any industry operating in India locally which does not satisfy certain conditions. The Legislature may prescribe whatever conditions it may think reasonable. Now the point that really arises would be this: if Imperial Chemical Industries decided to operate in the Indian market, would they be prepared to follow the conditions which may be considered reasonable in India?

*Mr. Hughes.*—That I could not say. Suppose our price was quite remunerative to the Indian producer and in spite of this they commenced to undersell, what would be the position then? Supposing we agreed to sell at equal rates and our selling organisation was better than theirs, what would be the position then?

*Dr. Matthai.*—That sort of competition as far as I can see at present is legitimate and that would not be considered unfair competition. It is competition in the ordinary way of business.

*Mr. Hughes.*—The bigger the business, the lower the cost.

*Dr. Matthai.*—In this particular case supposing you started a works here, you would have a local Directorate.

*Mr. Hughes.*—Yes.

*Dr. Matthai.*—You would have a local Board on which Indians would be reasonably represented.

*Mr. Hughes.*—It might or might not have Managing Agents I could not say. It would be an entirely separate Company. The system of Managing Agents is not very satisfactory.

*President.*—I entirely agree with you, but I have no power over it.

*Mr. Hughes.*—It is a heavy burden—commission on all purchases and on all sales plus a percentage of profits.

*Dr. Matthai.*—We have reached a stage in our enquiries when we find that every Indian industry is up against the competition of powerfully organised combinations abroad and it is of some interest to this Board and interest also I take it for foreign concerns to know precisely where they stand with regard to each other, Imperial Chemical Industries have been organised largely for the purpose of operating in the Empire as a market.

*Mr. Hughes.*—That is true.

*Dr. Matthai.*—That is to say they have a definite Imperial objective and therefore the question is of special interest to you.



*Mr. Hughes.*—If the units of the Empire are able to consume reasonable quantities of products, they will follow a policy of manufacturing in the country.

*Dr. Matthai.*—Under reasonable conditions.

*President.*—It is on that point we want your information.

*Dr. Matthai.*—Would your Director be able to discuss this question?

*Mr. Hughes.*—Certainly he would.

*President.*—Take the Swedish Match Company. What was the allegation made against them? First of all competition came from Sweden and then it was alleged that competition was within the country. The same situation may arise as regards yourself.

*Mr. Hughes.*—A high tariff was put on motor cars in Great Britain and the Americans promptly put up factories.

*President.*—Great Britain can look after itself. Great Britain is so industrially advanced that it doesn't really matter. India is very different. India wants opportunities of learning its business and you cannot learn any business unless you have some interest in the management. It is not merely a question of getting the thing, but it is a question of learning how the thing is to be made.

*Mr. Hughes.*—I repeat once more that these assurances that you want cannot really be given until the situation actually arises. There would be no object whatever in putting up a synthetic ammonia factory when there is no market.

*President.*—I have not made my point clear. It is not a question of putting up a soda factory or ammonia factory or anything like that. It is a question of the general policy I am discussing.

*Mr. Hughes.*—We are a selling Company in India. It is our duty to sell as much as we can.

*President.*—We are dealing with Imperial Chemical Industries as a manufacturing company. Whether you put up a plant now or 5 years or 10 years hence, it is quite immaterial. As my colleague pointed out we are interested in knowing what would be the attitude generally speaking of the Company towards a country which means to establish an industry. It is going to be a competitor against Imperial Chemical Industries. If you are not able to say something definite about your general policy now. . . .

*Mr. Hughes.*—We shall hold on as long as we can and then we shall probably come behind the tariff.

*President.*—When it goes behind the tariff, what would it do?

*Mr. Hughes.*—It will obtain a site, erect a plant and do its duty by its shareholders in every way it can.

*President.*—What interests would this country have in it?

*Mr. Hughes.*—It will have a capital interest. To what extent I am quite unable to say.

*President.*—I am very anxious that you should give us as definite information as you can on questions of this kind.

*Dr. Matthai.*—I quite appreciate your position. It is very difficult for you to make any specific suggestion about a situation which has not actually arisen, but probably you have a general policy in other parts of the Empire in which industries might arise likely to compete with you.

**IMPERIAL CHEMICAL INDUSTRIES (INDIA) LIMITED.**

**Oral Evidence of Mr. HUTCHINSON, and Mr. HUGHES, recorded at  
Calcutta, on Saturday, the 9th March 1929.**

*Introductory.*

*President.*—Mr. Hutchinson, you were the Imperial Bacteriologist?

*Mr. Hutchinson.*—Yes.

*President.*—Up to what time?

*Mr. Hutchinson.*—1926.

*President.*—Since then you have been connected with the Imperial Chemical Industries?

*Mr. Hutchinson.*—Yes.

*President.*—Are you attached to any one of the subsidiaries?

*Mr. Hutchinson.*—I am directly under the Imperial Chemical Industries.

*President.*—What is your principal function in India?

*Mr. Hutchinson.*—I am the Chief Scientific Adviser to the Imperial Chemical Industries in India.

*President.*—In connection with fertilizers?

*Mr. Hutchinson.*—Yes.

*President.*—I understand it is the Nitram Limited who are interested in fertilizers chiefly?

*Mr. Hutchinson.*—They are not limited to any fertilizer.

*President.*—I understand the company which deals with fertilizers is Nitram Limited.

*Mr. Hutchinson.*—That is the sales organization of the Imperial Chemical Industries.

*President.*—Then there is another company called the Fertilizers Propaganda Company.

*Dr. Hutchinson.*—That is as far as I know defunct.

*President.*—You are in touch, I suppose, with all the agricultural departments in India?

*Mr. Hutchinson.*—Yes.

*President.*—And you collect information, I suppose, as regards the different requirements of the soils of the country from the agricultural departments and then you advise your own company as to what fertilizers are required?

*Mr. Hutchinson.*—Yes. We rely very largely on information derived from the local departments of agriculture. Our function at present is to find out what is wanted in different localities, for different crops and for different soils, and supply those manures.

*Mr. Mathias.*—You carry out experiments through the local agricultural department, do you?

*Mr. Hutchinson.*—That is what we are doing at present. We get our information from them and limit our propaganda to their recommendations.

*Dr. Matthai.*—You are not concerned in making any experiments directly for yourselves?

*Mr. Hutchinson.*—Not at present.

*Dr. Matthai.*—Is there any proposal in that direction?

*Mr. Hutchinson.*—I think there will be. That is what I am recommending. We should have our own experiments to supplement those which are being carried out by the departments of agriculture.

*President.*—Who looks after the commercial aspect of the fertilizer question?

*Mr. Hutchinson.*—I know nothing about it.

*Mr. Hughes.*—The commercial aspect or the selling side of sulphates of ammonium is in the hands of Messrs. Shaw Wallace and Company and Imperial Chemical Industries (India), Limited.

*Dr. Matthai.*—Brunner Mond (India) Limited is not in being now?

*Mr. Hughes.*—It has been converted into Imperial Chemical Industries (India), Limited.

#### *Fertilizers.*

*President.*—This question of fertilizers arises rather in an indirect way to some extent in this chemical enquiry. We are enquiring into the question of heavy chemicals of which sulphuric acid is one which plays an important part in the production of two of the fertilizers, viz., nitrogenous and phosphatic, and we want to have some information as regards those. Firstly, as to the demand for sulphate of ammonia, I take it the consumption of sulphate of ammonia at present in the country is about 17,000 tons?

*Mr. Hutchinson.*—23,000 tons including imports and local production.

*President.*—Can you give us figures for the last five years to show how the consumption has increased, and the prices?

*Mr. Hughes.*—Have not Messrs. Shaw Wallace and Company given you this already?

*Dr. Matthai.*—I think you told us in Bombay that it is approximately 17,000 tons.

*Mr. Hughes.*—Yes, but I had no figures with me then.

*President.*—Will you be able to send us these figures and the prices at which it has been sold?

*Mr. Hughes.*—The prices have just come down.

*President.*—Yes I know but I want to see what the trend of prices has been.

*Mr. Hughes.*—Has not this information been given by Messrs. Shaw Wallace and Company? They are acting as agents of the federation and keep the accounts of the federation in India.

*Dr. Matthai.*—They gave us the quantities of local production and imports but I don't think they gave us the prices.

*Mr. Mathias.*—I suppose price is a big factor in the expansion of sales of sulphate of ammonia?

*Mr. Hughes.*—I suppose it has an important bearing on it. The whole thing is, whether you can put the manure on the market at such a price that it comes within the range of the ryot's pocket?

*Mr. Mathias.*—Speaking generally the reduction in the price recently has been accompanied by a large expansion in business?

*Mr. Hutchinson.*—Yes, mainly that, but very largely due to our propaganda and the actual economics of the use of sulphate of ammonia as disclosed by the hard work for the last two years. It has come to this, that first of all judging from sales to the ryot—I am not talking of the planters at all—we have gone ahead in our sales in Madras because of two things; the one is that our propaganda there has developed more fully than elsewhere, and secondly, that the Madras ryot has such hard conditions of living that he has to make the most of any opportunity to improve his position and, consequently, he takes advantage of the recent introduction of artificial manures which people in Bengal don't take the trouble to use.

*President.*—Are you referring to sulphate of ammonia or superphosphate or both?

*Mr. Hutchinson.*—Both, but to my mind sulphate of ammonia is the most significant.

*President.*—We leave out the planters for the moment and we would be glad if you could give us figures to show that the ryot is using more sulphate of ammonia than before.

*Mr. Hutchinson.*—I can tell you roughly what these figures are, and I will give you a note on the actual figures if you like. Roughly what would happen is this: In Madras the sales of sulphate of ammonia have gone up in the last three years from 400 tons to 10,000 tons. That I think is a sufficient proof that in those three years the ryots have found that sulphate of ammonia has given them a good return. Practically I should say 85 per cent. of the sulphate of ammonia has been used on the paddy crop.

*Mr. Mathias.*—How have the prices gone down in these three years?

*Mr. Hutchinson.*—I don't think the fall in prices has been significant before the beginning of this year.

*Mr. Mathias.*—What is the actual reduction?

*Mr. Hutchinson.*—From Rs. 14 a unit of nitrogen down to Rs. 8. It averaged well over Rs. 250 a ton before then.

*Dr. Matthai.*—When you speak of the hard conditions of the Madras ryot do you mean that the deficiency of fertilizers in Madras soil is more than in other areas?

*Mr. Hutchinson.*—I am referring mainly to climatic conditions as compared to Bengal. Compared with the uncertain climate and soil in southern India you have evenly distributed rain fall, plenty of rivers and deep alluvial soil in Bengal. The agricultural conditions in the Madras Presidency are much more difficult. That makes the difference between the activity of the Madras ryot and those in Bengal. The Madras ryot takes advantage of the fertilizers.

*President.*—That is the point. There is more nitrogen required in the Madras soil, is it not?

*Mr. Hutchinson.*—No. But I think the Madras ryot realizes that by using cheap nitrogen he can get an increase in crop whereas the Bengal ryot does not realize that because he gets a crop sufficient for his living without doing anything at all.

*Dr. Matthai.*—Have you any figures for superphosphates in the Madras area?

*Mr. Hutchinson.*—The figures for superphosphates at present are compared in this way. Our recommendation is based on those of the agricultural department and that is that for every bag of sulphate of ammonia (a bag weighing 80 lbs.) they should use one bag (1 cwt.) of superphosphate. The two should go together. The last figure I gave you of 10,000 tons of sulphate of ammonia has been accompanied by about 3,000 tons of superphosphates.

*President.*—You said a bag of 80 lbs.

*Mr. Hutchinson.*—Sulphate of ammonia 80 lbs. and superphosphates 112 lbs.

*President.*—But they are not using the quantity of superphosphate that they ought to do?

*Mr. Hutchinson.*—They are not and that is for the very simple reason that if you put nitrogen on the soil you can get an obvious increase in your crop. If you put superphosphate on your crop it may on some of the soils not give you any obvious return, although the expert knows that it is necessary to keep up the fertility of the soil.

*President.*—How then are you going to convince the ryot that if he uses nitrogen he gets so much increase and if he uses the two he will get more?

*Mr. Hutchinson.*—You can convince the ryot in this way. You make him recommendations for the use of sulphate of ammonia. You say it is good for his crop. He finds it is good. Then you tell him it would be better for his soil if he adds superphosphate. The confidence he has gained as a result

of your recommendation carries him a step further and makes him use superphosphate.

*President.*—Naturally it must result in an increase or better quality of crop. Can't it be demonstrated to him afterwards?

*Mr. Hutchinson.*—It can. You divide the field into two parts, put superphosphate on one half with sulphate of ammonia and then you put sulphate of ammonia without super on the other half. In the course of the year he finds that he gets better return from the part which had superphosphate than from the part which had no superphosphate.

*Mr. Mathias.*—It means this, that the application of superphosphate is an insurance against depreciation?

*Mr. Hutchinson.*—You must have phosphate for your crop. All soils contain phosphate. They contain it not only in varying amount but under varying conditions. In soils that contain phosphate in available condition you may add super and get no increase by reason of additional super and in those soils you may say super is not required. But in those soils which contain it in unavailable condition you get no phosphatic plant food and the addition of available phosphate as super will give you an obvious increase in your crop.

*President.*—That means you have got to experiment with practically each plot so far as the ryot is concerned?

#### *Superphosphate.*

*Mr. Hutchinson.*—In view of Dr. Clouston's evidence you had the other day I am afraid I must make a correction because he is out of touch with these sort of things for some years now and what he does not know is this. He said that certain soils in India do not require superphosphate. That information he got from the department of agriculture and they got it in this way. You can put super on a soil and get no increase in crop. Now, it does not follow that because you get no increase in crop, superphosphate is not necessary for the fertility of that soil. The reason is this that when you are growing a plant you have got to have several things present in the soil. If one of the things is missing nothing else will do any good. Nitrogen acts as a limiting factor on the action of the super; in the same way super may act as a limiting factor on the nitrogen.

*President.*—I think he said this that there are certain soils which will not require nitrogen but will require superphosphate because green manure if used in conjunction with superphosphate may serve the same purpose. Is he wrong there?

*Mr. Hutchinson.*—He is wrong in saying that there are any soils in India that will probably not be benefited by the application of available phosphate. Then again he is wrong in saying that superphosphate has been tried on a small scale. I don't know how he can say that the sale of 3,000 tons of superphosphate is small—all sold in a single place.

*Dr. Matthai.*—I think Dr. Clouston was thinking of the rest of India when he said that experiments on superphosphate on a large scale have not been carried out. I think he made an exception of Madras.

*Mr. Hutchinson.*—I hope Dr. Clouston did not say that superphosphate was being used on a small scale on sugarcane and rice. I don't think 3,000 tons in one year can be called a small scale.

*Mr. Mathias.*—Taking the whole of India 3,000 tons might be considered a small scale?

*Mr. Hutchinson.*—I am afraid Dr. Clouston is taking his ideas from the report of the Royal Commission on Agriculture which is two years behind the times!

*President.*—We gathered that in the last two years the sale of superphosphates have gone up to 7,000 tons.

*Dr. Matthai.*—Taking single and double superphosphates together the figure that we got is roughly 10,000 tons. That I think is based on the figures that Dr. Clouston got from Messrs. Shaw Wallace and Company.

*Mr. Hughes.*—That includes tea gardens and everything.

*Mr. Mathias.*—The position as I understood it from him is, that all soils require superphosphates; some soil reacts at once to superphosphate.

*Mr. Hutchinson.*—Yes, superphosphate is an insurance against reduction in fertility.

*Mr. Mathias.*—But you would say that there are no soils which do not require occasional application of superphosphate for fertility?

*Mr. Hutchinson.*—I know of no soil where you can go on putting nitrogenous manure without putting phosphoric acid. My opinion is that phosphoric acid is a general requirement of Indian agriculture.

*Dr. Matthai.*—Supposing there is going to be a very big increase in the consumption of sulphate of ammonia during the next two years, there would be along with it a corresponding increase in the consumption of superphosphates. Am I right?

*Mr. Hutchinson.*—I think so. At present the agricultural department has sufficient control in its own district to see that the use of nitrogen by itself, which might be a dangerous thing, will not take place to any exaggerated extent, that is to say there should be a backing of phosphoric acid to the application of nitrogen which is essential to prevent the deterioration of the soil.

*President.*—Is it rather due to the fact that the ryot can get more nitrogen from various sources than he can get phosphoric acid?

*Mr. Hutchinson.*—No. The tendency of the ryot towards the use of nitrogen is because he gets obvious results.

*President.*—He can get that from his green manure and things like that?

*Mr. Hutchinson.*—He won't get nitrogen from green manure.

*Mr. Mathias.*—What is the effect that he gets from green manure?

*Mr. Hutchinson.*—It would improve the physical condition of the soil. The nitrogenous effect of green manure is very small.

*Mr. Mathias.*—What is the source of nitrogen that is open to an Indian ryot if he does not use green manure?

*Mr. Hutchinson.*—Farm manure and oil cake.

*Mr. Mathias.*—The use of green manure in conjunction with super gives an obvious return to the ryot and therefore in this particular form it is easier for the agricultural department or for propagandists to induce the ryot to use superphosphate. Is that the position?

*Mr. Hutchinson.*—It is. But there is this drawback that the ryot hates green manure. He loses a crop. It is very difficult for him to get in sufficient labour to turn it in; if there is any failure of rain fall the green manure does more harm than good.

*Mr. Mathias.*—As regards oil cake has the cultivator any objection to its use?

*Mr. Hutchinson.*—None at all, but it is more expensive.

*Mr. Mathias.*—Even the cheaper kinds?

*Mr. Hutchinson.*—There are none cheap enough. The point is this that there is not enough of either oil cake or cow dung in India to meet the requirements of the ryot. It must be supplemented. That we are doing just now is this. You want to put organic matter in your soil and keep the soil in good condition, but there is not enough organic matter available to meet the requirements of the whole of India for use as manure. If you supplement it with artificial manure such as sulphate of ammonia and superphosphate then you can cover at least twice the area with the same supply of organic manure that you are doing now.

*President.*—Take the Madras Presidency where you say that the ryot has learnt the use of some of the artificial fertilizers. Taking the average rice crop in the Madras area how much manure would he require per acre for the rice crop?

*Mr. Hutchinson.*—He puts on a maund of sulphate of ammonia on an acre of rice. That costs him Rs. 7. Then he puts on 1 cwt. of superphosphate which costs him Rs. 3 to Rs. 4.

*President.*—Say Rs. 10 or Rs. 12 per acre.

*Mr. Hutchinson.*—Yes. Then, the average increase in Madras over several hundred demonstration plots in the crop has been 39 per cent. in the last two years and the average nett profit has been Rs. 25 per acre.

*President.*—Will you be able to give us some figures?

*Mr. Hutchinson.*—(Hands in) These figures are the same that I gave to His Excellency the Viceroy because I came to the conclusion that the pronouncement of the Agricultural Commission was so unsatisfactory. May I suggest that what actually happened was that it relied too much on information which was two years out of date. These figures are returns obtained within two years and have been got as a result of our propaganda and the result of our having been able to persuade the Provincial departments of Agriculture to take more interest in manures than they had ever done before and also owing to the reduction in the price of nitrogenous fertilizers. There has not been very much drop in the price of phosphates because it has never been very high. These are the figures (hands in).

*President.*—It would be better if you would state in terms of nitrogen and phosphoric acid and just show the results. Let us take a few of the principal crops. We will take paddy, sugarcane, and cotton, for instance, and then you can tell us what results can be obtained by the use of these manures showing them separately—what would be the increase in the cost of fertilizers, what would be the yield and the difference.

*Mr. Hutchinson.*—I understand that at the present moment your idea is to get information about superphosphate.

*President.*—That is right, and any information that you could give us which would explain the importance of superphosphate and the probable increase in the use of superphosphate would be useful.

*Mr. Hutchinson.*—I think I have indicated that the probable increase is due to the fact that our recommendations and those of the agricultural department will be invariably to back up nitrogen which the ryot is certainly going to use with the superphosphate which he ought to use.

*President.*—The agricultural department is a bit conservative at times!

*Mr. Hutchinson.*—Very cautious!

*President.*—As I say, it looks to the immediate results.

*Mr. Hutchinson.*—I don't know that it does that. For instance the most go-ahead of the directors of agriculture in India is Mr. Anstead of Madras. He will tell you that he does not dare to advocate the use of nitrogen without the backing of superphosphate. That is perfectly sound, but although he is the most go-ahead man he is the most cautious man in regard to that particular point. He does not go in for immediate results; he is actually for sound agriculture.

*Dr. Matthai.*—These are results that you got from experiments conducted by the agricultural department?

*Mr. Hutchinson.*—Some of them are agricultural department, others are our own experiments. They will give you the quantity used per acre, cost and the return.

*Dr. Matthai.*—Would you care to commit yourself to any estimate of the consumption of sulphate of ammonia during the next ten years?

*Mr. Hutchinson.*—No.

*Dr. Matthai.*—I remember a statement was made in London in the course of evidence given by somebody connected with the Imperial Chemical Industries that a cautious estimate was 500,000 tons.

*Mr. Hutchinson.*—The facts of the case are that you have got 250 million acres under arable cultivation in India and there is not a single acre that would not be better by an application of sulphate of ammonia.

*Dr. Matthai.*—If that estimate has any validity, we might assume that there would be at least a demand for 500,000 tons of superphosphates in India.

#### *Combined fertilizers.*

*Mr. Hutchinson.*—In the future, I think, it is extremely probable that superphosphate as a commercial article will give way to the ammonium phosphates as an economic alternative, because if you use a manure such as Leunaphos containing 20 per cent. of nitrogen and 20 per cent. of phosphoric acid you save 5/7th of the cost of moving it from one place to another which is important because the freight charges are very heavy in India.

*President.*—There is so much variation in the soil that you may constantly have to go on varying the proportion.

*Mr. Hutchinson.*—I don't think that is a practical consideration at all wherever you want phosphate and wherever you want nitrogen together you can use a compound like that with safety and with economic success.

*President.*—First of all I think you have got to get the ryot used to the two. Then of course there is the question of the form in which he is going to import it. Isn't that so?

*Mr. Hutchinson.*—Yes, but there is the other point that it is much easier to get the ryot to use one combined manure than to make him use two different kinds at one time.

*Mr. Mathias.*—I take it that there would be considerable demand for superphosphate by itself; for instance as an addition to the cake or green manure or farm manure there should always be some demand for phosphoric acid. Supposing 500,000 tons of fertilizers was necessary we could probably put it down that out of it 10 per cent. would be superphosphate by itself?

*Mr. Hutchinson.*—I think so.

*President.*—Take the whole world at present. You find that in spite of these compound fertilizers a very large quantity of superphosphates is being used.

*Mr. Hutchinson.*—I think that is because combined fertilizers have not been on the market long enough.

*President.*—True, but before the ryot or the farmer gets used to the combined fertilizer superphosphate must be separately used for a considerable period.

*Mr. Hutchinson.*—Undoubtedly.

*President.*—And the main thing, so far as India is concerned, is more or less to bring up the ryot to the use of these articles as fertilizers and put them in his way as cheaply as possible.

*Mr. Hutchinson.*—Our difficulty as a commercial firm is to get the ryot to use something which is entirely new to him. Artificial fertilizer he considers as a *dawai*, a magical application to the soil and in some cases you will find the ryot putting sulphate of ammonia on his crop and then doing no cultivation or weeding at all! These combined fertilizers have this enormous advantage that instead of having to persuade him to use two different kinds of manures and thereby to buy two bags, which is a much more practical difficulty, it is much easier to persuade him to buy one of these combined manures, putting all in one. So, as artificial manures at the present moment are in the pioneer stage, in any development of their use in India one is bound to consider the possibility of these combined fertilizers going right ahead of the other two.



*Mr. Mathias.*—Even supposing the use of combined fertilizers might be extended, there would always be room for the disposal of locally manufactured superphosphates?

*Mr. Hutchinson.*—I think so.

*Mr. Mathias.*—The agricultural department could keep itself in close touch with the manufacturer.

*Mr. Hughes.*—What can you make it of? There are no suitable phosphates in India. What is the use of importing rock phosphates and treating it with acid here when the finished product can probably be carried at the same rate of freight as the crude article.

*Mr. Mathias.*—Other countries are importing rock phosphates, are they not? Speaking generally, if you import rock phosphate into England you have to pay freight on the rock phosphate which is not very much less than the cost of importing rock phosphate into India. You have to import your rock phosphate and export your superphosphate from England to India, while here you can import rock phosphate and manufacture superphosphate on the spot.

*Mr. Hutchinson.*—The only thing I am anxious about is that there should be nothing to prevent the ryot from getting his supply of cheap phosphate to balance his nitrogen.

*President.*—We fully realize that and we are considering how it can be put in his way without increasing his price. We want to decrease the price of all fertilizers as far as possible.

*Mr. Hutchinson.*—Have you come across the suggestion of the possibility of using Indian rock phosphate?

*Dr. Matthai.*—We had some discussion about the Trichinopoly phosphates.

*Mr. Hutchinson.*—There are the Singbhum phosphates.

*President.*—I understand some people have taken up concessions in the Singbhum area.

*Mr. Hutchinson.*—I wonder if you have come across this point of view that although the Singbhum phosphate is entirely unsuitable for making acid phosphate there is nothing inherently impossible in making use of it for the manufacture of phosphoric acid by the pyrolytic process so long as cheap fuel is available.

*President.*—I believe there is one company just now which is investigating it, but how far they have gone I do not know.

*Dr. Matthai.*—Is it your suggestion that there is some possibility of using Singbhum rock phosphate for the production of phosphoric acid?

*Mr. Hutchinson.*—Yes. I think the point is that you must have phosphate for Indian agriculture. That is the basic need of practically all soils. In some of the soils you put phosphate and take a crop like mustard; you will find that you get four times the crop that you get without it. That is what has happened in Bihar. As regards the rest of India it is only a question of variation of degree. It is perfectly obvious that you must have phosphate for Indian agriculture.

*President.*—Would you be able to give me the price of imported superphosphate, Mr. Hughes?

*Mr. Hughes.*—We are selling at Rs. 80 a ton in Madras.

*President.*—What percentage is that?

*Mr. Hughes.*—18 to 20 per cent. phosphoric acid.

*Dr. Matthai.*—Does the ryot get it at Rs. 80?

*Mr. Hughes.*—He gets it at Rs. 80 plus the railway freight.

*President.*—That is Rs. 4 a unit. The price of superphosphate, 33 per cent. f.o.r. works comes to £3. That is 1s. 10d. a unit and this is Rs. 4-0-0. When you say 20 per cent. do you mean phosphoric acid content?

*Mr. Hughes.*—Yes.

*President.*—That will correspond approximately to the price of 1s. 10d. that I have given, so that what it means is that the cost of transport and other charges take away about a rupee a unit.

*Mr. Hutchinson.*—What possible sources of rock phosphate are you thinking of from which to import it into India?

*President.*—It can be imported either from Africa or Egypt. Will you be able to give us the cost of imported rock phosphate?

*Mr. Hughes.*—No.

*Dr. Matthai.*—As a matter of fact Messrs. Parry and Company, Madras, are using small quantities of Algerian rock phosphate.

*Local manufacture of superphosphate.*

*President.*—What we are considering is this: we want to encourage the use of artificial fertilizers in the country, superphosphate being one of them. That would mean of course the encouragement of the manufacture of sulphuric acid and our idea is that it should be made possible to produce sulphuric acid and the other products on as large a scale as possible, and superphosphate is one of those articles which would consume considerable quantities of sulphuric acid. We don't wish to do anything which would raise the price of superphosphate because that would defeat the object in view. Therefore, we are considering whether we could not develop the use of fertilizers by cheapening it and we are considering whether it could not be cheapened if we recommended a bounty on the production of sulphuric acid which is used in the production of superphosphate. Our proposals would extend only over a very few years subject to a further enquiry and it is important for us therefore to make an estimate as to what would be the consumption, say, in the next five years.

*Mr. Hutchinson.*—It is a very difficult thing to do.

*President.*—It can be very approximate. It may be 10,000 or 15,000 or 30,000 tons. Could you venture on some suggestion, say, in the next five years?

*Mr. Hutchinson.*—I shouldn't like to do that because it is such a fatal thing to do.

*President.*—What will happen is this: we make an estimate taking 20,000 tons which means in terms of sulphuric acid is 10,000 tons and we recommend a certain bounty. If we take a very low figure, and if the production goes up, the same amount of bounty has to be distributed on a larger production and we want to avoid that if possible. It is for that reason that we want to take a figure which, on an average, would give them the amount of bounty which we think they ought to get. That is the reason why I am asking that question. In the case of a bounty Government cannot say "we will give you so much per ton without fixing the quantity".

*Mr. Hutchinson.*—Fixing it in accordance with the development of the industry, that would be the wisest thing. Do you want a minimum figure?

*President.*—Yes, so that we can tell Government "this is your liability within the next five years on which you are expected to give a bounty." The idea also is this. I think you made a suggestion that Government ought to spend some money on propaganda and assist you.

*Mr. Hutchinson.*—On the contrary our suggestion was that we should subsidise the Government department of agriculture.

*President.*—This may amount to a subsidy by Government for the purpose of propaganda.

*Mr. Hutchinson.*—Government should be responsible for that. I say that after 20 years of work they have done nothing at all on fertilizers.

*President.*—The easiest way to convince the ryot is to show by propaganda that if he spends Rs. 5 on superphosphates, he gets Rs. 15.

*President.*—You have to take the chance. The whole thing is this: in the case of nitrogenous fertilizers, I admit that a bounty will not do, because

it will not necessarily bring down the price of sulphate of ammonia. It is quite possible that if a bounty on superphosphates is given, the manufacturers of superphosphates might charge the world price and pocket the whole of the bounty.

*Mr. Mathias.*—Any bounty on superphosphates manufactured in this country would operate to extend the use of superphosphates. Also the more superphosphates you make, the cheaper you can get your sulphuric acid for other products.

*Mr. Hutchinson.*—The probable difficulty is really the question of propaganda. It all depends on that, because all your recommendations would depend on the use of superphosphate by the ryot.

*President.*—There will be more propaganda, because people interested in the manufacture of superphosphates will be interested in the manufacture of other products.

*Mr. Mathias.*—We found that certain firms who manufacture ploughs locally are keeping in very close touch with the Agricultural Department in the matter of propaganda and through the assistance and local knowledge of the Department they are able to secure a larger market than in recent years.

*Mr. Hutchinson.*—I may tell you that our firm spent £50,000 last year on fertilizer propaganda in India.

*Dr. Matthai.*—Propaganda to be effective should be based on what you can show as the margin between expenditure and yield; that is real propaganda. Supposing there is a scheme which brings down the expenditure, obviously your central propaganda committee would be able to show a better margin and therefore to that extent your propaganda would be more effective.

*Mr. Hutchinson.*—Yes, it will be more effective in the future, when you have got the price of superphosphate down, and it will have to go down a considerable amount to make any difference as far as propaganda is concerned, because it is relatively cheap at present. If you take the Bombay ryot, he puts 10 maunds of sulphate of ammonia on an acre of cane, 500 maunds of castor cake and 20,000 lbs. of cattle manure. The super costs Rs. 3 or Rs. 2-8-0 which is negligible.

*President.*—Take the more extensive crops like paddy. It is one of the staple crops of the country.

*Mr. Hutchinson.*—Do you think it will make much difference to the ryot whether we charge him Rs. 3 or Rs. 3-8 for superphosphate?

*Mr. Mathias.*—On the other hand there is this to be said for the suggestion that we have under consideration, that the money which the Government would pay out might in time return to the pocket of the agriculturist and it is not very often that a proposal for bounty has that effect. The manufacturer would be able by increasing his production of sulphuric acid, to reduce its cost and that would enable him to produce his other products more cheaply. On the other hand the cultivator would probably in time obtain his superphosphate cheaper.

*President.*—You have given us the price at which you are selling superphosphates. Can you give us the f.o.b. price and the other charges?

*Mr. Hughes.*—The price fluctuates.

*President.*—That we can't help. You have got to take a particular date for it, and say this is the f.o.b. price and this is the c.i.f. price Madras, Bombay or Calcutta whichever it is. We really want to know what advantage a man would have if it was manufactured here and for that purpose it is very important for us to know what the freights and the other charges are.

*Mr. Hughes.*—We shall have to ascertain that by writing home. I have no idea of what the freights are. The best thing would be to write to Holland. In our documents freight is not shown.

*President.*—You can get us the information, can you?

*Mr. Hughes.*—Yes, but it will take some time.

*President.*—We want it for the sulphate of ammonia as well as for superphosphates.

*Mr. Hughes.*—I will let you have it.

*President.*—Please give us the price and the contents and whether you are talking in terms of ammonia or nitrogen.

*Mr. Hutchinson.*—We will give you the contents of nitrogen and phosphoric acid.

#### *Bone superphosphate.*

*Dr. Matthai.*—On this question of bones, at present bone superphosphate is very much more expensive than rock superphosphate, is it not?

*Mr. Hutchinson.*—Yes.

*Dr. Matthai.*—Taking into account the difference in the manurial quality between the two, do you think that at present prices they are much about the same from the point of view of the real cost to the ryot?

*Mr. Hutchinson.*—I don't think so, because the activity of the bone as a source of nitrogen is very uncertain, but as a source of phosphate, it is extremely slow.

*Dr. Matthai.*—Assuming that the ryot gets his rock superphosphate at Rs. 85 a ton and his bone superphosphate at Rs. 116, that is at a difference of about Rs. 30, is it possible to maintain that this difference of Rs. 30 is really so much more manurial quality that he gets out of the bone superphosphate?

*Mr. Hutchinson.*—I don't think it is.

*Mr. Mathias.*—There is a certain amount of nitrogen contained in the bone superphosphate?

*Mr. Hutchinson.*—Very little.

*Mr. Mathias.*—It is supposed to be 4 per cent.

*Mr. Hutchinson.*—Yes. It takes a long time to act.

*Dr. Matthai.*—So that I expect that so far as the use of superphosphate is concerned, it will restrict itself to the use of rock phosphate.

*Mr. Hutchinson.*—Yes. I think you can wash out the bones.

*Mr. Mathias.*—I understand that bones are largely used for the manufacture of gelatine.

*Mr. Hutchinson.*—The facts of the case are apparently simple. You get £9 a ton for bones in India and I think one firm from Bombay giving evidence before the Royal Commission on Agriculture gave this figure of £9 a ton. He went on to say that every year India was losing 4,000 tons of nitrogen and 23,000 tons of phosphoric acid on an export of 100,000 tons of bones every year. If you take that value of £9 a ton, for 100,000 tons you get enough money to buy the equivalent of phosphate and nitrogen not in the form of bones which is very slow and uncertain, but in the form of sulphate of ammonia and super and still have £50,000 sterling left over. It is quite out of the question to use an expensive source of phosphate when you have got something cheaper. As you know if you lowered the price of bones to the Indian collector, they are not likely to be collected at all.

*President.*—£9 a ton for bone meal at Liverpool, is it not?

*Mr. Hutchinson.*—Yes. That was two years ago. I was going on the figures given before the Royal Commission on Indian Agriculture.

#### *Distribution upcountry.*

*President.*—You do the distribution, do you?

*Mr. Hughes.*—Yes, we and Messrs. Shaw Wallace and Company.

*President.*—First of all you have got to take it to the ports from England or Holland or wherever it may be?

*Mr. Hughes.*—Yes.

*President.*—Then I take it you have to distribute it to the districts. So I take it you have to stock it at the port in the first instance.

*Mr. Hughes.*—Yes, and then stocks are held up country.

*President.*—And at various distributing centres. Then you distribute from there?

*Mr. Hughes.*—Yes.

*President.*—Is it necessary to have these stocks up country?

*Mr. Hughes.*—Yes, to have it readily available when the season is on.

*President.*—Would it not suffice if you send it direct from the ports?

*Mr. Hughes.*—How can we supply a man who require one bag? We have stocks in depôts. The buyer can always go there and buy one or two bags just as he wants. We have about 240 depôts and all these depôts carry stocks of sulphate of ammonia and superphosphate.

*President.*—I am not suggesting that you should not have representatives in the districts who should be in touch with the ryots, but I am asking you whether it is necessary to keep local stocks.

*Mr. Hughes.*—Yes, if the thing has to be kept going properly, stocks must be kept in depôts all over the place.

*President.*—That would add considerably to the cost of distribution.

*Mr. Hughes.*—Yes.

*President.*—That would happen even if the superphosphates were manufactured in the country, would it not?

*Mr. Hughes.*—It depends on what the manufacturer wishes to do.

*President.*—Could you suggest to us what the Nitram Limited would do in the event of a local industry being started for the manufacture of superphosphates?

*Mr. Hughes.*—They will do nothing.

*Dr. Matthai.*—Supposing they could get their superphosphate in India cheaper, what would they do?

*Mr. Hughes.*—It would be bought here. We may also act as distributors to Indian manufacturers. It is quite immaterial to us where it comes from.

*President.*—At present the Imperial Chemical Industries is not interested in this.

*Mr. Hughes.*—No.

*President.*—They are interested in compound fertilisers?

*Mr. Hughes.*—Yes.

*President.*—It would be to your interest to push more the sale of compound fertilisers than single fertilisers.

*Mr. Hughes.*—Very probably.

*President.*—If you want to push your compound fertilisers, you would obviously not encourage the use of separate fertilisers?

*Mr. Hughes.*—We should probably push the sale of compound fertilisers. It all depends on the tendency of the market. If the market wants single fertilisers, they will always be sold.

*President.*—We really want to know what the difference is in the cost to the ryot taking the two separately and comparing them with your compound fertiliser.

*Mr. Hughes.*—We can send you these figures in.

*President.*—Mr. Hutchinson, there are these nitrogenous fertilisers available in the country such as oil cake and things like that. These are available and the ryot does actually use them. He may use them in conjunction with superphosphate. Where those are not available he will use the nitrogenous fertiliser as well as phosphatic fertiliser or the compound fertiliser, is that the position?

*Mr. Hutchinson.*—That is right. Generally speaking we may say that whenever you use super, if you can combine it with an organic fertiliser, the combination will be better than using them separately.

*President.*—That is what I want to understand. It is quite possible that in some parts of the country organic fertilisers may be available and in that case if the ryot uses superphosphate he will get better results, will he not?

*Mr. Hutchinson.*—Generally speaking that is true.

*President.*—We are only concerned with a very short period and it is quite possible that though compound fertilisers may be in the long run used on a larger scale, so long as this other condition remains, there will be room for superphosphates being used by itself?

*Mr. Hutchinson.*—Yes.

*President.*—This deficiency of fertilisers applies practically to all rice crops, I take it in India and Burma. I am asking you this question, because the Agricultural Commission said that this deficiency was more obvious in the Peninsula and Burma.

*Mr. Hutchinson.*—The average yield of paddy in India last year was 850 lbs. per acre, that is a little over 10 maunds, whereas the average yield in Spain was 5,000 lbs. and the difference is due to the use of fertilisers.

*President.*—Do you mean to say it is only 850 lbs?

*Mr. Hutchinson.*—Yes. That is the average for the whole of India. In Madras it is about 1,000 lbs. I think it is very obvious that that difference has got to be made up.

*President.*—I think in Burma on the poorer soil it is about 10 to 12 baskets of 60 lbs. and on the better ones just about double.

*Mr. Hutchinson.*—I think the average in Burma is better than the average in India.

*President.*—Yes. When we have got such a large area under paddy cultivation, it is obvious that if the ryot were to learn the use of fertilisers, the potential market must be a very large one.

*Mr. Hutchinson.*—Yes. Our organisation has got striking results in the last two years. It is a revelation that instead of having to rely on the revenue crops for the use of artificial fertilisers, it is the country crop that has given the best economic return.

*Dr. Matthai.*—By revenue crop you mean sugar cane, jute and so on, don't you?

*Mr. Hutchinson.*—Yes. It was the revenue crops such as cane, cotton and jute on which our organisation expected to get obvious economic returns from artificial fertilisers. It has been an eye opener to us in the last two years that it is the rice crop that has given most consistent economic returns from the use of fertilisers like sulphate of ammonia and superphosphate, and that is most encouraging.

*President.*—The principal rice growing areas are Bengal, Burma and Madras.

*Mr. Hutchinson.*—Yes and also United Provinces.

*President.*—That is a very different kind of rice.

*Mr. Hutchinson.*—The United Provinces has gained the most by the use of sulphate of ammonia. You have got 80 million acres under rice in India, so if you take no other crop at all, it would be enormous from the economic side. In actual practice field crops, like paddy have given big return which is a thing you can't ignore in using a thing like artificial fertilisers.

*President.*—Supposing the use of superphosphates was to be developed and supposing superphosphates were manufactured locally, do you suggest that the Agricultural Department would be the proper medium for distributing?

*Mr. Hutchinson.*—No, I don't think they will ever act as distributors.

*President.*—They would tell the manufacturer where it is wanted.

*Mr. Hutchinson.*—They will tell us where it is wanted.

*Mr. Mathias.*—In actual practice they do a certain amount of distribution by means of formation of Associations in the Central Provinces, do they not?

*Mr. Hutchinson.*—Seed distribution was largely undertaken by the Co-operative Associations in the Central Provinces.

*Mr. Mathias.*—Something on that line might be done for fertilisers.

*Mr. Hutchinson.*—Yes.

*President.*—I think one of your witnesses suggested that it was done by Government in Egypt and that the Imperial Chemical Industries sold to the Egyptian Government these fertilisers and they distributed them to their departments.

*Mr. Hutchinson.*—I think the conditions there are quite different from those in India. In India no Government can say to the ryot "grow this sort of crop and use this sort of fertiliser in this way", whereas in Egypt they can. Lands in Egypt are held very largely by Agricultural Syndicates and they use fertilisers.

*President.*—What I was interested in asking you was how, apart from your propaganda, supposing superphosphates were manufactured on a large scale, they could be popularised?

*Mr. Hutchinson.*—In the same way as we are doing now by propaganda through the Agricultural Department and by our own organisation.

*President.*—The difficulty about your organisation is the one that I pointed out a little while ago, viz., that you are interested in one kind of fertiliser and it would not be to your interest obviously to push anything else.

*Mr. Hutchinson.*—I would not like to say anything about that. I am only their scientific adviser, but I don't know of any reason why we should not be interested in all suitable fertilisers.

*President.*—You may, but on the other hand, you may say "it is more to our interest to push our fertilisers".

*Mr. Hutchinson.*—I don't know. Our present effort, however, is not to push one thing or another, but to teach the ryot to use artificial fertilisers.

*President.*—If that policy was maintained, there would be no objection, but if the Government paid a bounty for the manufacture of superphosphates, for instance and the Imperial Chemical Industries got interested in some compound fertiliser . . . . .

*Mr. Hughes.*—There will always be a market for single fertiliser such as sulphate of ammonia or nitrate of soda or superphosphate, but Messrs. Shaw Wallace and Company have introduced American compound fertilisers, *é.g.*, ammophos, and we are bound to follow.

*Mr. Hutchinson.*—Although at the present moment their principal work is that of propaganda, they have in the future to look at it from this point of view that most of the soils require the application of phosphoric acid, but probably it is not every soil that is benefited by an application of nitrogen will be benefited by an annual application of superphosphate, so that as far as the relative advantage of compound phosphate and superphosphate and sulphate of ammonia is concerned, you may have a situation where it would be of advantage to use fertilisers every year in this way that you use sulphate of ammonia one year and superphosphate another year or in two years.

*President.*—We examined Dr. Clouston and he expressed an opinion more or less similar to yours that phosphates remained in the soil much longer than nitrogen and therefore, as you said just now, the ryot might require nitrogen every year but not necessarily superphosphate.

*Mr. Hutchinson.*—That is what is going to happen in the future. I don't think there will ever be a case for the application of this compound

phosphate on every soil every year, but in this pioneer stage it is easier for propaganda purposes.

*President.*—I quite understand that the soil might have been so much impoverished in the past of phosphates that it might be necessary to put in phosphates every year for a little while, but not after a time.

*Mr. Hutchinson.*—No. You must deal with this question as being one based on entirely economic condition. It is very difficult for that reason to say what is the best form of propaganda and it is extremely difficult to say how it is going to work out in the future.

*President.*—We have got to make certain proposals that would lead to the development of the Chemical industry. That is our main function. This question of fertilisers is linked with that of course and therefore we must not do anything which would raise the price of fertilisers. That is all we are concerned with just now.

*Mr. Hutchinson.*—I am very glad to hear that your Board has arrived at the opinion that artificial fertilisers will play a more important part than that suggested by the Royal Agricultural Commission.

*President.*—The opinion of the Royal Commission is supposed to be the opinion of an expert body on points on which they investigated.

*Mr. Hutchinson.*—The figures I have given don't coincide with their information.

*President.*—It would naturally follow, would it not, that once you get better crops by the use of artificial fertilisers, as you go along, you will require them more and more?

*Mr. Hutchinson.*—Yes.



**THE TATA IRON AND STEEL COMPANY.**

**Oral Evidence of Messrs. J. C. K. PETERSON, S. K. SAWDAY and  
D. M. MADAN recorded at Bombay on Monday, the 26th  
November, 1928.**

*Apathy of interested parties.*

*President.*—Before proceeding with the enquiry I would like to ask you if you would give the Board a list of people who manufacture sulphuric acid in the country. It is rather important. These people who know what we are doing apparently don't seem to take any interest in what is going on.

*Dr. Matthai.*—There are six on the Bengal side.

*Mr. Peterson.*—Yes.

*President.*—The proposal now before the Board is that a bounty should be given on the production of sulphuric acid as a means of giving protection to the subsidiary industries. Supposing we accept their proposal and make a recommendation for a bounty, it is quite obvious we will have to confine the proposal more or less to people who have appeared before us and stated their case and it is very likely that those people who do not come forward and state their case might be entirely left out. We have issued a communiqué asking for representation from people interested in heavy chemicals. But I understand that some of these people who do manufacture sulphuric acid have not appeared at all. We will make one more effort, though I don't think that they deserve that we should go out of the way to draw their attention to what is going on.

*Mr. Sawday.*—Besides these pig iron people there are Messrs. D. Waldie and Company, Bengal Chemical Works, etc.

*President.*—Some people do manufacture coke, don't they?

*Mr. Sawday.*—Yes, about 6 or 7.

*President.*—Is sulphate of ammonia really a bye-product of coke?

*Mr. Sawday.*—Yes.

*President.*—In that case there must be others who manufacture sulphate of ammonia.

*Mr. Sawday.*—There are 6 or 7 people who manufacture. They are all in the Sulphate of Ammonia Federation.

*President.*—It is very important for the Board to know how much sulphuric acid is manufactured in the country to start with.

*Mr. Madan.*—They don't all make sulphuric acid.

*Mr. Peterson.*—A good many of these people will be buying sulphuric acid.

*Dr. Matthai.*—Who are these people that you are talking about?

*Mr. Sawday.*—Manufacturers of Sulphate of Ammonia.

*President.*—Will you kindly give us the names?

*Mr. Peterson.*—With regard to sulphate of ammonia, I would suggest that you should write to Messrs. Shaw Wallace and Company who are the agents of the Federation in India.

*Dr. Matthai.*—What is this Federation?

*Mr. Peterson.*—The Sulphate of Ammonia Federation is a Federation for marketing sulphate of ammonia throughout the world.

*Dr. Motthai.*—Is it connected with the Imperial Chemical Industries?

*Mr. Peterson.*—Yes, it is.

*President.*—The Imperial Chemicals are appearing before us next month.

*Mr. Madan.*—Messrs. Nitram Limited market not only the nitrates of the Imperial Chemical Industries, but also those of many others.

*Mr. Peterson.*—Messrs. Shaw Wallace will be able to give you full information about the Sulphate of Ammonia Federation. They can give you the names of the principal manufacturers of sulphate of ammonia.

*President.*—It does rather seem odd that the Board should look after these people.

*Mr. Peterson.*—I expect that they are not aware that you are going to propose a bounty on the manufacture of sulphuric acid. They would probably appear as soon as you said that a bounty might be given.

*President.*—This is being discussed for the last several weeks.

*Mr. Sawday.*—These discussions are not reported in the Calcutta papers.

*President.*—They know that there is this enquiry into sulphuric acid. There is a proposal that the freights should be reduced both on the raw materials and on the finished products which is a kind of indirect bounty. It is possible that if we accept that proposal we may frame our recommendations in such a way that people who have not appeared before us are left out.

*Mr. Peterson.*—Shall we write to the Sulphate of Ammonia Federation and draw their attention to this?

*President.*—I think it would be just as well for you to inform them.

*Mr. Peterson.*—We will do so.

*President.*—The idea underlying this proposal is simply this: sulphuric acid enters into the manufacture of so many of these other chemicals and it might be much simpler to say that 50 per cent. of sulphuric acid enters in fertilisers. Instead of recommending protection on fertilisers, we simply say that we recommend so much bounty per ton of sulphuric acid produced in the country which would be the equivalent of so much in terms of the duty.

*Dr. Matthai.*—Sulphuric acid taking the place of ingot in the bounty scheme in steel.

#### *Sulphuric acid costs.*

*President.*—Let us take up the question of sulphuric acid. I take it, *Mr. Peterson*, that you don't wish to treat anything sent to the Board as confidential.

*Mr. Peterson.*—No.

*President.*—Your Chamber acid, I take it, is about 65 per cent. sulphuric acid.

*Mr. Peterson.*—Yes.

*Dr. Matthai.*—What strength of acid is used for sulphate of ammonia? Is it Chamber acid or has it got to be slightly concentrated?

*Mr. Peterson.*—It is used as it is.

*Dr. Matthai.*—What exactly is the point of this note: "The production is of acid containing 77 per cent.  $H_2SO_4$ "?

*Mr. Peterson.*—That is not intended for the manufacture of sulphate of ammonia. I gave you an estimate of the cost of producing sulphuric acid.

*Dr. Matthai.*—Am I to take it that this statement of costs of sulphuric acid that you give here is the cost of sulphuric acid of 77 per cent.?

*Mr. Peterson.*—Yes. This is simply an estimate of the cost of production under present conditions.

*Dr. Matthai.*—Of commercial acid.

*Mr. Peterson.*—Yes, this is not an actual cost. It is an estimate.

*President.*—This 77 per cent. is the theoretical percentage of commercial acid.

*Mr. Peterson.*—Yes.

*Dr. Matthai.*—So that this includes not merely the cost of making chamber acid but also concentrating it to 77 per cent.

*Mr. Peterson.*—Yes.

*President.*—Your cost for 1927-28 were Rs. 36'67. That is on 65 per cent. basis I take it.

*Mr. Peterson.*—Yes.

*President.*—In your new estimate the price would come down to Rs. 37 though the percentage would be 77 per cent., is that right?

*Mr. Peterson.*—Yes. This is not an estimate of ours. This is an estimate which we happen to possess.

*President.*—You say it has recently been made.

*Mr. Peterson.*—Yes, very recently.

*President.*—That is to say, for 12 per cent. more acid, you won't spend more than you are spending. That is really what it comes to.

*Mr. Peterson.*—Yes, that is what it comes to.

*President.*—As regards sulphur, how much a ton is this sulphur? It seems that you have adopted a higher figure for sulphur. Is that owing to a higher percentage or what?

*Mr. Madan.*—The cost of sulphur is going up.

*President.*—What is the c.i.f. price of sulphur?

*Mr. Madan.*—It was 28 dollars two years ago. It has gone up to 31 and it is still rising. It might be 32 dollars.

*President.*—How many rupees is that?

*Mr. Madan.*—About Rs. 88.

*President.*—And landed at the works?

*Mr. Madan.*—It is about Rs. 103 including the wastage.

*President.*—What are the actual charges?

*Mr. Madan.*—The freight is Rs. 12.

*President.*—From Calcutta to Jamshedpur?

*Mr. Madan.*—Yes, sulphur is considered a very bad article to carry.

*Mr. Peterson.*—We will give you a full statement showing what the last consignment has cost us.

*President.*—Have you long-term contracts or do you buy from time to time as you require?

*Mr. Peterson.*—We buy from time to time.

*Mr. Madan.*—We buy from the Sulphur Export Corporation. We buy absolutely at the best price possible.

*President.*—Do they make a reduction for special quantities?

*Mr. Madan.*—We buy 300 tons monthly.

*President.*—What I want to know is this. What is the rebate that you get if you buy in large quantities?

*Mr. Peterson.*—The price varies according to the prevailing price of sulphur.

*President.*—For large quantities?

*Mr. Madan.*—The last figure is 32 dollars. We have made a contract for the whole year at the rate of 300 tons a month.

*Mr. Peterson.*—We had better give you a statement of our purchases last year showing quantities, etc. Do you want the cost of unloading also?

*President.*—Yes, the costs that you have to add to the c.i.f., that is to say, not taking the loss into account.

*Mr. Peterson.*—We will send you a statement.

*Dr. Matthai.*—How long is it since the price started going up?

*Mr. Madan.*—About one and a half years ago. The last purchase which we made was early in 1927 when the price was about 29 dollars. Since then, the reports which we have received go to show that the price is going up. We have arranged for further purchases after that at 32 dollars.

*President.*—Is there no reason given for this?

*Mr. Madan.*—That is the American Sulphur Corporation's control price. They have some arrangement with Greek suppliers by which the latter have been given a quota. After the quota, the American Corporation begin to supply.

*Dr. Matthai.*—Do you mean by Greek suppliers Sicilian suppliers?

*Mr. Madan.*—Yes.

*Dr. Matthai.*—The point that interests us is this. When the price of sulphur in the United Kingdom moves, does the Indian c.i.f. price also move in the same direction?

*Peterson.*—I don't think that there would be very much import into India except by these large manufacturers.

*Dr. Matthai.*—What we were told is this—that if sulphur were sold in the United Kingdom, one thing at any rate that would determine that price would be the price of pyrites at the time because they compete. There is no question of local pyrites in India, is there?

*Mr. Peterson.*—We have not been able to find any.

*Dr. Matthai.*—So that the question is whether the price of sulphur in European countries moves in the same way as the price in India or whether it moves differently.

*Mr. Madan.*—We have not studied that question.

*President.*—Do you think that there would be a very big variation in the price in future? Can you give us some idea? What do your experts say?

*Mr. Peterson.*—We really do not know what the world supply of sulphur is.

*Mr. Madan.*—We did buy about four years ago at about Rs. 80 c.i.f. but since then the price has been going up all the time.

*Dr. Matthai.*—I remember that at the time when the question of the duty on sulphur was examined, the price was somewhere about Rs. 120.

*Mr. Peterson.*—The price with the duty was about that figure.

*President.*—As regards the works costs; you have taken nitrate of soda at a higher figure.

*Mr. Peterson.*—In the second estimate?

*President.*—Yes.

*Mr. Madan.*—We generally purchase it.

*Mr. Peterson.*—It is merely a round figure.

*President.*—You use about 20 lbs. per ton.

*Mr. Peterson.*—31 lbs.

*President.*—What is the consumption of sulphur per ton of sulphuric acid?

*Mr. Peterson.*—556 lbs.

*Dr. Matthai.*—That is about  $\frac{1}{4}$  ton.

*Mr. Peterson.*—Yes.

*President.*—The cost above material is Rs. 7 in your new estimate.

*Mr. Peterson.*—About that.

*President.*—If you compare this with the cost above material given in the statement in Volume II of the Steel Report, 1926, there is a saving of Rs. 2'44.

*Mr. Peterson.*—Yes.

*President.*—Might not this be due very largely to allocation?

*Mr. Peterson.*—Very probably.

*President.*—May I know whether in the estimate that you have made you have treated the plant as entirely separate?

*Mr. Peterson.*—Yes, that is the idea.

*President.*—Therefore it is quite possible that your allocation may be very different.

*Mr. Peterson.*—Yes, it is possible.

*President.*—May we take it that the cost above material of Rs. 7 is on the plant manufacturing sulphuric acid?

*Mr. Peterson.*—Yes.

*President.*—Then, really it does seem to me that the cost of sulphur matters a great deal.

*Mr. Peterson.*—That determines the total cost.

*President.*—Now the point is this. Take Europe for instance. Supposing you use  $\frac{1}{3}$  of a ton of sulphur, your disadvantage is the freight on that plus transport charges. If you take in round figures the cost of one-third ton of sulphur as Rs. 33, the disadvantage may come to Rs. 4 or Rs. 5.

*Mr. Peterson.*—Yes, but the manufacturers of sulphuric acid in Europe have also to import sulphur.

*President.*—What disadvantage have you got purely as regards raw materials compared with the foreign manufacturer who uses sulphur?

*Mr. Peterson.*—It really comes down to the question whether the freight disadvantage is greater on the raw sulphur or on the acid.

*President.*—Supposing the British manufacturer gets sulphur at £6 c.i.f.?

*Mr. Peterson.*—The man who produces sulphuric acid manufacture something else.

*President.*—He gets sulphur at £6 c.i.f. and the transport charges may come to about 5 shillings, the total being £6-5-0, or about Rs. 84 as against your Rs. 103. The difference comes to Rs. 19, and one-third of it is Rs. 6. That is your disadvantage.

*Mr. Peterson.*—Yes.

*President.*—Supposing you had an up-to-date plant—the same as they have—your labour and other charges would be proportionately lower compared to their charges.

*Mr. Peterson.*—I doubt it.

*President.*—You don't think that they would be lower.

*Mr. Peterson.*—No, they would probably be higher.

*President.*—If you have all labour saving appliances, it should not cost you more. The whole point is this. Where you have to use manual labour pure and simple, in that case, there may be no saving. But if you use a machine which requires only one man, it should not require more than one man here.

*Mr. Peterson.*—It would require more than one man.

*President.*—It should not. Therefore it is quite possible that where in both countries machinery is used, India should have some advantage so long as labour in this country is cheaper. But, of course, we cannot say how much it amounts to.

*Mr. Peterson.*—I don't think that there would be any practical advantage in that.

*President.*—The disadvantage of Rs. 6 must more or less remain so long as freights continue to be higher.

*Mr. Peterson.*—It would disappear in time as labour became educated, and more skilled.

*President.*—I am talking of the freight disadvantage. That also must disappear gradually to some extent when you get cheaper freights to India.

*Mr. Peterson.*—That would disappear slowly.

*Dr. Matthai.*—You don't sell any of your sulphuric acid, do you?

*Mr. Peterson.*—We sell some quantity to the Tinplate Company. We really sell them for their convenience. They complain that we do not give them enough but we have not enough to spare.

*President.*—In 1923-24 when you were producing 5,400 tons of sulphuric acid, your cost above material was about Rs. 17 and it came down to about Rs. 10 when the production went up to 14,000 tons.

*Mr. Peterson.*—That was probably due to the new plant which we installed at about that time. The figures for 1926-27 and 1927-28 are as follows:— Last year it has come down by Rs. 1½.

*President.*—That is due to what?

*Dr. Matthai.*—That is due to fuel I expect.

*Mr. Peterson.*—Yes, and also to labour.

*President.*—The output was about the same.

*Mr. Peterson.*—Yes. For the past year, the saving has come about purely in labour cost per ton.

*President.*—What I am suggesting is this. In 1923-24, your cost above material was Rs. 17. In the new estimate that you have given, you show Rs. 37 as being the cost of sulphuric acid per ton on the basis of 900—1,000 tons per month and Rs. 40.75 on the basis of 340 tons per mensem. The latter figure is for one-third of the output. That is what I do not understand.

*Mr. Peterson.*—That is probably due to salaries.

*President.*—That reduction is not sufficient.

*Mr. Peterson.*—We will send you a note showing the comparison between 1924 and the present year.

*President.*—We want to know how your costs will come down with an increased production.

*Mr. Peterson.*—We will send it to you later.

*President.*—We want to know that because these other people are manufacturing 1,000 tons a year. Their costs are very high at present and they expect to bring them down by a very big figure if the output goes up to 8,000 tons and I want to see whether there is anything in it.

*Mr. Peterson.*—I will send you a note on that, but it may take some time for you to get it. If necessary I will send some one to give evidence.

*President.*—Is this your maximum capacity?

*Mr. Peterson.*—Yes, we cannot make any more at present.

*President.*—How many chambers have you?

*Mr. Madan.*—We have got four different units producing about 1,300 tons a month.

*Dr. Matthai.*—That is 65 per cent. acid, is it not?

*Mr. Madan.*—Yes.

*Dr. Matthai.*—That is to say, it would be roughly equal to 8,000 tons a year on a cent. per cent. basis.

*Mr. Madan.*—Yes.

*President.*—Dharamsi's plant is about 8,000 tons taking it on cent. per cent. basis. It corresponds to your plant.

*Mr. Peterson.*—Probably it does, but I am not certain.

*Mr. Madan.*—Ours is 65 per cent. On cent. per cent. calculation our output will be about 10,000 tons.

*President.*—Is there really much more wear and tear in the chemical plant than in the other plant?

*Mr. Peterson.*—The lead chambers have to be renewed constantly.

*Dr. Matthai.*—Provided you renewed the lead from time to time there is nothing else in the plant which is subject to wear?

*Mr. Madan.*—It is mainly the lead plates.

*Mr. Peterson.*—I will give you the details.

*President.*—What I want to know is, does the plant want more repairs? As it gets older, in order to maintain its efficiency have you got to spend more and more money on the plant?

*Mr. Peterson.*—I will give you details.

*President.*—Who is in charge of the sulphuric acid plant in Jamshedpur?

*Mr. Madan.*—Mr. Cartland.

*President.*—You supply acid to the Tinplate Company?

*Mr. Madan.*—Yes.

*President.*—How do you send it?

*Mr. Madan.*—In tank wagons.

*President.*—The Railway Company supply the wagons?

*Mr. Madan.*—Yes.

*President.*—How many wagons have you got?

*Mr. Peterson.*—I think there are only two.

*President.*—How much do you send them in a year?

*Mr. Peterson.*—We are sending a maximum of 200 tons a month.

#### *Freight rates.*

*President.*—What is the freight from Jamshedpur to Golmuri?

*Mr. Madan.*—They charge Re. 1 per ton.

*Mr. Peterson.*—We have a quoted rate for sulphuric acid from Calcutta Dock to Jamshedpur, a distance of 155 miles, of Rs. 9-12-0 per ton, from Ambarnath to Tatanagar Rs. 5-6 per mile per wagon of 14 tons, that is, about Rs. 25-4 per ton. That quotation was given to the Dharamsi Morarji Chemical Company.

*Mr. Sawday.*—The Tinplate Company are paying Rs. 14 a ton from the Lodhna collieries.

*President.*—Is that a special rate?

*Mr. Sawday.*—I think so.

*President.*—There is another point. In transporting sulphuric acid, except for small users.

*Mr. Madan.*—The rates are 12 annas per maund from Calcutta to Tatanagar for small lots or Rs. 20-7-0 per ton and the B. N. Railway rate as existing for wagon loads between Calcutta and Tatanagar is Rs. 15-12-0 per ton.

*President.*—What is the freight on steel from Bombay to Tatanagar?

*Mr. Peterson.*—Rs. 15 per ton. This has only recently been brought into force.

*President.*—Assuming that the rate on steel is fair, the sulphuric acid rate is not excessive, is it?

*Mr. Peterson.*—It is a very special rate.

#### *Sulphate of ammonia.*

*President.*—As regards sulphate of ammonia I suppose I must take the Wilputte for that?

*Mr. Peterson.*—Yes.

*President.*—What I want to know is, how much sulphuric acid, 65 per cent., is required per ton of sulphate of ammonia?

*Mr. Peterson.*—It is about 1'22.

*Mr. Madan.*—9,024 tons of sulphuric acid to 7,365 tons of sulphate of ammonia.

*President.*—Really speaking two-thirds of the cost of sulphate of ammonia is sulphuric acid taking Rs. 74 as the works cost?

*Mr. Madan.*—45'10 is the sulphuric acid cost as against Rs. 74.

*President.*—That is roughly about two-thirds. That again is a question of allocation. Materials and repairs seem rather a large amount.

*Mr. Peterson.*—I will give you details. That should not be allocation: that would be actual cost.

*Mr. Madan.*—It is repairs and maintenance: it is not only repairs.

*President.*—The two things come to about Rs. 8—labour and repairs—out of Rs. 29. Then the other charges Rs. 6·15 “shipping supplies”: what are these?

*Mr. Madan.*—That includes the price of the bags. Each bag costs about 8 annas.

*President.*—That is packing charges?

*Mr. Madan.*—Yes: “packing charges” is a minimum of Rs. 5.

*Dr. Matthai.*—Four years ago you gave the price of the bags as 14 annas.

*Mr. Madan.*—We used to have double bags in those days when we were not neutralising the sulphate: we are now using only one bag. We save the price of one bag.

*Dr. Matthai.*—In spite of that big reduction your costs have only come down from Rs. 75 to Rs. 74?

*President.*—As far as 1925-26 costs are concerned, that is not really a very appreciable difference?

*Mr. Madan.*—I think as in the case of steel the allocation has been slightly revised.

*President.*—I think we have had a good deal of discussion over this allocation business! If you take your works costs as Rs. 74 then you credit the coke ovens with Rs. 124?

*Mr. Peterson.*—Yes.

*President.*—What is the actual price that you get for sulphate of ammonia *ex-works*?

*Mr. Peterson.*—The price which we get is the federation price which has been fluctuating very considerably. It is about £8-15-0 on the basis of 20·4 per cent. nitrogen.

*President.*—How much is the average price for sulphate of ammonia?

*Mr. Peterson.*—Ours fetches 29 shillings more. We get about £10-7-0 *f.o.r.* works, that is about Rs. 138. It has a better analysis.

*President.*—I take it that that price is a sort of world parity price, that is to say, the price of importing sulphate of ammonia into India from England?

*Mr. Peterson.*—Yes, practically.

*Mr. Madan.*—I think in India sulphate of ammonia is being sold at somewhere between Rs. 150 and Rs. 180 per ton *ex-works*.

*President.*—What it would mean is this. Assuming your coal is cheaper than the British coal and your coke is cheaper, it does seem to me that you may be able to export sulphate of ammonia to Europe?

*Mr. Peterson.*—The production in India is not consumed in India entirely. It is exported largely. We used to export large quantities to Java.

*President.*—Now it is consumed mostly here?

*Mr. Peterson.*—Yes.

*President.*—What I want to know is this. This price of sulphate of ammonia is really based upon the *c.i.f.* price of sulphate of ammonia in India imported from England?

*Mr. Peterson.*—It is based on the sales of the federation all over the world.

*President.*—That is the limit?

*Mr. Peterson.*—Yes.

*President.*—Is the price that you are paid equivalent to the world parity price?



*Mr. Madan.*—Our feeling is that we pay rather heavily for propaganda and for overhead charges.

*President.*—You get about Rs. 140?

*Mr. Madan.*—Yes.

*President.*—The point is this. In the case of sulphate of ammonia, supposing a bounty was given on sulphuric acid, the consumer will not benefit at all by it: if you claim world price for it, you will make so much more profit.

*Mr. Peterson.*—As a matter of fact India is not making enough because of the world price.

*President.*—As manufacturers of sulphate of ammonia Tata's may benefit, but the consumer will not. The whole point is that there is no case, on the assumption that the price of sulphate of ammonia is the world price, for granting a bounty on sulphuric acid used for the manufacture of sulphate of ammonia: that is what it comes to.

*Mr. Peterson.*—You mean to say there is no case for protection unless we are subject to unfair competition?

*President.*—Yes. My point about a bounty on sulphuric acid is that you encourage the manufacture of sulphuric acid and thereby make it possible for other industries to start, but here, in this case, the price of sulphuric acid even if it is reduced is not going to make any difference so long as you get the world price.

*Mr. Peterson.*—I think there will be a difference. If there is a larger production of sulphate of ammonia in India the federation will drop their price.

*President.*—Why should they reduce the price?

*Mr. Sawday.*—To increase the demand.

*President.*—Would the competition of other fertilisers be very great?

*Mr. Sawday.*—It has always been very great.

*Mr. Peterson.*—The reason for the formation of the sulphate of ammonia federation is to fight the Chilean Nitrate of Soda.

*President.*—But the price of Chilean Nitrate is not very cheap?

*Mr. Madan.*—People have got used to it, even though there is less nitrogen and they have to pay a little more.

*President.*—You hand over the entire production to this Federation.

*Mr. Peterson.*—Yes.

*President.*—And then it pays you a price corresponding to the world price.

*Mr. Peterson.*—To Indian manufacturers they give a little extra where they don't have to import.

*President.*—It would be round about that limit.

*Mr. Peterson.*—Yes.

*President.*—They carry on this propaganda for popularising the use of sulphate of ammonia.

*Mr. Peterson.*—Yes.

*President.*—Is there any other fertiliser in which the same Federation is interested or does it confine itself merely to sulphate of ammonia?

*Mr. Peterson.*—The Federation is now amalgamated with Nitram Limited which handles all possible nitrates.

*President.*—Is it a subsidiary of the Imperial Chemical Industries?

*Mr. Peterson.*—It is really controlled by the Imperial Chemical Industries.

*Dr. Matthai.*—Is the Nitram Limited interested in superphosphates?

*Mr. Madan.*—Not in phosphates, but in nitrates.

*President.*—There is no competition between this Federation and of German Chemicals.

*Mr. Peterson.*—Germans are not in the Federation. They are outside it.

*Mr. Madan.*—As a matter of fact German competition has been all the time responsible for reducing our price of sulphate of ammonia.

*President.*—I understand that Germany is very vitally interested in this also.

*Mr. Madan.*—We get report after report from the Federation saying that they are buying up German output and giving them a better price in order not to let them enter the markets which these people have gained.

*President.*—Is this sulphate of ammonia entirely a coke oven product or is it also a synthetic product?

*Mr. Madan.*—There is a good deal of synthetic nitrates. I do not know whether they are imported into India. The Nitram Limited controls the new Brunner Mond's synthetic nitrates and Ammonia Limited. More than 50 per cent. of the total sulphate of ammonia handled by the Federation, is made by the synthetic process.

*President.*—I think the Federation will be able to give us the figures showing the increased consumption of sulphate of ammonia.

*Mr. Peterson.*—Yes.

*Dr. Matthai.*—Do Brunner Mond represent the Sulphate of Ammonia Federation?

*Mr. Peterson.*—Shaw Wallace represents the Sulphate of Ammonia Federation. I think Brunner Monds are also doing propaganda work for the Sulphate of Ammonia Federation and they are also doing retail sales. They can give you full information.

*President.*—As regards the fair selling price of sulphate of ammonia, there is really no means of finding out.

*Mr. Peterson.*—As a matter of fact we should get a better price for sulphate of ammonia.

*President.*—I look at it this way. We discussed the principle of the allocation of overhead charges and profit in the Steel Report and there we came to the conclusion that we could not follow any principle. We said that the average incidence of the overhead and profit was Rs. 39 a ton, but we didn't add for every product the same amount. Here in the case of sulphate of ammonia there is no basis on which we can proceed. At that time the average works cost of all steel was about Rs. 111. If we take Rs. 111 and Rs. 39 and if we take the works cost of sulphate of ammonia at Rs. 74, the allocation should be about Rs. 30.

*Mr. Peterson.*—Yes.

*President.*—Say, Rs. 104 or Rs. 105. That would be your fair selling price if we were to follow that principle. Do you think that that would be correct?

*Mr. Madan.*—The cost of the by-products plant taken together is Rs. 41 lakhs and the cost of our sulphuric acid plant is nearly Rs. 13 lakhs.

*President.*—You take the coke ovens in that.

*Mr. Madan.*—We have got separate accounting figure for the by-products plant.

*Mr. Peterson.*—I don't see how it is possible to separate them.

*President.*—How would you take the gas that you get out of it?

*Mr. Madan.*—We have no value for it. We get ammonia free.

*President.*—What would you allow for the ammonia liquor?

*Mr. Madan.*—We have not allowed for anything in this cost.

*President.*—What I wish to know is this: supposing there was no question of any world price and supposing there was the question of giving this bounty, at what price could you afford to sell sulphate of ammonia in the country?

*Mr. Madan.*—We should like to have this price *plus* the depreciation on the plant as such.

*Mr. Peterson.*—I don't see how we can work it out in our case. If you

take a separate plant making coke for the market, then you can work it out from their costs.

*President.*—Even there you don't know how much to allocate for coke alone.

*Mr. Peterson.*—It is very much easier, but it is very difficult in our case.

*Dr. Matthai.*—The only practical way of allocating the by-products would be to take the market price as the basis.

*President.*—That is to say we take the average realised price of sulphate of ammonia.

*Mr. Peterson.*—Take the average world price of sulphate of ammonia.

*President.*—Take the average realised price of steel and we know the incidence of the overhead and profit. We take it in that proportion.

*Mr. Peterson.*—I think that would be the only fair way of doing it.

*President.*—It comes to very much the same thing.

*Mr. Peterson.*—Yes.

*President.*—Rs. 120 is the average realised price for steel. Therefore if you add Rs. 39 to Rs. 74, you get a figure of about Rs. 115.

*Mr. Peterson.*—Yes.

*President.*—Mr. Madan wants more to make it pay.

*Mr. Peterson.*—He is working it out from the other point of view.

*Mr. Madan.*—If we allow the by-products to be wasted, we need not have erected a plant to recover them.

*President.*—It is impossible, as I said, to get really the fair selling price of sulphate of ammonia.

*Mr. Peterson.*—The selling price based on the world's cost would be a fair way of doing it.

*President.*—As regards sulphuric acid plant you have got a separate account.

*Mr. Peterson.*—Yes, we have.

*President.*—What is the cost of the block?

*Mr. Peterson.*—Rs. 12·89 lakhs.

*President.*—Is that your book value?

*Mr. Peterson.*—That is our capital expenditure.

*President.*—What reduction did we make in our last report?

*Mr. Peterson.*—40 per cent.

*President.*—This would be liable to the same reduction.

*Dr. Matthai.*—The bulk of these was set up since 1924.

*Mr. Peterson.*—I can give you a recent estimate of the coke ovens with a new acid plant.

*President.*—That would be useful. Can you give us a recent estimate of the plant of 900 to 1,000 tons that you have mentioned here?

*Mr. Peterson.*—We know the second-hand value. We don't know what the cost of the plant will be.

*President.*—Your plant is a bit big to start with.

*Mr. Peterson.*—It would cost about Rs. 5 lakhs second-hand. I had better give you a recent estimate that we got for the new coke ovens with a by-product plant attached.

*President.*—What I want to know is the cost of a sulphuric acid plant. In the Dharamsi Works the plant costs about Rs. 6 lakhs. Then there is the building. Now they say that it would be worth about Rs. 3 or Rs. 4 lakhs. The capacity of the plant is 8,000 tons.

*Dr. Matthai.*—If you could give us an estimate of the recent plant, it would be useful.

*Mr. Peterson.*—Yes, I will look it up and send you.

*Pyrites.*

*President.*—As regards pyrites, you have got no information.

*Mr. Peterson.*—We have had reports from time to time about the existence of pyrites in various parts of India.

*President.*—In what parts?

*Mr. Peterson.*—Hazariabagh. We never really had the stuff in sufficient quantities to work it.

*President.*—Quantities are insufficient.

*Mr. Peterson.*—Yes. Here is the result of the analysis (handed in).

*President.*—25·66 is the sulphur content.

*Mr. Peterson.*—That was not tested.

*President.*—It would be simpler if you could let us have a summary of what you have done as regards finding pyrites.

*Mr. Peterson.*—We have not been able to find any. I can give you whatever information I have. We have got no systematic information about the existence of pyrites. At various times we have had offers stating that pyrites had been discovered. We examined some of these, but most of them were in remote districts which were of no commercial value even if the reports were correct. Wherever the deposits had been accessible, we investigated and found that the quantity was so small as to be of no interest at all. This is in Bilaspur. I think you would probably get better information from the Geological Survey.

*Dr. Matthai.*—How old is this information of yours?

*Mr. Peterson.*—This is the last information we have. One of these offers were made in 1922 and another offer was made in 1918. We were continually getting these offers. So far we have found nothing worth examining.

*Dr. Matthai.*—There was a proposal to make sulphuric acid out of zinc blende.

*Mr. Peterson.*—Yes. It very nearly came to completion.

*Dr. Matthai.*—What was the difficulty.

*Mr. Peterson.*—It would not pay for the Burma Corporation to manufacture in this country and they prefer to export it.

*Dr. Matthai.*—That was going to be undertaken by the Burma Corporation.

*Mr. Peterson.*—Yes, at Jamshedpur. They had laid the foundations for part of their buildings before they gave up the scheme.

*Dr. Matthai.*—I suppose the point was that the freight on zinc blende would have increased the cost.

*Mr. Peterson.*—They came to the conclusion that the technical difficulties would be too great.

*President.*—Have you made any attempt to make fertiliser out of your slag?

*Mr. Peterson.*—We investigated that question some time ago. I can put in a note as to what has been done.

*President.*—I would like a brief note on that point to find out what you have done and what are the difficulties.

*Mr. Peterson.*—I will put in a note by Mr. Percival showing what exactly has been done.

*President.*—Is this recent?

*Mr. Peterson.*—Yes. It gives all the information.

*President.*—Are you finding any difficulty in getting limestone?

*Mr. Peterson.*—We have lots of lime in the neighbourhood. Some has got to be brought from a long distance as far as Katni.

*President.*—That is about 500 miles.

*Mr. Peterson.*—Yes.

*President.*—What is the nearest source?

*Mr. Peterson.*—Bird and Company are supplying us. Birmitrapur is within 120 miles.

*President.*—Is there any scarcity of limestone round about Calcutta?

*Mr. Peterson.*—There is no limestone near Calcutta. It would be about 150 miles away from Calcutta.

*President.*—Is the freight on limestone high?

*Mr. Peterson.*—Some of the limestone that comes to Calcutta comes from Assam. There must also be considerable quantity of supplies from Chota Nagpur.

*President.*—How far is it from the principal coalfields?

*Mr. Peterson.*—It would be fairly close—about 150 miles.

*Mr. Sawday.*—They have started now a Cement Company about 50 miles from the coalfields.

*President.*—We were discussing the other day the question of site for manufacturing some of the alkalies near the coalfields and it was suggested that if limestone was not available within a reasonable distance, then it would not be economical.

*Mr. Peterson.*—It would require a very high class of lime. This limestone that I have been speaking of is not first class. There is first class limestone available in Assam and very good coal available in Assam.

*President.*—That would be away from the port.

*Mr. Peterson.*—There is water transport.

*Dr. Matthai.*—Transport from Assam is very expensive.

*Mr. Peterson.*—Yes. We also went into the question of getting limestone from Burma. We found that the cost would be very high, and so we gave it up.

**INDIAN METALLURGICAL ASSOCIATION, CALCUTTA.**

**Extract from the Oral Evidence of Messrs. S. K. SAWDAY and  
G. H. FAIRHURST recorded at Calcutta on Tuesday the  
5th March, 1929.**

*President.*—The Indian Metallurgical Association exists simply for official purposes, does it not?

*Mr. Fairhurst.*—Yes. The members are not only the iron and steel people, but also people who produce chemicals, manganese and other minerals.

*President.*—Does it do any regular work; has it got any articles of association and so on?

*Mr. Fairhurst.*—We have.

*President.*—So far as the iron and steel are concerned you are the only two members and the Bengal Iron perhaps.

*Mr. Fairhurst.*—The Bengal Iron Company, Indian Iron and Steel Company, the Tata Iron and Steel Company, the Tinsplate Company and Messrs. Bird and Company are also members. These latter are interested in iron ore only at present.

*Dr. Matthai.*—Does it include the engineering firms?

*Mr. Fairhurst.*—No.

*President.*—Who is the Chairman of this Association?

*Mr. Fairhurst.*—Mr. Sawday.

*President.*—Has it got an office?

*Mr. Fairhurst.*—Yes, a registered office. It has been formed to further the interests of the metallurgical people generally.

*Sulphate of Ammonia.*

*President.*—How much sulphate of ammonia do you make?

*Mr. Fairhurst.*—We are making about 350 tons a month, which will be increased by 40 per cent. in August.

*President.*—That is 4,200 tons and you will reach about 6,000 tons after August?

*Mr. Fairhurst.*—Yes.

*President.*—Does the Bengal Iron Company produce any sulphate of ammonia?

*Mr. Fairhurst.*—Yes, they are making about one half of what we are making.

*President.*—Are they still producing it?

*Mr. Fairhurst.*—Yes.

*President.*—You manufacture your own sulphuric acid, do you?

*Mr. Fairhurst.*—Yes.

*President.*—Could you give us the cost of sulphuric acid or is this also confidential?

*Mr. Fairhurst.*—We will let you have it with pleasure.

*President.*—You will give also the specific gravity, strength, and so on and make it on the 100 per cent. basis. Your acid would be about 76 or 77 per cent., would it?

*Mr. Fairhurst.*—About that.

*Zinc dross.*

*President.*—Please mention that also in the statement that you send us. There is one point that I want to be cleared and that is about zinc dross. There is a proposal to manufacture zinc chloride in India. As it happens

the probable demand for zinc chloride is on the Bombay side. I wish to know what price you get for your zinc dross f.o.r. works.

*Mr. Sawday.*—Rs. 290 f.o.r. works lately. Yesterday's price was Rs. 300.

*President.*—You get a price just below the price of spelter. I supposed you go on the zinc content?

*Mr. Sawday.*—Yes, a little over 90 per cent.

*Dr. Matthai.*—How much zinc dross have you been able to sell?

*Mr. Sawday.*—We sell 20 to 30 tons a month.

*Dr. Matthai.*—Is it likely to increase or decrease?

*Mr. Sawday.*—It is likely to increase.

*Dr. Matthai.*—As the process improves there would be less dross. The point is really this, supposing these people in Bombay wanted about 500 tons of dross for their works, could they count on getting that from the Tata Iron and Steel Company?

*Mr. Sawday.*—We can always get a market on this side. We sell it all to Mirzapore.

*Dr. Matthai.*—What do they manufacture there?

*Mr. Sawday.*—Galvanized buckets and so on.

*President.*—Don't they use galvanized sheets?

*Mr. Sawday.*—They use our black sheets and galvanize them. We are selling the stuff at Mirzapore at Rs. 317 a ton.

*Mr. Mathias.*—Do you sell it to Bombay?

*Mr. Sawday.*—No.

*President.*—We had some figures which showed that you were selling at Rs. 150 a ton.

*Mr. Sawday.*—No.

*Mr. Mathias.*—Is there any bazaar trade in zinc dross?

*Mr. Sawday.*—It all goes to Mirzapore.

*Mr. Mathias.*—Practically all the zinc dross comes from Tatanagar?

*Mr. Sawday.*—Yes. It would not pay to import.

*Mr. Mathias.*—We had a very much lower quotation from one of the chemical works at Bombay?

*Mr. Sawday.*—It won't be ours.

*Dr. Matthai.*—These people at Mirzapore would be able to take all your zinc dross?

*Mr. Sawday.*—Yes, but the zinc ashes we export.

*President.*—Does it pay you to export?

*Mr. Sawday.*—We cannot get a market for it here.

*President.*—How much zinc ash do you produce?

*Mr. Sawday.*—16 tons a month.

*President.*—How much zinc would it contain?

*Mr. Sawday.*—40 per cent.

*President.*—If the people on the Bombay side want about 500 tons of zinc dross per annum, would you make any reduction in price?

*Mr. Sawday.*—There is no trouble about zinc dross. It all goes to Mirzapore as I told you before.

*Mr. Mathias.*—You have got a full market for the zinc dross you produce?

*Mr. Sawday.*—Yes, we have no trouble about it.

*President.*—I think your production of galvanized sheets is 1,500 tons a month?

*Mr. Sawday.*—It is about 1,000 tons. We shall be making up to 2,000 tons soon.

*President.*—You get about 10 tons of zinc ash out of that?

*Mr. Sawday.*—Yes.

*President.*—I do not know whether these ashes would be used or not but it might pay you if they were to use this instead of zinc dross. Your c.i.f. price is about 90. Taking it into Bombay, how much would it mean in freight?

*Mr. Sawday.*—Rs. 16 a ton.

*President.*—That might just do for them if it was a good raw material.

*Mr. Mathias.*—Did you get any enquiries from the chemical factories in Bombay about it?

*Mr. Sawday.*—I don't think so.

*Mr. Mathias.*—They have not made experiments with it?

*Mr. Sawday.*—No.

*President.*—As regards sulphate of ammonia you are in this Federation since 1923?

*Mr. Fairhurst.*—Yes. We are all members up to 1930 and then we can retire from it if we wish to.

*President.*—You are getting about Rs. 160 a ton on an average?

*Mr. Fairhurst.*—We are getting about Rs. 120 only.

*President.*—At the works?

*Mr. Fairhurst.*—Yes.

*Mr. Sawday.*—Prices have gone down and are steadily going down.

*Mr. Fairhurst.*—Our nett price is between Rs. 110 and 115. Prices have been going down owing to competition with synthetic ammonia.

*President.*—Is that below the British prices?

*Mr. Sawday.*—We are getting more than the British price because the Indian manufacturer gets the extra benefit of the local prices.

*President.*—In the *Trade Journal* it is quoted at £10-10-0 f.o.b.

*Mr. Fairhurst.*—That I think is the delivered price. Propaganda also costs a lot of money.

*President.*—Do you sell very much pig iron on the Bombay side and in Southern India?

*Mr. Fairhurst.*—Not a great deal; not more than 200 tons a month.

*President.*—Do you sell some on the Madras side?

*Mr. Fairhurst.*—Yes, small quantities. I don't think we sell in Madras more than 100 tons a month.

*President.*—For that you get the import price, I suppose?

*Mr. Fairhurst.*—We have a schedule rate which I think is the same as the Bombay price and the Calcutta price. We pay the freight, Rs. 16 or so a ton to Madras.

*President.*—There Mr. Sawday you would have some advantage because you are on the Bengal Nagpur Railway half the way. When does this contract with the Bengal Nagpur Railway expire, Mr. Sawday?

*Mr. Sawday.*—1932 or 1933.



## THE INDIAN COPPER CORPORATION.

Oral Evidence of Mr. H. C. ROBSON, recorded at Calcutta on  
Monday, the 4th March 1929.

### Introductory.

*President.*—Mr. Robson, you represent the Indian Copper Corporation?

*Mr. Robson.*—I am the Metallurgist in charge of the plant.

*President.*—Who are the managing agents?

*Mr. Robson.*—We have none. Messrs. Gillanders Arbuthnot and Company are our selling agents.

*President.*—Who is in charge of the management part of it?

*Mr. Robson.*—We manage it ourselves from Home.

*President.*—Do you represent the home office here?

*Mr. Robson.*—No, Mr. Woakes is the general manager.

*President.*—When was this company started?

*Mr. Robson.*—Years ago. I cannot tell you exactly the history of the concern. It was first the Cordova Copper Company and then re-converted and called the Indian Copper Corporation.

*President.*—Is it a sterling company? What is the capital of the Company?

*Mr. Robson.*—Yes. The capital is £214,420 in ordinary shares and £350,000 in debentures.

*President.*—Is that all subscribed capital?

*Mr. Robson.*—Authorized capital is more. (£750,000.)

*President.*—This is the actual capital put down?

*Mr. Robson.*—Yes.

*President.*—Where is this property chiefly?

*Mr. Robson.*—It is in Singbhum District in Bihar, near Ghatsila.

*President.*—Is that in the coal area?

*Mr. Robson.*—No. It is in the iron area, about 20 miles from Tatanagar and the distance from Calcutta is about 130 miles.

*President.*—Which is the station for it?

*Mr. Robson.*—Ghatsila.

*President.*—Have you started working the mines?

*Mr. Robson.*—Yes, we have started producing copper.

*Mr. Mathias.*—Is it the same deposit that was worked by the Cordova Copper Company?

*Mr. Robson.*—Yes. There is another property called the Cape Copper Company and that failed; that is about 8 miles north of us.

*Mr. Mathias.*—Is this a new seam?

*Mr. Robson.*—Yes. I think we have been developing the seam for about seven years and after proving 600,000 tons of 4 per cent. ore they issued the debentures.

*President.*—600,000 tons of ore have been proved?

*Mr. Robson.*—Yes. We have found that where we calculated 42" it goes up to 15 feet in some places and I should say myself from a conservative estimate there is a million and a quarter tons of 4 per cent. copper ore.

*Dr. Matthai.*—4 per cent. is supposed to be a good percentage, is it not?

*Mr. Robson.*—Yes, quite a good percentage.

*President.*—Are you going to refine the ore?

*Mr. Robson.*—Yes. At the present time we are producing the best selected copper giving 99.5 per cent.

*President.*—You have got smelting furnaces?

*Mr. Robson.*—Yes.

*President.*—Is it working?

*Mr. Robson.*—Yes, actually operating at the present moment.

*President.*—What is the capacity of this plant?

*Mr. Robson.*—The capacity will be about 300 tons of copper per month.

*President.*—In the immediate future you will be able to work up to 300 tons a month?

*Mr. Robson.*—In the first month we made 90 tons.

*President.*—And you expect to run up to 300 tons?

*Mr. Robson.*—That is the maximum unless we put down an extra plant.

*President.*—That means, I suppose, 300 tons of sulphur?

*Mr. Robson.*—Not necessarily. It is impossible to say the exact amount of sulphur, we take this 4 per cent. ore and we have a concentration process; that is done with oil and water and we enrich it from 4 to 28 per cent. copper and then it is treated by smelting and then treating it in converters and Refinery Furnaces.

#### *Sulphuric acid.*

*President.*—Do you propose to manufacture sulphuric acid?

*Mr. Robson.*—No. I cannot see how we could. The sulphur simply goes off as gas.

*President.*—Won't you be able to utilize it?

*Mr. Robson.*—No. I have made sulphuric acid in copper works elsewhere but with quite a different type of ore.

*President.*—Is this ore not suitable for producing sulphuric acid?

*Mr. Robson.*—With the present knowledge I should say that it is not suitable.

*President.*—What is the difficulty?

*Mr. Robson.*—The mineral in our ore is mostly copper pyrites, that is a double sulphide of iron and copper and has a very low fusing point. If you want to make sulphuric acid you must roast that to burn off your sulphur. In roasting your temperature would rise and would fuse the copper pyrites and you have to shut down your furnace in no time.

*President.*—Why?

*Mr. Robson.*—It would simply clog the whole thing. It is fine dust; 200 mesh and directly you heat that above a certain temperature, 600° Cent., it will clog the furnace; it will form into lumps and the sulphur won't volatilize. I know of no case in the world where they are producing sulphuric acid from similar material to ours.

*President.*—Which are the chief copper producing countries?

*Mr. Robson.*—America is by far the biggest copper producing country in the world.

*President.*—Have they got ore similar to yours?

*Mr. Robson.*—Yes, and other types of ore as well. There are only one or two plants in the United States where they produce sulphuric acid from ore and that is done in blast furnace with lump ore. It is not concentrated at all. In this case I may state that in America the ore is smelted in the lump form in blast furnaces. It is very rich in sulphur.

*Mr. Mathias.*—Is it a question of plant?

*Mr. Robson.*—Yes. The Cape Copper Company failed as a result of unsuitable plant. They tried blast furnaces and failed.

*President.*—What is your process?

*Mr. Robson.*—Reverberatory furnace smelting. It is a fireproof Chamber with a roof on the top and you charge the ore into the furnace on the side walls. There is a flue through which the Gases pass into the boilers after smelting the copper bearing material. The slag is run off three times a day and the Matte is tapped through a tap hole on the side of the furnace; the Matte settles at the bottom and the slag on the top: which is skimmed off and goes to waste. It contains about 0.5 per cent. copper and the Copper Matte accumulates at the bottom of the furnace.

*President.*—Does that slag possess any value.

*Mr. Robson.*—It has some value as ballast.

*Dr. Matthai.*—Was there any definite investigation of the question of making sulphuric acid?

*Mr. Robson.*—I believe it actually came up about three years ago. I can't tell you the whole history of the company because I have been out here only two years. I built the plant and started operations.

*Dr. Matthai.*—Now you have discovered this seam which is superior to that you had three years ago?

*Mr. Robson.*—It is all one seam, the only thing we did was to determine the true width of the seam and tonnage.

*President.*—How deep have you gone now?

*Mr. Robson.*—Down 500 feet.

*President.*—You are working by means of shafts?

*Mr. Robson.*—Yes and we have about 5,000 feet of lode running both in a north and south direction.

*President.*—Is it safe?

*Mr. Robson.*—Yes.

*Dr. Matthai.*—We were told last week by the Geological Survey that there was some possibility of some sulphuric acid being made in connection with your copper works. You are definitely of a different opinion, are you not?

*Mr. Robson.*—Yes, I have actual experience; I have made sulphuric acid myself from copper ores, but not from this type of ore. My own opinion is that unless a new process is found we can never make sulphuric acid. It can be done in the laboratory. Theoretically it is feasible, but practically in my opinion, is it not feasible. I have been 18 years doing nothing else but copper smelting; I have been all over the world. If it would pay, I am sure and certain that the people who are running this show—the Anglo-Oriental—would have attempted it.

*President.*—Would you export it in copper ingot form?

*Mr. Robson.*—Yes. I think they will also probably produce brass sheets. That is on the cards but not definitely settled yet. We reckon that there is about 3,000 tons of ingot copper required in India at the present time. I don't know whether it is the correct figure or not. If we enlarge our plant we must find another outlet for our copper and the only way for us would be to make brass sheets.

*President.*—What is the price of copper at the present time in Calcutta?

*Mr. Robson.*—About Rs. 69 a cwt.

*President.*—Would it pay you to export to the United Kingdom at that price?

*Mr. Robson.*—Not at the present moment because we are not producing up to capacity yet.

*President.*—Is there a duty on copper?

*Mr. Robson.*—Yes, 15 per cent.

*Dr. Matthai.*—The real trouble with this copper ore is that it is mixed with copper pyrites.

*Mr. Robson.*—Yes. If there is more iron pyrites it is much easier to handle when making sulphuric acid. Iron pyrites does not fuse like copper pyrites. It is quite easy to roast iron pyrites.

*Dr. Matthai.*—Have you had copper pyrites by itself?

*Mr. Robson.*—Our concentrates that we make are practically pure copper pyrites. There is only about 2.9 per cent. iron pyrites in the concentrates. The trouble, as far as I see, is that the melting temperature of copper pyrites is too low for successful roasting under present conditions although eventually we may solve that problem.

*President.*—Do you mean to say that in other countries it is mixed more with iron?

*Mr. Robson.*—No. They don't make sulphuric acid from copper pyrites anywhere in the world to my knowledge although there are plenty of deposits. Take Rio Tinto; the ore contains 2 per cent. of copper and large percentage of Iron Pyrites. They roast that and make sulphuric acid then recover the copper in the burnt cinder, the refuse from the roasting, by dissolving the copper in the cinder.

*Dr. Matthai.*—Which is the chief copper producing country in the world?

*Mr. Robson.*—The United States of America which produces 54 per cent. of the world's production.

*Dr. Matthai.*—I understand that they are not making much sulphuric acid from copper, because they have plenty of sulphur available. But if you take a country where sulphur is not available, don't you think it is likely that in connection with the copper smelting works you might be able to make some sulphuric acid?

*Mr. Robson.*—If we can find some practical process for doing it, then only we can do it.

*Dr. Matthai.*—This question is not likely to come up again for investigation in connection with your works?

*Mr. Robson.*—I should say no so far as we are concerned simply because I don't know any method of doing it. If some new method is invented, we should probably go into it.

*Dr. Matthai.*—Supposing your proposition was to make sulphuric acid out of zinc blend and the other proposition was to make copper sulphate out of copper ore?

*Mr. Robson.*—Zinc blend is much more feasible, because it has a much higher fusing temperature. That is done.

*President.*—This evidence is rather interesting, because we were told that it might be useful as raw material for the manufacture of sulphuric acid. Theoretically of course there is this sulphur in it.

*Mr. Robson.*—Theoretically it is possible to manufacture it in the laboratory as sulphuric acid, because I could give undivided attention and maintain an even temperature when operating on a small scale, but on a practical scale, I don't think we can maintain even temperature.

*President.*—It is not impossible that in course of time you may yourself invent something, because it would be remunerative.

*Mr. Robson.*—Only if we could do it economically.

*President.*—How much sulphur does this ore contain?

*Mr. Robson.*—If you take 4 per cent. copper ore, it would be 5.89 per cent. sulphur.

*Dr. Matthai.*—If you get 300 tons of copper, theoretically you may get the same amount of sulphur?

*Mr. Robson.*—More.

*Dr. Matthai.*—What else do your mines contain besides iron and copper?

*Mr. Robson.*—It contains a small amount of nickel. It is a nuisance. We have to produce copper to pass a certain specification and we maintain that specification with great difficulty, because of this nickel. To-day your copper

may be 99.6 to-morrow it may assay 99.28 because of the nickel. Then we have a little lime in the ore, silica and alumina.

*President.*—You must have tremendous quantities of slag.

*Mr. Robson.*—No. We have a concentration process. You grind your ore and you get it concentrated. The copper in the waste contains .1 per cent. copper and the concentrates contain 26 per cent. copper, representing 1/10th of the weight of the original ore treated. If you had a blast furnace, then you would make a lot of slag.

*President.*—What you actually extract is 4 per cent. and 96 per cent. is something else. I suppose part of it is burnt out, but the rest must remain somewhere?

*Mr. Robson.*—Immediately after you concentrate your ore, you get that down to a 1/10th of the original weight of ore treated. If you treat 400 tons, you get 40 tons of concentrate and the other 360 tons go away as waste material. We simply throw it away; it is mixed with water and runs down the drain.

*President.*—You will have mountains before long!

*Mr. Robson.*—We have a fairly big area there and the mill that does the concentration has a good position and the waste is carried away by gravity.

*President.*—Do you sell any slag?

*Mr. Robson.*—No, the Cape Copper Company sold a lot to the Port Commissioners for concrete. It is extraordinarily heavy and is impervious to water. It makes splendid ballast for concrete docks and things of that sort where a heavy structure is required. It looks like bottle glass. We produce 1,000 tons a month and we shall probably produce 1,500 to 1,600 tons a month within a short time.

*President.*—I hope you will find a market for it. What is the freight?

*Mr. Robson.*—Rs. 4 a ton.

*President.*—This morning the railways told us that they gave the lowest rates for road metal and ballast.

*Mr. Robson.*—We have found no buyers yet.

*Mr. Mathias.*—Have you had any experiments made with it as road metal?

*Mr. Robson.*—There is a road made of it but made with slag produced years ago. That is 10 times as good as ordinary ballast and it doesn't wash away.

*Mr. Mathias.*—Does it set like cement?

*Mr. Robson.*—No, it has to be properly rolled like maccadam to make a pucca road. We sent some in to Messrs. Gillanders Arbuthnot & Co. and I think they are trying to find buyers.

*Dr. Matthai.*—How long have you been in India?

*Mr. Robson.*—Just under two years.

*President.*—You are looking after both the smelting works and the mine?

*Mr. Robson.*—No, simply the smelting works and the central power station.

*President.*—Is your previous experience confined to America?

*Mr. Robson.*—No, Russia and all over Europe. The bulk of my experience is in Russia and Siberia. I came straight here from Russia.

*President.*—Have they got big copper mines there?

*Mr. Robson.*—Yes, they had.

**THE INDIAN MERCHANTS' CHAMBER.**

**Oral Evidence of Messrs. KAPILRAM VAKL, Dr. VENKATRAO and  
J. K. MEHTA recorded at Bombay on Friday  
the 23rd November, 1928.**

*Preliminary observations made by the President.*

*President.*—Mr. Mehta, I should like to say that when we asked the Chamber to appear, we wanted the Chamber's views on the questions of policy.

*Mr. Mehta.*—Yes.

*President.*—But I see that you are giving us two witnesses who are supposed to be experts and who are in some way interested in the enquiry.

*Mr. Mehta.*—But they are members of our Chamber.

*President.*—That is perfectly true. The fact that they are members of the Chamber doesn't make them represent the Chamber on the general questions of policy.

*Mr. Mehta.*—We have appointed them as representatives.

*President.*—You have raised certain questions of policy in the representation. I am afraid those questions of policy I cannot discuss with these witnesses.

*Mr. Mehta.*—We could not send witnesses who have no knowledge of these technical questions. We thought that the Board would ask technical questions.

*President.*—As regards the technical evidence we should welcome any evidence that is produced before the Board. We are always grateful for that sort of assistance, but when we examine a Chamber of Commerce we expect it to be represented by the Officers of the Chamber who are not directly interested in the result of the enquiry.

*Mr. Mehta.*—But there was no other help. We wanted to send gentlemen who could combine knowledge both with regard to the policy and with regard to technical matters. It is no use sending gentlemen who would not be able to distinguish magnesium chloride from any other substance.

*President.*—I welcome this assistance, but at the same time the Board would expect that those officers of the Chamber who are really in charge of the policy and who formulate the policy of the Chamber should come and assist the Board.

*Mr. Mehta.*—Without having any technical knowledge.

*President.*—I want to discuss the general questions of policy which you raise in your representation.

*Mr. Mehta.*—Last year it was a coincidence that Mr. Walchand Hirschand who had a perfect grasp of questions like cinema or matches was the President of the Chamber and yet he was not interested in any of these industries. It was a perfect combination, but these combinations are not forthcoming every now and then.

*President.*—I don't think you have grasped my point. The point is we want the considered views of the Chamber on the larger questions of policy and not on technical matters upon which we should have experts' views. I should examine these witnesses as experts, but as you yourself say they won't express the opinion of the Chamber on technical matters, but their own personal opinions.

*Mr. Mehta.*—So far as our representation goes, they will express the opinion of the Chamber.

*President.*—They don't control the policy of the Chamber.

*Mr. Mehta.*—As representatives they are.

*President.*—You understand the difference, don't you? They might just as well have appeared before me as ordinary witnesses. When we addressed the Chamber, we wanted the views of the Chamber on general questions and you have rightly adopted that attitude in your representation.

*Mr. Mehta.*—These gentlemen have been entrusted with the work of representation both on matters of policy as well as on matters of technical details.

*President.*—I must tell you that I don't think you treated the Board fairly on that point. I do feel that.

*Mr. Mehta.*—Are we to take it that with regard to all such questions, you don't want representatives conversant with technical matters also?

*President.*—Yes, along with the officers of the Chamber who represent the policy of the Chamber. On previous occasions when we examined the Bengal Chamber of Commerce, they didn't bring any experts. Either the President or the Vice-President appeared. The same thing happened as regards the Indian Merchants' Chamber. At the same time they brought other people who understood the technical aspect. Really we do want to know the opinion of the Chamber on the larger issues. I shall examine them on points on which they can give their personal opinion and then it is for the Chamber to consider whether it really wishes to express any opinion on the larger questions of policy. Those officers of the Chamber who really control the policy of the Chamber should give evidence.

*Mr. Mehta.*—Thank you very much.

*President.*—You must not imagine that I am not appreciating the value of the experts whom you are producing. We are welcoming them. There are two aspects of the question and we are very grateful to you for having given us the benefit of the experts' evidence. As I say, I cannot examine them on the questions of policy.

*Mr. Mehta.*—Why can't you?

*President.*—Unless the Chamber binds itself to accept their views as theirs.

*Mr. Mehta.*—When we have sent them as our representatives, it is presumed that our Committee are bound by their expressions of opinion.

*President.*—It would not be regular.

*Mr. Mehta.*—How long are you staying here?

*President.*—We are staying here for some time.

*Mr. Mehta.*—If you like you can postpone our examination.

*President.*—I am very much interested in the expert's evidence. We have read Mr. Vakil's report and notes. I do wish to examine him on these points as well as Dr. Venkat Rao.

*Mr. Mehta.*—With regard to the other questions of policy, I will explain to the Committee.

*President.*—Supposing you put forward some general proposal, if we are able to say "this is the considered view of the Chamber and is supported in evidence by its responsible officers", it would go a much longer way.

*Mr. Mehta.*—Generally whenever our Chamber sends our representatives we give them the whole authority of expressing our opinion: so far as the representation is concerned.

*President.*—I may tell you that we have examined other Chambers of Commerce. Generally the Chairman appeared though he didn't know anything about the technical aspects of the enquiry.

*Mr. Mehta.*—We also generally do it, but with regard to this particular question it is a very technical question.

*President.*—I don't wish to examine them on technical questions.

*Mr. Mehta.*—It is due to some misunderstanding on our part.

*President.*—I will confine myself to-day to the technical points, but if the Chamber wishes to give any evidence, we shall give another opportunity.

*Mr. Mehta.*—Yes.

*Mr. Vakil's experience in Chemical Industry.*

*President.*—Mr. Vakil, I understand that you have specialised in Chemistry.

*Mr. Vakil.*—I have.

*Dr. Matthai.*—What degrees do you hold?

*Mr. Vakil.*—I hold first of all the degree of Master of Technology of the Manchester University, I am a Fellow of the Institute of Chemistry of Great Britain and also a Member of the Institute of Chemical Engineers of Great Britain. Those are besides others my chief academical qualifications.

*Dr. Matthai.*—Did you have all your practical training in England or were you also on the Continent?

*Mr. Vakil.*—Almost entirely in England.

*Dr. Matthai.*—You have first hand experience of conditions in the Chemical industry in Germany.

*Mr. Vakil.*—If you will kindly allow me to explain, I will do so. I don't think there is a Chemist in India—I may be pardoned for saying so—who has as much privileges and opportunities as I had of studying all branches of Chemistry in relation to Indian requirements. For nearly 6 years I was the Chief Consulting Chemist and Chemical Engineer attached to the Tata's Head Office and the Tata Engineering Co., Ltd.

*President.*—When was this?

*Mr. Vakil.*—From the year 1918 to 1923. In this connection I may say that during these years I had the opportunity of going several times to England, Germany, France, Holland, Italy and various other countries specially for the purpose of getting inside informations regarding Chemical industries which could not be obtained from ordinary sources.

*Dr. Matthai.*—What aspects of the Chemical industry were you in touch with when you were at the office of Tatas?

*Mr. Vakil.*—Problems of a variety of nature.

*Dr. Matthai.*—Was it largely the question of bye-product recovery?

*Mr. Vakil.*—Not only bye-products, but also heavy chemicals.

*Dr. Matthai.*—In what connection did the question of heavy chemicals come up?

*Mr. Vakil.*—This question was considered by Tatas on many occasions. Without disclosing information which I was in a privileged position to acquire, I may say, Tatas at one time were in association with big millionaire groups in England and America for various schemes which I had to examine for them side by side in some cases, with the European Experts and Indian experts and in some cases I had to prepare my own reports on their schemes.

*Dr. Matthai.*—Without disclosing any secrets of the firm, can you tell us what were the sort of heavy chemicals that you were concerned with?

*Mr. Vakil.*—At one time the transference of the Eastern Chemical Company was proposed. Another time the establishment of heavy chemicals at Jamshedpur was discussed. A third time the manufacture of explosives required for mining and general purposes in India was discussed. At another time the establishment on a very large scale of heavy chemicals using electrolytic power was discussed. At another time I paid also a special visit to America in connection with the establishment of soda ash industry and other chemical industries. In obtaining these information Tatas have spent several lakhs of rupees. I don't think there is a chemist in India who can say that I am not in possession of information from first hand enquiries as much as any other. In some cases we had to spend very lavishly to get most



inside information. In one particular case especially in the manufacture of alkalies and soda ash, I may say that Tatas spent Rs. 75,000 to Rs. 80,000 to obtain that information.

*Dr. Venkatrao's experience in the industry.*

*President.*—Dr. Venkatrao, you are connected with Messrs. Powell and Company.

*Dr. Venkatrao.*—Yes.

*President.*—Are you their expert?

*Dr. Venkatrao.*—I am a partner.

*President.*—Mr. Powell is interested in pharmaceutical works.

*Dr. Venkatrao.*—Yes.

*President.*—We are not enquiring into this just now. Are they connected with heavy chemicals?

*Dr. Venkatrao.*—No.

*President.*—Of course, the Chamber has raised that question. The whole point is this: if you are interested in drugs, it would be advisable for you to ask for a reference on that point. I may explain here that though these 11 heavy chemicals are mentioned, we are not confining our enquiry merely to these 11, but they must reasonably compare with heavy chemicals. If you make a pill, for instance, we can't make an enquiry as regards that in connection with heavy chemicals.

*Dr. Matthai.*—Do you make any sulphuric acid?

*Dr. Venkatrao.*—We don't make any of the heavy chemicals. I have not come on behalf of Messrs. Powell and Company, but I have come here on behalf of the Chamber.

*President.*—You make surgical instruments and appliances. Messrs. Powell and Company are very well known. At present we are enquiring into heavy chemicals.

*Dr. Venkatrao.*—There is one point on which I wish to draw your attention. Government have given some facilities in preparing tinctures by levying a small duty. On foreign tinctures Government are charging about Rs. 21-12-0 per proof gallon and on Indian tinctures they charge only Rs. 5. Had it not been for this concession—I had a talk with the Chamber the other day—some of these manufactures would have been finished and gone. It is only an instance just to quote.

*President.*—I don't think the Government have ever said that they would not refer to the Board the question of other chemicals, but the attention of the Government, as far as I know, have never been drawn to it.

*Dr. Venkatrao.*—Another thing that I wanted to draw your attention to was to the Food and Drug Act. I wonder whether the Tariff Board could make any recommendation with regard to that. The Chamber is fighting for the Food and Drug Act.

*President.*—The Tariff Board's position is rather peculiar. It cannot initiate an enquiry.

*Dr. Venkatrao.*—We have been already fighting with the Government with regard to Food and Drug Act.

*President.*—When a reference is made in general terms, we interpret the reference as liberally as we can. We cannot start an enquiry unless the matter is referred generally or specially to us. Mr. Vakil you know alkalies are hardly manufactured in this country just now.

*Mr. Vakil.*—Yes.

*Alkali industry.*

*President.*—Of the heavy chemicals alkalies form a very considerable percentage and as you know the imports amount to nearly Rs. 1 crore. We should like to have your opinion very briefly as to what you think are the difficulties in the way of starting an alkali industry in the country.

*Mr. Vakil.*—If you will allow me to go a little more into the subject, I shall be very glad to satisfy the Board.

*President.*—I will first of all tell you the points on which I would like you to give your opinion. As regards alkalies, the principal raw material would be salt.

*Mr. Vakil.*—Salt and limestone.

*President.*—We have got both salt and limestone and there is no question about that. The next thing is the process that you employ.

*Mr. Vakil.*—Yes.

*President.*—I understand the ordinary process is what is called ammonia process.

*Mr. Vakil.*—Yes.

*President.*—To get ammonia there is the synthetic process. By what other processes can you get it?

*Mr. Vakil.*—Ammonia fixed as ammonium sulphate in coal gas coke oven plants.

*Dr. Matthai.*—You can use either bye-product ammonia or synthetic ammonia.

*Mr. Vakil.*—Yes.

*President.*—I take it you can get bye-product from the coke ovens.

*Mr. Vakil.*—Yes.

*President.*—Would you get it in sufficient quantities for this purpose?

*Mr. Vakil.*—Yes.

*President.*—The quantities are given, but I understood that you must have at least a plant of 5,000 tons to make it remunerative.

*Mr. Vakil.*—At this stage I would like to explain a little more in detail. That inside information which I spoke to you about and which cost the Tatas nearly Rs. 75,000 resulted in the establishment of an alkali factory in the Dhrangadhra State though it was originally meant by Sir Vithaldas Thackersey for the establishment of an alkali industry in the Baroda State.

*President.*—In Dwarka?

*Mr. Vakil.*—No, at Kodinar. Immediately after that, the scheme was taken up by the Dhrangadhra State. That scheme was worked out right from the beginning to the constructional stage by me. We invited tenders and were just about putting the final scheme through. Up to that stage, I was connected with it. The scheme has, I understand, just been finished and I think that they are taking trials now for making alkalies on a very large scale in Dhrangadhra. The factory as reported in the papers has cost them nearly a crore of rupees. While we were engaged on that scheme, I was associated with some of the best chemical engineers and experts in England. We came to the conclusion that the smallest economic unit which was determined for the Indian requirements and for fighting the foreign importers would be about 50 tons of soda ash per day. To that extent, I would point out that 5,000 tons is too small.

*President.*—That would be the smallest I say.

*Mr. Vakil.*—There I disagree.

*President.*—I said "it has been suggested to us" and I wanted to know what your opinion is. You consider that 50 tons a day or 15,000 tons a year would be the smallest economic unit.

*Mr. Vakil.*—Yes.

#### *Soda ash.*

*President.*—That is soda ash.

*Mr. Vakil.*—Yes.

*President.*—What is the process?

*Mr. Vakil.*—Ammonia soda process.

*President.*—How are they getting their ammonia?

*Mr. Vakil.*—They are getting sulphate of ammonia.

*Dr. Matthai.*—Do they get their ammonia from the Indian sulphate of ammonia?

*Mr. Vakil.*—I believe they tried Indian sources first. There are one or two manufacturers of ammonium sulphate in India and those are the big coke oven people—Tata's and the Bengal Iron. But their prices are a little on the high side. There is an international combine as far as I know which regulates the prices of ammonium sulphate.

*Dr. Matthai.*—Do you mean the British Federation?

*Mr. Vakil.*—Yes.

*President.*—Is there not a certain amount of wastage in using sulphate of ammonia as a raw material?

*Mr. Vakil.*—Yes.

*President.*—To get the ammonia you have to get other products besides.

*Mr. Vakil.*—There is a certain amount of waste, but that price of ammonia can be tolerated in the manufacture of soda ash because modern plants have worked out economies to such a very fine extent that you can use this ammonia over and over again. The loss by leakage or loss through solutions is the only quantity that we have to replace.

*President.*—What does the sulphate of ammonia contain?

*Mr. Vakil.*—It contains a radical of ammonia and a radical of sulphuric acid. Sulphuric acid combine with calcium, that is, lime and the ammonia is liberated, and it is used over and over again. It is a cycle process. At the time of starting, the quantity of ammonia may be more but then it is used up over and over again so that in the case of manufacture of, say, a ton of soda ash, it amounts to a very insignificant figure. To-day it is not the principal determining factor in the soda ash industry.

*Dr. Matthai.*—May I take it that when you say that the capacity required for an Indian factory at present should be approximately 15,000 tons a year, what you mean is that if you want to produce in India at a cost which will compare favourably with the present cost of imported ash, you have got to have a capacity of 15,000 tons.

*Mr. Vakil.*—Quite so.

*Dr. Matthai.*—That is the position.

*Mr. Vakil.*—I would like to qualify that with a further statement that the nature of the ammonia soda ash factory itself is such that it cannot carry out the operations on a small scale.

*Dr. Matthai.*—You cannot carry on operations except on a fairly big scale.

*Mr. Vakil.*—That is right.

*Dr. Matthai.*—The scale approximating 15,000 tons would be big enough for competitive purposes in India.

*Mr. Vakil.*—Yes.

*President.*—Is soda ash the same as sodium carbonate?

*Mr. Vakil.*—Yes. As regards the point about the size of a factory, there are factories erected of smaller sizes in other parts of the world. I know of factories in China and America where they tried to put up 10 ton plants. But they have all been failures.

*Dr. Matthai.*—The older process for making sodium carbonate was the Leblanc process.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—I take it that that is being gradually replaced.

*Mr. Vakil.*—Very nearly out of date.

*Dr. Matthai.*—I suppose it is quite out of the question for the Leblanc process to be tried in India.

*Mr. Vakil.*—I would not personally recommend it to anybody.

*Dr. Matthai.*—You would not.

*Mr. Vakil.*—No.

*Suitability of Dhrangadhra for alkali industry.*

*Dr. Matthai.*—Supposing it was a question of starting an alkali industry on this side of India and you started with the ammonia soda process, you have got to have salt, limestone, ammonia and a considerable quantity of coal. The question of freight on coal to this side of India might make it somewhat uneconomic.

*Mr. Vakil.*—No, it does not.

*Dr. Matthai.*—If you will kindly express your opinion, we shall be obliged.

*Mr. Vakil.*—We have gone into this question of freight on coal and other raw materials to which you referred just now. We have to select a site, where we can get salt practically for the cost of lifting and where we can get limestone practically for nothing. If we get these two raw materials at absolutely the lowest possible rates, then we can go in and spend a little more on coal. Ammonia as I said is not the principal determining the economic factor or the economic position of a factory—by that I mean the site of a factory. There is another item and that is the source of fresh water supply. The quantity of fresh water required for an ammonia soda ash factory is tremendous. So, I would not attach any importance to coal or ammonium sulphate at all.

*Dr. Matthai.*—Your point comes to this that taking these 4 or 5 materials which are essential to the manufacture of alkalies, supposing you were in a position to start your factory at a place where two or three of these could be had practically for the labour of extraction, and if you saved in transport on these materials, then you would have a certain amount of latitude with regard to incurring charges on other materials.

*Mr. Vakil.*—Quite so.

*Dr. Matthai.*—Having considered the saving that you make in this particular factory that you are speaking of on salt and on limestone, you are of the opinion that that saving will to a considerable extent make up for the increased expenditure on coal, due to freight.

*Mr. Vakil.*—Yes.

*President.*—Looking at the import figures, taking sodium carbonate, imports amount to 50,000 tons a year. Now two-thirds—in round figures—are consumed in Bengal, and one-third in the rest of India. Practically that is what it comes to. If you have a factory in Dhrangadhra you would be at a considerable distance from the market.

*Mr. Vakil.*—That question has been fully gone into. May I say that side by side with soda ash you have to consider the quantities of imports of other products like caustic soda, soda crystals, bicarbonate of soda, silicate of soda and other materials which are coming in as soda compounds. The total of all these chemicals is a fairly large one.

*President.*—What I am suggesting to you is this. The soda ash represents roughly two-thirds.

*Mr. Vakil.*—By itself?

*President.*—Yes, of the total imports, which are as follows:—

Soda Ash.  
Caustic Soda.  
Bicarbonate.

If your factory manufactures 15,000 tons it may be able to supply the whole of this side of India. That is the market you have.

*Mr. Vakil.*—We can supply Bombay, Ahmedabad, Sind, etc. We can go right up to Delhi and Punjab.

*President.*—The whole point is that two-thirds of the market are still on the Bengal side. Now the point arises in this way. Bengal has not got salt, but it has got plenty of cheap coal. It has got, as I say, a very big market. The sulphate of ammonia can be had because all the coke ovens are there. If people on that side wish to manufacture ammonia by the synthetic process also they can possibly make it very cheaply because they might have their works in the coalfields where they can get electricity at a very cheap rate. In that case, do you still think that a works on this side of India would be able to compete? You cannot, of course, tell for certain.

*Mr. Vakil.*—I can with the greatest certainty tell you on this point. Any attempt to manufacture soda ash on the Bengal side or on the eastern coast is bound to fail.

*President.*—Why?

*Mr. Vakil.*—Because two of the most important bulky materials salt and limestone are not easily available there.

*President.*—Limestone can be had.

*Mr. Vakil.*—Not where salt can be had.

*President.*—There is limestone not very far away from the coalfields. As you know a lot of limestone is required in the Steel Industry. Within a radius of three or four hundred miles it can be had.

*Mr. Vakil.*—Limestone, as I said before, must be within at least 100 miles and for greater fighting strength its proximity to the works determines the site of soda ash factory. You ought to be on the sea board and you ought to be at the place where limestone is available and you ought to be where salt is. If these three things are given, you can compete with the other party. Going into Bengal, getting salt from long distances and carrying salt where limestone is available, these are all very difficult problems.

*President.*—As I say we are not going into that question immediately because there is no applicant before us as regards that.

*Mr. Vakil.*—That is what the Indian Merchants' Chamber has also said.

*President.*—But we look upon it rather from a wider point of view, that is to say, if the country is to have an acid industry, it can also have an alkali industry. We have to explore into the question why no attempt has been made.

*Mr. Vakil.*—You are perfectly right.

*President.*—The whole point is this. You have got salt and you have got limestone. You have also got a market for your purposes.

*Mr. Vakil.*—Yes.

*President.*—But you have got no coal and no sulphate of ammonia. On the other hand Bengal has got coal, sulphate of ammonia, and a big market. It has got limestone. I do not know how far it is—I have forgotten the distance. We went into the question fully in connection with the Steel Industry and as I say that if they wanted to manufacture ammonia by the synthetic process they might not find it impossible. That is all one can say. One does not know what the costs may be. Considering it from the point of view of the market, one can say that it may be possible for somebody to manufacture it on that side of India in spite of the drawback that there is no salt, which is the only thing that is missing there.

*Mr. Vakil.*—I would not limit to that.

*President.*—Then, please explain to me.

*Mr. Vakil.*—I know very well how the Tata Iron and Steel Works came to be established there. They originally wanted to go somewhere in the Central Provinces first and then to Sini and so on. In large scale operations it is not the easy availability of one particular raw material only that should be considered. All the raw materials must be within an economic distance from the works.

*President.*—That we know.

*Mr. Vakil.*—As far as my studies go and the information which the Geological Department have supplied to us is correct, the nearest source of lime near Bengal would be Assam, it is not a question of any purity but it will have to be of a purity above 85 per cent.

*President.*—How much salt is required for one ton of soda ash?

*Mr. Vakil.*—I could not tell you offhand. It is about 1·6 to 1·73 tons per ton of soda ash.

*President.*—What is the quantity of limestone that will be required per ton of soda ash?

*Mr. Vakil.*—About the same as salt. Had I known that these questions would be put, I would have brought all my papers.

*President.*—It is all a question of cost. We have to compare the freight on raw materials with the freight on the finished product.

*Mr. Vakil.*—You may take it as my opinion which has been arrived at after several years, after many anxious moments, that Bengal is not as good a field as Kathiawar for alkali manufacture.

*President.*—The whole point is that in Bengal nobody has investigated this question.

*Dr. Matthai.*—How long is it since the Dhrangadhra works has been in operation?

*Mr. Vakil.*—It has been under construction for the last 3½ years. They had certain difficulties which had to be overcome. I understand that since *Devali* they have started taking trials.

*Dr. Matthai.*—It is far too soon to tell what is likely to be the cost of alkali produced in Dhrangadhra.

*Mr. Vakil.*—If you will allow me to say so, the next enquiry that you will be carrying on is the question of granting protection to the soda ash industry.

*Dr. Matthai.*—I expect that you have been making various tentative estimates as regards costs at which soda ash might be produced in India.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—Speaking simply on the basis of those tentative estimates supposing it was a question of granting protection to soda ash, what sort of measure of protection do you think it would be? At present it has a duty of 15 per cent.

*Mr. Vakil.*—I would strongly oppose the grant of any protection to soda ash beyond the 15 per cent. *ad valorem* duty existing at present.

*President.*—Then, there will be no occasion for you to come and give evidence before the Tariff Board.

*Mr. Vakil.*—The other party will make an application.

*President.*—Which other party?

*Mr. Vakil.*—The Dhrangadhra people. I am not in any way connected with the Dhrangadhra factory just now but they will surely make a case and their case will rest on the fact that a factory which ought to have cost Rs. 30,00,000 to Rs. 35,00,000 has cost them very nearly a crore of rupees and on the fact, and that is very interesting, namely that they will have to fight against people who hold the world's monopoly—practically in the British Empire and perhaps in other parts of the world.

*President.*—That is Messrs. Brunner Mond and Company?

*Mr. Vakil.*—Yes. That syndicate is so powerful that even in Japan, when the Japanese wanted to establish soda ash factories, this syndicate was able to cut down their prices to such an extent that they were threatened with extinction until the Japanese Government came to their help. Even then Japan could not put an embargo on it but put a heavy duty. It was then argued that it paid them to quote the lowest price in one market and raise the price in another place and make up the difference. When we were about to place this order for plants, etc., for the Dhrangadhra factory, a director

of Messrs. Brunner Mond and Company called upon me in London and asked me what it was worth the State to finish all its efforts at that stage, otherwise " hereafter you will have the greatest competition and we will not allow you to stand on your legs ".

*President.*—That is a very interesting thing you have stated.

*Mr. Vakil.*—Therefore my committee say that if there is no attempt from outside to throttle this industry, then we would not ask for any protection for soda ash alkali, but, as I said, it may be wanted later on.

*Dr. Matthai.*—Your position really is this. Supposing the present price of soda ash continued, then this new factory, when it comes into operation, would be able to produce without any more assistance than a duty of 15 per cent., but if as a result of the operations of the Imperial Chemicals prices were lowered as soon as the factory started work, then on that ground there would be need for protection?

*Mr. Vakil.*—That is how I put it emphatically.

*President.*—That is rather begging the question!

*Mr. Vakil.*—That is what I say. The next enquiry on chemicals will deal with that!

*Dr. Matthai.*—I take it that apart from the influence exerted by this powerful Trust, England is one of the countries which has the greatest natural advantages for the manufacture of alkalies. There the materials are within reasonable distance of one another: in Cheshire you have got salt, you have got limestone and you have got coal. Therefore England is apparently very favourably situated with regard to that. If on top of that they have a very powerful and influential corporation behind it, the position of other countries where these nascent industries may be attempted, might be very difficult.

*Mr. Vakil.*—There are other favoured spots in the world such as the coast of Kathiawar.

*President.*—But it has no fuel.

*Mr. Vakil.*—We can get fuel by sea, and against that we have other compensating features. In England we assume that coal is cheap: but in England with heavy labour rates the cost of winning limestone—high wages and salaries and all these things set off against cheap coal, and if this 15 per cent. duty is maintained, then what little local disadvantage that we may suffer from other drawbacks may very well be set back by the duty if it is maintained.

*Electrolytic method in the manufacture of chemicals and alkalies.*

*Dr. Matthai.*—Have you any considered opinion about the possibility of introducing the electrolytic method in the manufacture of chemicals in India?

*Mr. Vakil.*—Here is a note prepared by me (shown). I will send you a copy on Saturday.

*Dr. Matthai.*—Can you tell us briefly about the possibility of manufacturing alkalies by the electrolytic method in India? Is there a future for it?

*Mr. Vakil.*—This question was gone into very carefully for the Tata Electro-chemicals Company.

*Dr. Matthai.*—When was it? About 1919. There was a very powerful group formed for the development of electrolytic industries and in that connection I had to visit England and I had the advice of one of the best English experts on electrolytic products. We came to the conclusion that the electrolytic industry was possible in India at only two or three places. Chlorine gas was the only stumbling block: at that time the demand for chlorine had not arisen in India.

*President.*—Is there a demand now?

*Mr. Vakil.*—There is a fairly large demand for chlorine. It is now largely used by almost all the big municipalities for the purification of water.

Chlorine is imported in very large quantities by Messrs. Brunner Mond and Company. At that time that demand had not arisen. The situation has now changed and there is a fairly large demand. Power at cheap rate, I take it, is available.

*Dr. Matthai.*—What exactly is your idea of cheap rate?

*Mr. Vakil.*—For local purposes I would put it down at 0.45 of an anna.

*President.*—Somebody who starts this work can manufacture at this rate on the Bengal side.

*Mr. Vakil.*—Then the question of salt comes in, the question of limestone comes in.

*Dr. Matthai.*—Your idea is that if you can get electricity at somewhere about 5 pies per unit then the electrolytic process might be attempted in India for the manufacture of chemicals?

*Mr. Vakil.*—On the Kathiawar coast or even in Bombay there is scope for either of the processes. Chlorine has to be fixed in lime to convert it into bleaching powder. Wherever you get lime and transport facilities and easy availability of coal, from Bengal or from any other source, you can put up an electrolytic plant, and such a place is either Port Okha or Porebunder—or Kodinar—I am speaking of Kathiawar—and then the other place is Bombay. Here among the raw materials—I will call power for the time being raw material—you have got very cheap electricity, you have got the market at hand, but you have not got the limestone: you have got to go 200 to 300 miles before you can get pure limestone. This very morning I was discussing this subject with one of the best experts in the electrical line because a syndicate is being formed for the production of electrolytic caustic and electrolytic chlorine and we came to the conclusion that Bombay would be a very good centre, almost as good as any other Continental centre, provided Tatas gave electricity at .45 anna per unit. The rate at which they are selling electricity to the mills is .65 but the load is only during the day and not during the night. If for electrolytic purposes they can give us continuous load they ought to be able to reduce the price per unit to .45 anna.

*President.*—You require electricity for all the 24 hours?

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—Supposing it was a question at Kathiawar of choosing the soda process or the electrolytic process—you would consider the ammonia process as more economical?

*Mr. Vakil.*—I perfectly agree with you there provided you are at the closest proximity to a port. The port enables you to carry your alkalis to Madras, to Karachi, to the Persian Gulf, to Bengal, at very low rates.

*Dr. Matthai.*—Dhrangadhra is not very near a port?

*Mr. Vakil.*—No. The nearest port is Bhavnagar, which is about 120 miles. The whole factory was designed for supply up to Delhi, Ahmedabad and Bombay.

*Dr. Matthai.*—It is really for an inland market?

#### *Advantage of port Okha.*

*Mr. Vakil.*—Yes. But the advantage of port Okha would be different. We can enter Calcutta, we can enter Karachi: we can enter Madras, or any place on the east or the west coast, where we like. The difference between Dhrangadhra and the place where I am now developing my chemical works is that Dhrangadhra gets limestone from a distance of about 130 miles and salt from about 13 miles. I am building my factory on the site: practically I am sitting tight on salt and limestone.

*President.*—That is Okha?

*Mr. Vakil.*—Yes, and I have got the port within 6 or 7 miles from the factory.



*Magnesium Chloride.*

*President.*—We will now go on to magnesium chloride. As regards analysis, can I use page 12 of your book?

*Mr. Vakil.*—Certainly, Sir.

*President.*—In this analysis that you have given the quantity of magnesium chloride is about the same, as a matter of fact it is a little more in the Kharaghoda works, 101·8 against 101·4 in the German.

*Mr. Vakil.*—Yes.

*President.*—The Kharaghoda magnesium chloride contains magnesium sulphate 1·41. Is that due to the fact that there it would have been extracted from the magnesium chloride?

*Mr. Vakil.*—Yes, it has already been taken out.

*President.*—They use this magnesium sulphate in the textile industry, do they not?

*Mr. Vakil.*—Yes.

*President.*—So that magnesium chloride to this extent that it contains magnesium sulphate would be better from the consumers' point of view?

*Mr. Vakil.*—It will make absolutely no change in the sizing preparation.

*President.*—But the fact that it contains 1·41 of magnesium sulphate, does it interfere with its use as sizing material?

*Mr. Vakil.*—Absolutely not.

*President.*—Would it account for the difference in the colour between the two?

*Mr. Vakil.*—No.

*President.*—What is it due to?

*Mr. Vakil.*—Colour is due probably to two or three causes—a little iron oxide, a little copper and thirdly they having no facilities to clarify the bitters.

*President.*—That does not affect its properties as sizing material?

*Mr. Vakil.*—Not at all.

*President.*—That is absolutely clear?

*Mr. Vakil.*—Yes, and you had the authority of Mr. Stones when this question was raised by the Tariff Board during the last enquiry.

*President.*—In your opinion the Kharaghoda magnesium chloride is of the same quality as the German?

*Mr. Vakil.*—Absolutely the same. There is no reason why there should be any ground for complaint, because there is absolutely no difference.

*Dr. Matthai.*—I put it to you this way. At present I understand in a very considerable part of the market here there is a prejudice against the Kharaghoda product which may be measured by about As. 8. That prejudice is a mere prejudice which has no reference whatever to differences in quality. It is a pure prejudice.

*Mr. Vakil.*—None whatever. It is a pure prejudice.

*Dr. Matthai.*—I understand you have been considering the question of improving the processes here.

*Mr. Vakil.*—We have solved that question.

*Dr. Matthai.*—But apparently magnesium chloride at Kharaghoda retains the original colour.

*Mr. Vakil.*—We have now solved that question at great expense and great trouble.

*Dr. Matthai.*—Without perceptibly raising the cost of the product.

*Mr. Vakil.*—Yes, without appreciably raising the cost of the product, I agree to that.

*Dr. Matthai.*—I notice in your report you refer to treatment with zinc dust. Can you explain to me in non-technical language what it amounts to?

*Mr. Vakil.*—It amounts to this that we were up against the powerful combination and importers and we had to fight against prejudice. So my clients, the Pioneer Magnesia Works carried out the suggestion which I made to them and we took into consultation two of the best well known experts in Germany. We sent a very large quantity of bitters to them and we went into the question as thoroughly as any big Syndicate would do, spent money on it lavishly and came to the conclusion that if we adopted a certain type of plant and changed the process of our manufacture in a certain way—that process was not hypothetical or empirical—but as it was carried out in Germany on our raw product—our product would be superior to the German product.

*Dr. Matthai.*—That is to say it is a question first of cleaning the original bitters.

*Mr. Vakil.*—Yes, and treating them in particular type of chemical plants.

*Dr. Matthai.*—Particular type of evaporators.

*Mr. Vakil.*—Boiling down and so on.

*Dr. Matthai.*—Are you in a position to estimate what the cost of the additional plant would be?

*Mr. Vakil.*—The second part of my report will tell you all about it.

*Dr. Matthai.*—I notice in your original report you were not able to get an estimate.

*Mr. Vakil.*—After that much work has been done.

*Dr. Matthai.*—Taking into account the additional capital expenditure that would be involved, do you think that the savings that you expect would result in a net gain to the works?

*Mr. Vakil.*—All that is given in the report. Every aspect of it is dealt with there.

#### *Costs in Kharaghoda works and in works in Germany.*

*President.*—I just want to understand a little about the costs given on pages 23 and 24 of your report. Without going into any figures the first thing that they do is to remove the potassium salts from the Stassfurt mines.

*Mr. Vakil.*—Yes.

*President.*—And then a certain residue is left.

*Mr. Vakil.*—Yes.

*President.*—Then they make this magnesium chloride in the crystal form.

*Mr. Vakil.*—Yes, from the bitters.

*President.*—Then they make it into fused magnesium chloride.

*Mr. Vakil.*—That is perfectly true.

*President.*—I understand there is very little demand for fused magnesium chloride. It is chiefly sold in the crystal form.

*Mr. Vakil.*—Yes.

*President.*—You have seen the manufacture of magnesium chloride in Kharaghoda.

*Mr. Vakil.*—Yes.

*President.*—I take it first they take the bitters from the Salt Works. Corresponding to that process is the removal of the residue. Do they call it bitters?

*Mr. Vakil.*—They call it mother liquor or end liquor.

*President.*—That corresponds to your bitters being taken out from the Salt Works.

*Mr. Vakil.*—Yes.

*President.*—I take it that this mother or end liquor is to be taken or pumped from some place to magnesium chloride.

*Mr. Vakil.*—Up to the point at which Kharaghoda starts with its raw material, they are exactly in the same condition as in Germany. In Germany they pump it up.

*President.*—What is the distance?

*Mr. Vakil.*—They are all very close together, round about the principal works.

*President.*—You have to carry it by rail.

*Mr. Vakil.*—Here we have got to carry 7 miles.

*President.*—Your cost would be more.

*Mr. Vakil.*—Here we adopt a primitive method of collecting. We collect it in tins. There it is discharged in 4" pipe.

*President.*—Seven miles distance is very small and a very small pipe might do it.

*Mr. Vakil.*—That aspect we have gone into. The cost of the pipe is not a factor that decides the possibility.

*President.*—You cannot collect the bitters in one place from which you can pump it.

*Mr. Vakil.*—Yes.

*President.*—Comparing the two processes at this stage, there is this additional cost.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—In Germany where these people make magnesium chloride, these are very near where the deposits occur.

*Mr. Vakil.*—Yes.

*President.*—From the mines this is taken to their works.

*Mr. Vakil.*—Within an area of 8 to 10 acres everything is there.

*President.*—They extract potassium salt and then they take end liquor. Therefore there is this advantage so far as the Indian industry is concerned. After the liquor is collected what happens in Germany?

*Mr. Vakil.*—In Germany from what I have seen it passes through vacuum evaporators and then the first stage of the process is finished. That is, the density has increased up to a certain point.

*President.*—That corresponds to what process here?

*Mr. Vakil.*—Here we have not got that process.

*President.*—After that what happens?

*Mr. Vakil.*—There are two deviations. They either recover bromine or they pass it on to the melting kettles. They recover a valuable product called bromine out of it. That recovery of bromine makes it possible for them to treat magnesium chloride as a substance of no consequence.

*President.*—From end liquor, would they get more bromine than you would get from the bitters if you were to recover it?

*Mr. Vakil.*—In Kharaghoda we get more bromine than in Germany.

*President.*—But the cost of recovery would be more.

*Mr. Vakil.*—We have not installed a plant for it.

*President.*—You suggest that.

*Mr. Vakil.*—Yes.

*President.*—I take it the cost of recovering bromine in this country would be about the same as in Germany.

*Mr. Vakil.*—Practically the same.

*President.*—What is the principal process applied?

*Mr. Vakil.*—Electrolytic chlorine. We have got to recover electrolytic chlorine, for passing that chlorine into the mother liquor or the end liquor, so that bromine is liberated.

*President.*—From the electrolytic chlorine.

*Mr. Vakil.*—Yes.

*President.*—That you will have to import.

*Mr. Vakil.*—We can make it from salt solution.

*President.*—You have not got electricity.

*Mr. Vakil.*—We can generate it. It is very little.

*President.*—Then we will assume that they recover bromine at present and the remaining end liquor goes on to the boiling pots.

*Mr. Vakil.*—Yes.

*President.*—That brings you to the second stage here.

*Mr. Vakil.*—Yes.

*President.*—You have got to start boiling.

*Mr. Vakil.*—Yes.

*President.*—They use coal, don't they?

*Mr. Vakil.*—Yes. They call it brown coal. It is very cheap and its calorific value is also comparatively low. They fire the brown coal under the kettles and they finish it off with the aid of that.

*President.*—What is 132 H. L.

*Mr. Vakil.*—H. L. means Hecto-litres. 132 H. L. is equivalent to 8.4 tons of brown coal. It works out to 5½ sh. per ton. That coal has a calorific value of 3,600 h.t.u. All that is given in the only German book on the subject.

*President.*—In Kharaghoda you use wood fuel. How does it compare?

*Mr. Vakil.*—It is very uneconomical.

*Dr. Matthai.*—There is no alternative at present in Kharaghoda.

*Mr. Vakil.*—At present there is none.

*President.*—You start boiling.

*Mr. Vakil.*—Then we finish it off.

*Mr. Vakil.*—In both places.

*Mr. Vakil.*—In both places it is the same. After boiling we will allow it to settle down for some time, finish it off and fill the drums.

*President.*—It crystallises.

*Mr. Vakil.*—It goes into a fused mass.

*President.*—Here?

*Mr. Vakil.*—In both places.

*Dr. Matthai.*—I take it what happens in Germany is you convey this mother liquor to the factory, have it collected, then you evaporate it and when you reach a particular density, you stop there and you get the crystals.

*Mr. Vakil.*—Yes, we do.

*Dr. Matthai.*—And it is at that stage bromine is recovered.

*Mr. Vakil.*—There is an option. You can either recover the bromine at the beginning or at the end. The modern practice is to recover it at the beginning.

*Dr. Matthai.*—If you recover bromine, have you got to stop at this point or can you do it in one continuous process?

*Mr. Vakil.*—We have got to stop.

*Dr. Matthai.*—You take the crystals, heat them and that is how you get the fused chloride.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—Here what happens is the mother liquor is taken to Kharaghoda and then it is put into these evaporators. There is one long continuous process.

*Mr. Vakil.*—There are no evaporators at Kharaghoda. They simply boil it into the pans until they get the fused chloride.

*President.*—How much water would it contain when it is fused.

*Mr. Vakil.*—To begin with it contains roughly 50 per cent.

*President.*—When you have fused it?

*Mr. Vakil.*—6 molecules. That is the chemical combination.

*President.*—In describing this process in Germany, they will get the crystals first.

*Mr. Vakil.*—Yes. In fact Germans were very much surprised why we don't go in for crystals.

*President.*—What is the difference? Why don't you get crystals?

*Mr. Vakil.*—Because nobody would buy it from us.

*Dr. Matthai.*—The crystals are entirely used for cement.

*Mr. Vakil.*—They are being used in Germany for textile purposes.

*President.*—Is there any difference in the chemical formula of the two?

*Mr. Vakil.*—It is the same product.

*President.*—I take it in crystals the expenditure on fuel is less. Then why do you spend more fuel.

*Mr. Vakil.*—Up to the war we were dependent on foreign German magnesium chloride. If you want to pack the crystals, you want a number of packages. It was one of the ways by which they saved a little in packing. Science has gone a bit further. Now they are taking out 6 molecules of water and market anhydrous magnesium chloride with the result that they can save half the freight.

*President.*—How do you do that?

*Mr. Vakil.*—By passing in dry hydro-chloric acid.

*President.*—That will take out the moisture.

*Mr. Vakil.*—Yes.

*President.*—How would the atmosphere act on that afterwards? Would it again reabsorb the moisture?

*Mr. Vakil.*—Immediately you have extracted, you let it go into the packages and then seal and send them.

*President.*—What difference do 6 molecules make in weight?

*Mr. Vakil.*—On page 27 of my report I have described it. 203 parts of commercial fused magnesium chloride will contain 108 parts by weight of water. You can take out that 108.

*President.*—That would save them half the freight.

*Mr. Vakil.*—Yes, and half the packing.

*President.*—Why can't you do it?

*Mr. Vakil.*—There is no demand for that in India.

*Dr. Matthai.*—Why do you say there is no demand in India.

*Mr. Vakil.*—They will not buy it. Why should we go to the length of making anhydrous quality where they could easily use the crystal form which is the first stage. Why convert it into fused? Why take it through the other plant and convert it into anhydrous form? If we were an exporting country, that consideration would arise. Our mills refuse to use it in a crystal form.

*Dr. Matthai.*—Then the freight from Kharaghoda to Bombay market is a fairly considerable proportion of the cost.

*Mr. Vakil.*—Then the cost of recovery has to be taken into consideration.

*President.*—According to your statement given on pages 23 and 24 of your report the cost of making crystals into fused form is 10 marks per ton.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—The point that we want to consider is this. You give 15 marks as the actual cost at the works of fused chloride.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—Looking at the items that you give here, they cover the collection of the mother liquor, labour at the works and also fuel.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—I was looking at the corresponding figures of the Pioneer Magnesia Works. Their costs are as follows:—

	As. P.
Collection of bitters	3 6
Works Labour	2 0
Power and fuel (firewood)	5 6
TOTAL	11 0

May I take it that this 11 annas corresponds to 15 marks a ton that you give on page 24, a mark being equal to a shilling?

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—In that case this 11 annas would correspond to 8 annas per cwt.

There is just another point. I notice that the two chemical engineers whom you consulted seem to draw attention to the fact that the present cost of fused chloride is slightly higher.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—If that were so, probably these figures might exactly coincide.

*Mr. Vakil.*—They will.

*President.*—There you are talking of transferring to calcination furnaces. Why do you call it calcination?

up against the theory that some industrial product for which protection is

*Mr. Vakil.*—The process is called calcination.

*President.*—There is no lime.

*Mr. Vakil.*—No, that is a generic term.

*President.*—In a special sense it is used.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—It simply means intense heating.

*Mr. Vakil.*—Yes, the act of heating it up.

*President.*—It is never safe to compare the costs of one country with those of another.

*Mr. Vakil.*—No.

*President.*—Because as you know conditions are so very different. But we can compare the processes.

*Mr. Vakil.*—Yes.

*President.*—Does your manufacture involve more processes?

*Mr. Vakil.*—No.

*President.*—Your opinion is that they have got to go through precisely the same processes.

*Mr. Vakil.*—Precisely the same thing.

*Dr. Matthai.*—It comes to this that magnesium chloride is a by-product of potassium chloride in Germany whereas in India it is a by-product of sodium chloride.

*Mr. Vakil.*—It has always been so. It is a by-product of salt manufacture in France. In Italy it is a by-product of salt manufacture.

*President.*—We did not say that it was a by-product until Mr. Lalkaka came and called it a by-product. As my colleague has pointed out it is no more a by-product there than it is here.

*Dr. Matthai.*—As a matter of fact in enquiry after enquiry we have been asked is a by-product in some other country and that therefore it is out of

the question to try and establish it by protection. We have had a great deal of this by-product theory.

*Mr. Vakil.*—The whole thing arises from the confusion which a lay mind has as to what to call and what not to call a by-product.

*The meaning of By-product.*

*President.*—A by-product in a sense is a thing which does not cost you anything to produce or so little that it does not matter and for which there is a market.

*Mr. Vakil.*—That is so.

*Dr. Matthai.*—It is really some residual product in an industrial process that can be sold without further treatment.

*President.*—That is called a by-product if it can be sold without further treatment. When it requires further treatment, it adds to the cost of manufacture and hence it cannot be called a by-product.

*Mr. Vakil.*—You can call the raw product a by-product of other industry but not the finished product.

*Dr. Matthai.*—That is the difference.

*Mr. Vakil.*—Am I at this stage at liberty to point out that some witness has pointed out that magnesium chloride is picked up as such from the pits? You have it in your written evidence yesterday that magnesium chloride as such is picked up from the pits.

*President.*—That was an expression of opinion by a witness who did not claim to be an expert, and we did not examine him on the technique of the subject.

*Mr. Vakil.*—That was all that I wanted to point out.

*President.*—That was partly due to the fact that Mr. Lalkaka himself propounded that theory in the first enquiry.

*Mr. Vakil.*—That was a mistake which I had to correct later.

*Other by-products from bitterns.*

*President.*—As regards the statement on page 61 regarding by-products from bitterns, what I want to know is that you want to extract other by-products. Those would be by-products now.

*Mr. Vakil.*—That might be called the full programme of the company. We will have to take it up one after the other in the order of importance.

*President.*—You first take out the salt and that salt is taken over by Government.

*Mr. Vakil.*—Yes, we let it go.

*President.*—Then you get epsom salt.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—As regards salt that you give here, is it the salt which is contained in mother liquor?

*Mr. Vakil.*—Yes, but we are not allowed to make use of it because it is really the property of Government.

*Dr. Matthai.*—Are you not paid for it?

*Mr. Vakil.*—No.

*Dr. Matthai.*—Supposing you improve your process and you are able to get a better sodium chloride?

*Mr. Vakil.*—What is the use of that expensive sodium chloride when you can get cheap sodium chloride.

*Dr. Matthai.*—Your main object is to attempt solar evaporation because it gives a more uniform quality to your bitterns. When you do that, you get salt incidentally, and if you get a price for it, it is much better for you.

*President.*—Government will not pay anything for it.

*Mr. Vakil.*—Government will pounce upon it.

*President.*—The Pioneer Magnesia Works are manufacturing salt from the ordinary salt. Supposing you start from bitterns would it make any difference in cost? Supposing you start from bitterns and you recover salt (and you have the licence to recover it) and you go on getting the different products, would that be cheaper for you than getting the residue from Government?

*Mr. Vakil.*—That would not materially help me.

*President.*—What I wish to know is that in the quantities that you have given what quantities of bitterns have you assumed?

*Mr. Vakil.*—100 tons of bitterns.

*Dr. Matthai.*—Is it 100 tons of bitterns or is it 100 tons of magnesium chloride?

*Mr. Vakil.*—I am sorry, that is magnesium chloride.

*President.*—You don't treat magnesium chloride.

*Mr. Vakil.*—It is our practice sometimes to calculate all quantities of materials used in terms of our principal product.

*President.*—You are not manufacturing those by-products—we will call them by-products—from magnesium chloride.

*Mr. Vakil.*—No, we are not.

*President.*—You start from bitterns.

*Mr. Vakil.*—Yes.

*President.*—You first of all take out salt.

*Mr. Vakil.*—Yes.

*President.*—This 18 tons of salt that you mention, what quantity of bitterns does that represent?

*Mr. Vakil.*—That quantity of bitterns which will give me 100 tons of magnesium chloride.

*Dr. Matthai.*—That is to say, 250 tons of bitterns.

*Mr. Vakil.*—Yes.

*President.*—This means that from the quantity of bitterns which will give you 100 tons of magnesium chloride you get 18 tons of salt. That is what Government get.

*Mr. Vakil.*—18 tons may belong to Government and the rest belongs to us. Supposing my cost of manufacture is Rs. 3 per cwt. I get credit for Re. 1 per cwt.

*President.*—That I understand. Where does magnesium chloride come in?

*Mr. Vakil.*—It does not come in. This refers to products other than magnesium chloride.

*President.*—There are 100 tons of magnesium chloride too.

*Mr. Vakil.*—Yes, in the bitterns. But I am not considering bitterns. I am considering something that is inside bitterns.

*President.*—What I want to know is this. I will say that the value of the products *ex-Kharaghoda* would be as under—

From bitterns equal to 100 tons of magnesium chloride—is that right?

*Mr. Vakil.*—Yes.

*President.*—From that quantity you will get 100 tons of magnesium chloride, 18 tons of salt, 9 tons of epsom salt, 2.3 tons of potassium chloride and 25 tons of Bromine.

*Mr. Vakil.*—Yes.

*President.*—That accounts for the whole of the bitterns. Will anything be left out afterwards?

*Mr. Vakil.*—Nothing.

*Dr. Matthai.*—There will be some quantity of sludge left at the end.



*Mr. Vakil.*—Yes.

*President.*—Is there a big demand for Bromine in this country?

*Mr. Vakil.*—No, not in this country.

*President.*—What will you do with it?

*Mr. Vakil.*—If we manufacture bromine we will be the first or the second in the manufacture of bromine in the Empire.

*President.*—Is there any demand for it?

*Mr. Vakil.*—There is such a large demand for it.

*President.*—What is it used for?

*Mr. Vakil.*—It is used in the manufacture of dye stuffs.

*President.*—Nobody manufactures dye stuff in the country.

*Mr. Vakil.*—We will have to export bromine if we make it. It is used in the rubber industry, in the preparation of drugs and photographic materials. It has got such a large number of applications and they are increasing day by day.

*Dr. Matthai.*—It is also used in connection with petrol?

*Mr. Vakil.*—Yes.

*President.*—It would not give very much after all, this 100 tons of magnesium chloride.

*Mr. Vakil.*—May I draw your attention to what the Government Chief Chemist in London has said that the Rann of Cutch promises to be a very important centre for the manufacture of bromine.

*President.*—You have got to manufacture magnesium chloride.

*Mr. Vakil.*—We have got to take out other by-products.

*President.*—At present the market for magnesium chloride is 5,000 tons.

*Mr. Vakil.*—No, it is 7,000 tons.

*President.*—Even if you take 7,000 tons, that would give you about 25 tons (850 x 70 lbs.).

*Mr. Vakil.*—Yes.

*President.*—That is not a very large quantity.

*Mr. Vakil.*—That is a very large quantity for bromine.

*Dr. Matthai.*—At present bromine is produced in the United States and in Germany.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—Is the market steadily increasing for it?

*Mr. Vakil.*—Yes, to a considerable extent.

*Dr. Matthai.*—If there is a recovery plant for bromine is that likely to be very expensive?

*Mr. Vakil.*—No, it is not. I have gone into that very carefully.

*Dr. Matthai.*—You have got all the estimates.

*Mr. Vakil.*—All the information is contained in that report of mine.

*President.*—The most important of these by-products is potassium chloride.

*Mr. Vakil.*—Yes.

*President.*—What I want to know is this. Of course you can say by mere chemical analysis how much of these different chemicals are contained in a thing.

*Mr. Vakil.*—Enormous work has been done and these processes are in practice in so many places—“the United States of America” is recovering.

*President.*—From common salt?

*Mr. Vakil.*—Where the salt works are.

*President.*—Our sodium chloride is peculiar. Those salts may contain other ingredients. I am asking you whether from the ordinary sodium chloride that you have these by-products can be recovered.

*Mr. Vakil.*—Yes, they are recovered on a very large scale.

*President.*—That is what I want to know.

*Mr. Vakil.*—The United States of America are recovering those by-products.

*President.*—Is that rock salt?

*Mr. Vakil.*—No.

*President.*—Have they got this evaporation process?

*Mr. Vakil.*—Yes, near San Francisco.

*Dr. Matthai.*—They have got brine in underground streams.

*Mr. Vakil.*—Yes. In the middle west somewhere near the Ontario Lake there are brine springs from salt deposits. They have it also in Japan and also in Italy which I understand belongs to Government.

*President.*—This is only an estimate of the costs.

*Mr. Vakil.*—Yes. This is the goal which we aim at. These are the possibilities.

*President.*—That would require some additional plant.

*Mr. Vakil.*—Yes. When I talk of the recovery of magnesium sulphate, I may say that I have seen with my own eyes in the South of France near Marseilles magnesium sulphate being produced by thousands of tons from a huge pit as big as this building, being residue of one season's crop in one year.

*President.*—What is the quantity of salt?

*Mr. Vakil.*—It does not contain more salt. They say that is the same as ours: all the world over sea water has the same average analysis, except in the case of the Dead Sea.

*Dr. Matthai.*—I notice that the German expert whom you consulted makes the suggestion that the scale at which you are producing is so small that with the exception of bromine it might not be very economical.

*Mr. Vakil.*—Very recently there was an interview from one of the biggest officers of the State there and in that interview he said that Germany would fight to the last man if again an attempt is made to take away from Germany its potassium deposits in the south west of Germany. Not a single intelligent man in Germany will ever encourage anybody to recover potash. You can recover potash easily out of sea water. For this potash France wanted Alsace Lorraine. France has got it to-day and it has put in 2,000 francs import duty on any potash that comes into France.

*President.*—Have they got potash deposits in France?

*Mr. Vakil.*—They recover it at the salt works near Marseilles and in Alsace.

*Dr. Matthai.*—It also occurred to me from the trend of your German expert's report that some of the suggestions they have made require to be taken with a certain amount of reservation!

*Mr. Vakil.*—He won't encourage this industry being started elsewhere.

*President.*—This potassium chloride, can it be used for fertilisers?

*Mr. Vakil.*—It is used for fertilisers?

*President.*—At present you are not making it?

#### *Change of Government policy advocated.*

*Mr. Vakil.*—No. A most primitive, most conservative and most ruinous policy of salt manufacture is carried on at Kharaghoda, and Government will not change that policy.

*President.*—Government methods of business are not always the most economical!

*Mr. Vakil.*—Unfortunately they are ruining it. May I point out in this respect while on this subject the opinion expressed before the Chemical Services Committee, 1920 . . . . .

*President.*—I remember about this. Nothing came out of it.

*Mr. Vakil.*—And nothing would come out of it so long as Government follows the present policy of salt manufacture at Kharaghoda.

*President.*—What is your suggestion?

*Mr. Vakil.*—They should hand over the business to private salt manufacturers and then they would get a better return than they are getting at present.

*President.*—Which is the nearest port from Kharaghoda?

*Mr. Vakil.*—Bhavnagar, about 150 miles.

*President.*—Is there a railway connection between the two?

*Mr. Vakil.*—Yes. You have to change the gauge at Viramgaon.

*Protection for limited period advocated.*

*Dr. Matthai.*—May I put a general question, Mr. Vakil? Having read your report very carefully I feel that if certain new methods and certain new kinds of apparatus are adopted at Kharaghoda, it might be possible for the Pioneer Magnesia Works without any kind of assistance to compete at the current price of imported magnesium chloride?

*Mr. Vakil.*—Certainly.

*Dr. Matthai.*—Don't you think, therefore, that once protection is granted there is some possibility that the incentive for improvements would go.

*Mr. Vakil.*—It won't go.

*Dr. Matthai.*—Because it does mean that a man must be prepared to take a certain amount of risk before he adopts the suggestions that you have made.

*Mr. Vakil.*—We want protection for three years. That is the time within which any new industry can establish itself if it is well thought out and well organized. But if you don't give us protection right from the very beginning, hardly we come into existence we would be throttled. The most pertinent point in this connection is this, that hardly had I started with the construction of the Okha Salt Works than this German syndicate comes along and puts a united front to crush me and my works and yet they say Germany has no intention of throttling the Indian industry! They realized at a very late stage that they had made fools of themselves.

*Pyrites.*

*President.*—Have you studied the question of manufacture of other heavy chemicals in India?

*Mr. Vakil.*—Yes.

*President.*—Have you any knowledge of the existence of pyrites in this country? We have not got any reliable information on that at present.

*Mr. Vakil.*—I was very much surprised to read in one statement made before the Board that pyrites are available in very large quantities in the country. Then I requested my Chamber to ask for information on the subject but the papers which I have received are very disappointing.

*President.*—We have not been able to get any information on that point. We have written to the Geological Survey Department but we have not heard yet. It is a very important point. If we have pyrites then we have got the principal raw material.

*Mr. Vakil.*—I would like to clear the mist that is always there on the subject. I don't know how and where the impression originated that because India is poor in pyrites or sulphur it cannot make sulphuric acid. Take England or any other country. They all get sulphur or pyrites from other sources.

*Dr. Matthai.*—All countries except perhaps the United States of America have to get their sulphur from elsewhere?

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—There are two things. One of the conditions laid down by the Fiscal Commission is that the industry must possess the raw materials. It does not necessarily follow of course that if it does not possess all the raw materials, it has not qualified for protection. And the next point is that when you have not got an alternative raw material at your disposal, then you have to pay a higher price for it—in your case for the sulphur. For this reason I want to know whether you have got pyrites, but you say the information available is not satisfactory.

*Mr. Vakil.*—That is so. Of the two companies I know the inside out of one and of the other I know a good deal and the cost of manufacture—I have seen their confidential papers—compare favourably to the sulphuric acid costs at Jamshedpur.

*President.*—That is 65 per cent. and these works have given 100 per cent.

*Mr. Vakil.*—No. I am comparing their costs of Chamber Acids only.

*Dr. Matthai.*—Supposing some of the companies are able to get their full output, I should say there would not be a difference of more than five rupees between Tata's cost and theirs.

*Mr. Vakil.*—We ought to do better in Bombay than at Jamshedpur because of the freight that Tatas have to pay on their imported stuff to Jamshedpur.

*Dr. Matthai.*—As a matter of fact their sulphur seems to be cheaper? Perhaps by buying in larger quantities they get it cheaper?

*Mr. Vakil.*—That is so. If we are sure of continuous running the Bombay people could also be in a position to buy in the cheapest market.

#### *Sulphuric Acid.*

*President.*—The whole point is this, that at present—I pointed it out to the Companies also—they have got the whole of the market that they claim they ought to have. There is no room for more than one works.

*Mr. Vakil.*—I agree with you there.

*President.*—So that the question of sulphuric acid resolves itself into this, viz., the question of economic unit.

*Mr. Vakil.*—As my Committee have said, that is not the only solution; another solution is also possible. If an embargo or a heavy duty is put on substances made out of sulphuric acid which are coming into the country then two works can exist side by side.

*President.*—We went into the figures very carefully and we came to the conclusion that if adequate protection was given, whether by duty or something else, even so the quantity of sulphuric acid required would not keep two works going, working at full capacity.

*Mr. Vakil.*—I will accept your finding.

*Dr. Matthai.*—Roughly the figures that we have shown that taking into account not merely acid sold as such but also the secondary products the total consumption would not be higher than 20,000 tons. On the Bombay side you don't have sufficient consumption for a capacity of 15,000 tons.

*President.*—At present there is really no room for two plants working to full capacity.

*Mr. Vakil.*—To that extent I am in full agreement with you.

*President.*—We are confining our attention to the market which they can reasonably claim as theirs. It is no use manufacturing sulphuric acid here and saying that you will sell it at Calcutta. So that so far as the part of the market here is concerned, it is plain that unless a big demand is created for products in which sulphuric acid plays a part, there is very little room for expansion.

*Mr. Vakil.*—You have come to the right conclusion.

*President.*—We have come to no conclusion: these are facts!

*Price of German Magnesium Chloride.*

*Dr. Matthai.*—You have seen the terms of reference under which we are making this enquiry?

*Mr. Vakil.*—We have.

*Dr. Matthai.*—Are there any questions included in these terms of reference on which you would wish to express any opinion?

*Mr. Vakil.*—I was told that the price of German magnesium chloride in the home market is very low.

*Dr. Matthai.*—We were given 49 marks as the price.

*Mr. Vakil.*—That is not substantiated by facts. Magnesium chloride in the home market is sold at 9 marks per 100 kilos, that is 90 shillings per ton (hands in a copy of the Oil and Colour Trades Journal).

*President.*—Is that fused?

*Mr. Vakil.*—Yes, because it is for export purposes also.

*Price of other chemicals.*

*President.*—Can you give us the price of all these acids and heavy chemicals mentioned in the Government Resolution?

*Mr. Vakil.*—I will send you.

*Dr. Matthai.*—Is that the price which is current in the English market and in Germany?

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—Or are these export prices?

*Mr. Vakil.*—Merchants are at liberty to deal in them as they like.

*President.*—If the prices are export prices quoted by the syndicate themselves, then the export prices are very often lower than internal price.

*Mr. Vakil.*—Export prices cannot be lower than the cost of production.

*President.*—Are these export prices or are these prices at which these chemicals are sold in Germany itself?

*Mr. Vakil.*—In the open market in Germany.

*Dr. Matthai.*—The statement begins thus:—"The Home market is quieter and the export market is hampered by lower offers . . ." so that the reference seems to be to the export price.

*Mr. Vakil.*—May be they are export prices.

*Dr. Matthai.*—When a witness suggested yesterday that about 49 sh. at Hamburg was the price at the inland market of Germany, I was not inclined to quarrel with it, because in the inland market of Germany there is apparently little demand for fused chloride. Therefore if you have a quotation, it is probably a nominal quotation at which transactions do not actually take place.

*President.*—This probably corresponds to the c.i.f. price in Great Britain. It looks very much as if it is an export price.

*Mr. Vakil.*—It is very difficult for me to believe that 49 sh. is the price as stated by the former witness.

*Dr. Matthai.*—If you have no market for a commodity, you can have a nominal quotation.

*Mr. Vakil.*—There is a large market for magnesium chloride.

*President.*—For fused chloride?

*Mr. Vakil.*—Yes. There is more demand for magnesium chloride. New uses for magnesium chloride have been found.

*President.*—Will you send us the prices of these articles given in the terms of reference and also for magnesium chloride and tell us whether they are export price or whether they are f.o.b. Hamburg?

*Mr. Vakil.*—Yes. On pages 98 and 108 of that big report the internal cost of manufacture from an expert who is making it is given.

*Dr. Matthai.*—Is that quite recent?

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—How old are these?

*Mr. Vakil.*—Only last year. Conditions have not changed materially.

*President.*—Mr. Vakil, we are very much indebted to you for coming and giving evidence. Really it has been a most interesting morning for us and you have given us most valuable information and we are also obliged to the Chamber of Commerce for having produced you before us, much as we regret that we have not had the pleasure of examining you on the larger questions of policy.

*Consumption of Magnesium Chloride in India.*

*Dr. Matthai.*—There is just a point about which I wish to ask you. You said that the consumption in India is 7,000 tons. From the trade returns and the local production figures we get only 4,500 to 5,000 tons. Where do you get 7,000 tons?

*Mr. Vakil.*—My clients produce nearly 3,000 tons per year and 3,000 to 4,000 tons are the imports. That makes up 7,000 tons.

*Dr. Matthai.*—Imports for 1927-28 are only 2,000 tons.

*Mr. Vakil.*—Then I stand correct.

*Dr. Matthai.*—I was wondering whether you had any information on the consumption of crystal chloride.

*Mr. Vakil.*—No.

*Mr. Mehta.*—May I put it before my Committee what you said this morning or are you going to write to us?

*President.*—I don't think we shall write. I have told you frankly what I have to say. I have not said it in any unfriendly spirit. When discussing a particular view held by the Chamber, it strengthens the position of the Chamber if we have them before us in the ordinary way.

*Mr. Mehta.*—I have explained to you the reason why we sent Mr. Kapilram Vakil and Dr. Venkatarao.

THE INDIAN MERCHANTS' CHAMBER.

Oral Evidence of Messrs. L. R. TAIRSEE, President, Indian Merchants' Chamber, KAPILRAM VAKIL and VENKATARAO recorded at Bombay on Tuesday, the 27th November, 1928.

*President.*—I understand you have got some statement to make this morning.

*Mr. Tairsee.*—Yes. My attention was drawn to some remarks made by you on Friday last when our representatives were examined by you regarding the question of Chemical industries as reported in the Press, and our Secretary conveyed your message to me. I fear that there is some misunderstanding which I wish to be removed. There cannot possibly be any intention of the slightest discourtesy on the part of the Chamber to the Tariff Board for whom they have the highest respect. We nominated Mr. Kapilram Vakil and Mr. M. Venkatarao as our representatives as the question of Chemical industries was a highly technical one. Mr. Kapilram Vakil besides being a research chemist of reputation is also a merchant of high standing and a member of our Committee continuously for more than four years and our Committee thought that when they nominated these two gentlemen they were electing two representatives who would be in the best position to express their views regarding the question. I myself as President and an *ex-officio* member of all the Sub-Committees and delegations under the rules of the Chamber would have willingly accompanied them if I thought that any questions of policy were to be asked at that sitting. I now wish to inquire as to when it will be convenient to you to examine all three of us regarding any further question that you may have to ask of us. The remarks appearing in the Press on Saturday are, I understand, only a part of the remarks that you made and I should be gratified if you will be pleased to take steps to have the report amplified.

*President.*—Mr. Tairsee: The Board very much appreciates the prompt manner in which you have appeared before the Board personally at some inconvenience to yourself to give us an explanation of what took place last week in connection with the evidence of the Chamber and we are very glad to be told that there was no discourtesy intended towards the Board. Indeed we never thought that there could be any question of discourtesy. The reason why we were anxious to examine the official spokesman of the Chamber for the year is that we attach very great importance to the opinion of the Chamber as being the premier Indian Chamber and we felt that our proceedings would be somewhat incomplete if we had not had the advantage of its opinion expressed through its Chairman. We had not the least doubt that Mr. Kapilram Vakil and Mr. Venkatarao who appeared before us would be able to represent the Chamber's views generally and we were prepared to treat them as your representatives on that day except for the single reason that we thought that it would be more appropriate if you yourself came and gave us the benefit of your opinion. Mr. Vakil gave us very valuable evidence on that day as an expert and I am sure that we learnt much and acquired a great deal of knowledge from his evidence which otherwise would not have been available to us. We are very much indebted to the Chamber for having given us the benefit of Mr. Kapilram Vakil's services as an expert witness and we are indebted to Mr. Kapilram Vakil himself for his valuable evidence. We welcome your suggestion to appear before the Board and to state the views of the Chamber on the general questions of policy which have been raised in your representation. As it happens day after to-morrow we were going to examine Brunner Monds, but they have asked for a postponement. Therefore that day is available. If it suits your convenience, we can examine you at 11 o'clock on Thursday morning.

*Mr. Tairsee.*—Yes, Thursday, 11 o'clock will suit me. I am obliged to you for what has fallen from your lips.

THE INDIAN MERCHANTS' CHAMBER.

Oral Evidence of Messrs. L. R. TAIRSEE, KAPILRAM VAKIL,  
Dr. VENKATRAO and J. K. MEHTA recorded at Bombay on  
Thursday, the 29th November, 1928.

*Conditions laid down by the Fiscal Commission examined.*

*President.*—We will confine ourselves as far as possible this morning to the broader issues. In your representation you say that the conditions laid down in the Fiscal Commission are fully satisfied. There is one condition about raw materials as you know.

*Mr. Tairsee.*—Yes.

*Raw materials.—Sulphur.*

*President.*—All these chemicals except magnesium chloride depend very largely on sulphuric acid. We have got no sulphur in the country. We have been trying to collect evidence as regards pyrites, but the evidence is very unsatisfactory so far. Of course the absence of one raw material is not decisive against the grant of protection, but it is a point that has to be met.

*Mr. Tairsee.*—I understand subject to what Mr. Kapilram may be able to tell you, that even Germany and England also import sulphur.

*President.*—These countries have got one advantage. They have got an alternative source of supply either in their own country or just in the neighbouring countries which we have not got.

*Mr. Tairsee.*—England and Germany also have to import sulphur.

*Dr. Matthai.*—That is perfectly true. The only difficulty is that we have got to carry out the conditions laid down by the Fiscal Commission.

*Mr. Tairsee.*—I don't think the Fiscal Commission is the last word.

*Dr. Matthai.*—We are a subordinate body appointed to consider how far the conditions of the Fiscal Commission are carried out in a particular industry.

*President.*—In fact our reference begins by saying that we have got to make our recommendations having regard to the conditions laid down by the Fiscal Commission and that is also the policy of the Legislature. We can't override that.

*Mr. Tairsee.*—It may be the policy to-day, but when a country is out to fulfil its own aspirations, I think that there should be no limitation to our aspirations. I will not take the Fiscal Commission as the last word.

*President.*—We are not taking the Fiscal Commission as the last word. The legislature itself has now accepted the conditions laid down by the Fiscal Commission. It has gone beyond the stage of the Fiscal Commission.

*Dr. Matthai.*—As a matter of fact if the Fiscal Commission's conditions had to be accepted in other countries, Lancashire would get no encouragement for the Cotton Industry, the Match industry would get no encouragement in Sweden. It is, as you point out, a matter on which there can be honest differences of opinion as to whether these conditions are valid, but taking them for the moment as a settled fact, in what way would you suggest that we might get round that condition.

*President.*—That is the point.

*Mr. Tairsee.*—My own impression is this: that what is put down here and elsewhere and what is being done is only a camouflage. It is the stomach which is at the bottom of everything. The gastronomic reason is much more important than political or economic reasons. Every country is thinking how best to advance and acting accordingly irrespective of free



trade or protection. Everybody of course talks of protection though all the time there is the protectionist policy going everywhere.

*President.*—We know all that. All Indians have that feeling at the back of their minds, but this Board has to act upon certain principles which have been laid down by the Legislature.

*Dr. Matthai.*—To which we are subordinate.

*President.*—You have to work in the Legislature to get those principles altered, but so long as they remain, we have got to give effect to them as far as possible. I do not for a moment suggest that absence of sulphur is necessarily a bar to any recommendation, but it is a thing we have got to meet. I am asking you whether you have any suggestions to make.

#### *Gypsum.*

*Mr. Vakil.*—If you will allow me to say at this stage I have looked into the question of sulphur since we met last week. Sulphur as such may be very difficult to obtain in India but there is an abundant source of supply of sulphur in India and that is calcium sulphate.

*Dr. Matthai.*—Gypsum?

*Mr. Vakil.*—Yes. Looking up my notes I find that I personally had inspected and seen in Germany works where sulphuric acid was made out of sulphur from gypsum.

*President.*—Does gypsum contain sufficient quantity of sulphur?

*Mr. Vakil.*—Yes. The only necessary condition for the recovery of sulphur out of gypsum is a cheap supply of fuel.

*President.*—Gypsum occurs in the Central Provinces. There is plenty of coal there.

*Mr. Vakil.*—It also occurs in Rajputana and Kathiawar.

*President.*—But they have no coal there.

*Mr. Vakil.*—No.

*President.*—In our Cement Report I think we referred to gypsum.

*Mr. Vakil.*—They use gypsum to a large extent.

*President.*—But we have received no evidence so far as to the amounts available, the analysis of the gypsum and where it is to be found.

*Mr. Vakil.*—I admit. Up to now the manufacture of sulphuric acid from gypsum has not been so well known as the ordinary process of manufacture from iron pyrites.

*President.*—I find some reference to this in the text books, but the point there is some gypsum may contain more sulphur.

*Mr. Vakil.*—It is a chemical combination which is bound to keep to its natural proportions. It is not like pyrites or any other substance.

*President.*—How much sulphur would gypsum contain?

*Mr. Vakil.*—138 parts of gypsum contain 32 parts by weight of sulphur which would amount practically to 24 per cent.

*Dr. Matthai.*—I take it the difference between gypsum and pyrites from the point of the view of the production of sulphuric acid is largely a question of fuel.

*Mr. Vakil.*—Yes, it is a question of fuel.

*Dr. Matthai.*—Very much more in the case of gypsum than in the case of pyrites.

*Mr. Vakil.*—Yes, in the case of gypsum, because a special type of plant is required. In the case of pyrites the burning is a very easy affair.

*President.*—The formula is  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ . Gypsum contains 32.5 per cent. lime, 46.6 per cent. sulphur trioxide and 20.9 per cent. water. That may be accepted.

*Mr. Vakil.*—Yes. This is the hydrated state, but you may calculate it also from the anhydrous state.

*President.*—Yours is in what state.

*Mr. Vakil.*—Ours is in hydrous state in Okhamandal.

*President.*—That would be the formula.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—Is the manufacture of sulphuric acid from gypsum a post war development?

*Mr. Vakil.*—The process was known for a very long time, but during the war Germany has made a considerable advance and immediately after the war I myself personally visited that factory. It is a very big factory at Oppau near Mannheim.

*Dr. Matthai.*—I suppose the point was that during the war supplies of pyrites into Germany were cut off.

*Mr. Vakil.*—There was restriction.

*President.*—If it contains 46.6 per cent. sulphur trioxide, it is as good as pyrites which contain 45 per cent.

*Mr. Vakil.*—No. We don't measure sulphur as such in gypsum as in pyrites.

*President.*— $\text{SO}_2$  corresponds to what?

*Mr. Vakil.*—It would correspond to about 22 to 24 per cent. sulphur by itself in gypsum. I would not say that India has absolutely no sulphur after I have looked into the matter last week and after seeing what has been done in Germany.

*President.*—But considering that sulphuric acid contains  $\text{SO}_2$  or  $\text{SO}_3$ , would gypsum not be used more?

*Mr. Vakil.*—Yes, it is being used in larger quantity than pyrites.

*Dr. Matthai.*—I suppose, as far as India is concerned, where the question of pyrites is still an uncertain factor if we wanted an alternative at all to sulphur, it is more probably gypsum than pyrites.

*Mr. Vakil.*—That is so. Supposing to-morrow an international war broke out and India is cut off from a foreign supply of pyrites, then the Indian Chemist will have to get busy for months together and work out the same process as Germany has done during the war.

*President.*—Looking at the natural chemical formula of gypsum it does seem to me that it might be a shorter process for the manufacture of sulphuric acid.

*Mr. Vakil.*—I wouldn't say it is a shorter process. It is rather a difficult process and each stage is covered by a patent and whether these patents are covered in India, I do not know.

*President.*—That would be ordinarily.

*Mr. Vakil.*—Yes.

*President.*—Then that is not a source which is available to us.

*Mr. Vakil.*—Patents are available to any one who pays the patents' fees.

*President.*—It is a sort of royalty.

*Mr. Vakil.*—Yes.

*President.*—Some people would not give any licence.

*Mr. Vakil.*—That is the monopoly of a very secret thing. The speciality comes in the technique of it and not in the formula.

*President.*—As you know some of these big manufacturers—Brunner Mond—do not patent it at all and if they do, they don't give any licence.

*Mr. Vakil.*—Anything of that nature is the result of their own special research.

*President.*—I think this is very useful information as regards India. I was wrong in saying that gypsum occurred in the Central Provinces. It occurs in the Punjab and in Jodhpur.

*Mr. Vakil.*—It also occurs in Kathiawar.

*President.*—But then there is no fuel there.

*Mr. Vakil.*—Kathiawar has not got any fuel.

*President.*—It is the same case with the Punjab and Jodhpur. It is all a question of freight.

*Dr. Matthai.*—You have also got it round about Trichinopoly in South India. Are there any considerable supplies of other kinds of pyrites than iron pyrites?

*Mr. Vakil.*—That is what I told you last week. I was very much disappointed to find that that was not so. I thought that they were available from the representation that was made to you by one of the Chemical Companies. I personally feel that here and there there are rare instances of copper pyrites or iron pyrites but nothing to speak of, out of which sulphuric acid can be manufactured.

*President.*—We have written to the Geological Survey of India about gypsum also.

*Mr. Vakil.*—I would like to emphasise the fact that the use of gypsum for sulphuric acid is past the academical stage, that the process is in use on a very large scale in Germany and that it is a paying proposition.

*President.*—Do you mean the manufacture of sulphuric acid out of gypsum?

*Mr. Vakil.*—Yes.

*President.*—Are there any text books where this is discussed? I have seen occasional references of course.

*Mr. Vakil.*—If you want to know the full description of that Company's plant at Oppau in a scientific journal, I will send you a reference where you will find full details.

*President.*—In English?

*Mr. Vakil.*—Yes.

*President.*—We would like to see it very much.

*Mr. Vakil.*—I will send it to you later.

*President.*—It is of first rate importance to India.

*Mr. Vakil.*—Yes, it is.

*Dr. Matthai.*—Is there any specially valuable by-product that you get in that process?

*Mr. Vakil.*—No. We can get lime but we have got plenty of lime.

*Dr. Matthai.*—It is only lime that you get.

*Mr. Vakil.*—Yes. May I point out that a syndicate was formed with two or three of the best capitalists of Bombay to develop that process, Sir Vithaldas Thackersey, Sir Victor Sassoon and Sir Lalubhai Samaldas. But unfortunately it was in the hands of people who had very little knowledge of that.

#### *Market.*

*President.*—On page 2 of your representation of the Chamber you mention some arguments which are really not in favour of protection but against it. For instance you say "The Indian manufacturers are unable to meet the foreign competition on account of their inability to produce the principal acids in sufficiently large quantities to lower their cost of production and also consequently lower the cost of salts and heavy chemicals made from them". That is just the point. If you ask for protection, the market must exist. Here we are up against a real difficulty. I think that we discussed this point last time.

*Mr. Vakil.*—It is all arguing in a circle. The market for acids is not there because the products as such are coming from abroad. If the products are given a chance of being made in the country, the market will be there.

*President.*—I worked out the market this morning. Leaving out sulphuric acid and nitric acid about which there is no question of protection, you get only about 14,000 tons of heavy chemicals.

*Mr. Vakil.*—May I point out in this respect one very essential point and I think you will agree with me when I have finished—that is the angle, the standpoint from which the whole subject ought to be approached. If you consult statistical books, blue books on chemical industries, they are bound to lead you astray.

*President.*—These are trade figures.

*Mr. Vakil.*—That is what I am saying. Please bear with me for a little while. If we study the chemical requirements of the country from statistical tables supplied by Trade Returns compiled and published by Government, we are not likely to make much headway or to come to a final decision or any decision that will lead us anywhere. The chemical industry, if you will permit me to say so, is of a peculiar kind and it has got a significance of its own in this way. I will put it to you in the same way in which it has been put time after time during the war. Take your own case for instance. You get up in the morning and go to bed at night. There is not a single requirement—whichever civilization you may take whether English or Indian or any type of life that you may be leading—there is not a single requirement in the preparation of which chemicals have not entered in some form or other.

*President.*—That will be conceded at once. There is no question about that.

*Mr. Vakil.*—We are getting so many of the finished articles to-day into the country in which chemicals have played the chief role or the most important part.

*President.*—I will come to that point later on. At present the enquiry is confined, under our terms of reference, to heavy chemicals. You are here talking of the inability of the Indian industry to compete against foreign competition because they cannot produce in sufficient quantities and I was trying to suggest to you that we have got to bear in mind this that even if the whole market of these heavy chemicals was secured to India, the market would not exceed 14,000 or 15,000 tons excluding of course sulphuric and nitric acids.

*Mr. Vakil.*—Yes, as such.

*President.*—I am suggesting to you that a good deal of that market, so far as Bombay is concerned, is not within its reach. I am now confining the enquiry at present to Bombay. Therefore it is an argument against protection that you are mentioning. There is no market in existence at present.

*Mr. Vakil.*—I think that my Chamber reasoned on this argument in this way. We are not able to manufacture chemicals because we are not able to manufacture acids. The whole point is this. If the heavy chemicals required by Government and the country and by various other public bodies are taxed heavily as certain chemicals are taxed in other countries, then it would be possible to manufacture them in India.

*President.*—I agree. The whole point is this that at present as you know the Chemical Industry must be carried on on a fairly large scale in order to bring down the cost.

*Mr. Vakil.*—Quite so.

*President.*—I am suggesting to you that these figures show that India can have at the most only one works or two works to supply the demand of the whole country unless of course the demand increases. We assume that the cost of production will come down and that you will be able to compete. Having competed against the foreign manufacturer, there is not a sufficiently large market for the industry.

*Mr. Vakil.*—To that extent I will agree with you to the very letter.

*President.*—The next point is how is protection going to lead to the increase in demand? That is what I want to know. On the contrary prices will go up by reason of protection. Supposing we put very heavy duties,

the result will be that prices will go up and consequently the demand may be still less.

*Mr. Vakil.*—If the prices go up, then it is worth while manufacturing those articles in the country itself. I shall give you the instance of magnesium sulphate. To manufacture magnesium sulphate they are using Salem magnesite and sulphuric acid. If 1,000 or 2,000 tons of magnesium sulphate or epsom salts are prohibited entry into the country by a heavy protective duty, I am sure that the Eastern Chemicals or Dharamsi's will find an additional outlet for their sulphuric acid and they will be able to turn out their sulphuric acid for general requirements at a lower cost.

*President.*—That is true. I say there is a market for only 15,000 tons of these various heavy chemicals. 15,000 tons would mean seven or eight thousands tons of sulphuric acid speaking generally. Therefore there is room for seven or eight thousand tons of sulphuric acid for the whole of India. These 15,000 tons one big works—properly equipped—can supply.

*Mr. Vakil.*—Are we confining ourselves to acids or to alkalis also?

*President.*—I am talking of heavy chemicals.

*Mr. Vakil.*—That is the acid side and not the alkali side.

*Dr. Matthai.*—Taking epsom, if you take the imports into India and the local production, you cannot estimate the market at more than 4,000 tons.

*Mr. Vakil.*—That is about the same as magnesium chloride.

*Dr. Matthai.*—In the case of Bombay factories, if they produce to their full capacity, they may be able to make more than the whole of India needs to-day. If that is so, the question arises, supposing you put a sufficiently high duty on imported epsom, and the Indian factories are able to get the whole of the Indian market, you may soon reach a stage where overproduction takes place.

*Mr. Vakil.*—May I, in this respect, point out to you that both the factories need not make the same products. They may come to some understanding, as in other countries like England for instance, whereby some products may be made by one and some by the other.

*Dr. Matthai.*—That would be a line of escape from that situation.

*Mr. Vakil.*—Dharamsi's may specialise in copperas or magnesium sulphate or one thing or another and the Eastern Chemicals being nearer Bombay may produce acids. In that way, it may be made possible for both of them to exist.

*President.*—Quite true. That is my point. Supposing they did it, then—we will put it this way—there is room in India for one sulphuric acid plant on a large scale and one other plant for making heavy chemicals for the whole of India.

*Mr. Vakil.*—Yes.

*President.*—Bombay has not got the whole of Indian market.

*Mr. Vakil.*—No.

*President.*—Therefore the Bengal people might well say “we will manufacture also; we have got a larger market in some than they have—especially in alkalis.” The problem is not solved merely by asking for protection, unless the industry organises itself.

#### Co-ordination.

*Mr. Vakil.*—That is why my Chamber refers to co-ordination.

*Mr. Tairsee.*—Is it your argument that the whole enquiry which the Board is now conducting has reference only to 11 articles?

*President.*—Not only those eleven chemicals mentioned in the communique but also others of the same kind.

*Mr. Tairsee.*—You must look at the whole question from a generous point of view and extend the scope of the enquiry because one part of the chemical industry is dependent upon the other.

*President.*—We are willing to consider the reference as liberally as possible but we have got no applicants before us.

*Mr. Tairsee.*—I just want to put my point before you as a matter of policy. I am not concerned with what the other manufacturers are doing. What I want to put before the Tariff Board is that the whole enquiry should be made to cover the whole chemical industries as such and not restrict it to the 11 articles mentioned in the Government of India Resolution. They are all inter-dependent. In enquiries of this kind too much is being made of the consumer, but unfortunately the consumer is at present being consumed away. So, I say, the whole thing must be looked at from the national point of view.

*President.*—I agree entirely with you. We have issued communiques. We have issued press notes and I have publicly made statements at almost every sitting that those people who are interested in any chemicals or similar chemicals must come forward and state their case. Now if they do not come forward and state their case, on what case am I going to put forward my recommendation? That is my point.

*Mr. Tairsee.*—So far as the question of policy is concerned, I would like to have this fact emphasised more than I am capable of, *viz.*, that the whole industry—I will not call it basic but I will go further and say mother industry—can give you more children, males and females, daughters and sons, if protection is given.

*President.*—So far as the general principle goes, we are in entire agreement with you. But the whole point is that we don't deal in general principles. We deal with specific cases.

*Mr. Tairsee.*—You would deal in general principles if you are a national Government. I want to emphasise that point.

*Dr. Matthai.*—Perfectly true. It is a point that we have ourselves considered. If you take these heavy chemicals which are specifically referred to us, the one big body of chemicals left out is alkalis, and last time we put the question definitely to Mr. Kapilram Vakil and asked him whether he would be in favour of protecting the alkali industry, he said "For Heaven's sake don't protect alkalis".

*Mr. Tairsee.*—This is the paragraph to which you are referring—"It is the key industry on which depend many other industries such as textiles, glass, soap and paper. My Committee are not in a position to make any definite recommendations as regards the alkali industry as they feel that as yet there is no case made out for its protection, but if unnatural competition is created and foreign alkalis are dumped into India, as in the case of magnesium chloride, at extremely low rates with only one view, *i.e.*, to make it impossible for the Indian industry to survive, then in that case protection should be granted to the alkali industry".

*President.*—It would be very much like a Court saying in trying a murder case "there is no murderer just now found but if the murderer is found at some future date, he will be hanged". Can a Court pass an order like that?

*Mr. Tairsee.*—The Court must take proper precautions.

*President.*—The murderer must be before the Court. Here you talk of a case which may or may not arise. Therefore the Board is not in a position to make any recommendation, much as the Board may like to do on proper materials being placed before it.

*Mr. Tairsee.*—It is the duty of the police to see that the potential murderer is well watched.

*Mr. Vakil.*—The murderer is there if you only look at him.

*President.*—The murderer must do some act which will bring him within the purview of the law. There are many murderers at large. They pass their life without being molested.

*Mr. Tairsee.*—My point is that any one making an inroad into our chemical trade must be deported.

*President.*—The one thing that I want to suggest to you is that the question of demand is of very great importance. Where the demand in itself is small and where under modern conditions you must have a large unit of production, unless the industry organises itself and puts itself on that footing in which modern competition takes place, the chances of its success are very remote, even if you have a scheme of protection. In the Cement Industry—I do not know whether you have read our report or not—we were up against the same difficulty. There was more cement being produced than the country required . . . . There was more capacity for production than the country needed, there was internal competition amongst them and no amount of protection could help it unless the industry organized itself.

*Mr. Tairsee.*—If in the initial stage we consider it too small to think of and in the middle stage we allow it to stand by itself and when it comes to the stage of over-production we hold an enquiry which is in the nature of an inquest: that is how we treat the national industries! We will not think of the child, we will not think of the young man . . . .

*Dr. Matthai.*—When you are protecting an infant industry, you must take care that while you protect it, you at the same time provide conditions for the infant industry which would enable it to take proper advantage of the protection. The position now is that in enquiry after enquiry it is found that our industries are up against these Trusts, and if we are going to protect our industries by means of a tariff wall, then unless within that tariff wall you have a corresponding system of rationalization you will not stand in competition very long. We cannot see any future for the Chemical industry unless you are prepared to organize yourselves.

*Mr. Tairsee.*—When there is rationalization on the one hand and if even then there are these Trusts which come in and sell at cheaper prices, the natural instinct would be to give protection against them and not go into philosophical considerations as to how the industry will get on later on, whether there will be over-production and so on.

*President.*—It is not merely a question of over-production. You yourselves have said in your representation that the costs cannot be brought down because production is not on a large scale and therefore we assume all along that production must be on a large scale. When you have got production on a large scale and when you have fulfilled the other conditions under which protection is to be granted, we say "Now this industry has made out a case for protection against foreign competition of an unfair kind by these big Trusts and we must protect this industry", but at the same time is it not necessary for us to see that the industry behind the tariff wall is so well equipped that the costs are not unnecessarily high?

*Mr. Tairsee.*—The very fact of an enquiry of this nature on these lines pre-supposes that the national industry is not looked upon from the national point of view.

*President.*—The whole point is, if we are going to have any industry in the country, the conditions of business have so changed all over the world that the industry must be carried on on a reasonably large scale, with a reasonable degree of efficiency, and the costs should not be unnecessarily high because of bad equipment or bad organization, and I want to ask you whether at the present moment there are any indications that the chemical industry is organized on that footing?

*Mr. Vakil.*—Admitting what you say and anticipating or taking it for argument's sake that protection would be a very difficult thing and would not be granted, what would be the effect on the Indian Chemical industry? I say with the greatest emphasis that the development of a chemical industry in India will be set back another 20 years. During the war or a little before that the Eastern Chemical Company was brought into being. That was the first big chemical industry on this side of India. Circumstances had enabled me to watch its progress very very closely. At one time I had handled its most confidential papers. This industry was started when the

prices of chemicals were soaring high. Foreign chemicals were difficult to obtain. The Government was behind it inasmuch as Government had contracted to buy their chemicals at high rates during the war several of its products. In spite of these most favourable conditions and concessions as regards land and other matters, the Eastern Chemical Company, if you will look into its past history, had never at any period of its existence called itself a successful industry although it had everything. The Dharamsi Morarji Chemical Company right from the beginning is more like a consumptive child than a healthy growth and development of an industry. If conditions like these continue there is no investor to-day who will come forward and put a single pie in the Chemical industry. If, on the other hand, protection is granted then, after all, the investor has always some hope of getting a return on his money. By any protection that Government grants, you give the Chemical industry a chance of exerting itself even if the chances of success may be one in a 100. The conditions which you ask for, namely, co-ordination and development on a large scale . . . .

*President.*—I am only suggesting to you that, at the present moment the Chemical industry can be carried on only by one or two units. That is what I am suggesting to you, and I think you would agree with me that if you had six or seven units for these heavy chemicals you will not have a successful industry. As regards the general argument in favour of protecting the chemical industry I have no difference of opinion.

*Mr. Vakil.*—At present there is no more scope for more than one or two. That is a matter of fact which I must admit.

*President.*—That is a fact that is really of some consequence because if that is the position, the next thing follows, namely that if you have more units there is no market, and therefore the cost of production must remain high, and the need for protection must remain as great so long as the cost of production is not brought down. The industry cannot live without protection. These are the difficulties about which we wish to know your opinion. What else can you suggest than this that the industry must organize itself?

*Mr. Vakil.*—There ought to be co-ordination: that is what we say also.

*Dr. Matthai.*—What do you precisely mean by co-ordination? Do you mean that in the future chemicals in India should be produced by as few units as possible and these few units should concentrate as far as possible on particular products?

*Mr. Vakil.*—Yes, that is the only thing to be done.

*President.*—We are in entire agreement there. What I wish to know now is, how is this state of affairs to be brought about?

*Mr. Vakil.*—That can't be brought about until the capital is there.

*Mr. Venkatrao.*—Unless this industry is protected it is impossible for investors to come forward and invest in this industry.

#### *Explosives.*

*President.*—Now we will go into the question of explosives. This is a very important question. We know in some countries really the manufacture of explosives has led to the development of the chemical industry, but explosives at present in India cannot be manufactured by private agencies.

*Mr. Venkatrao.*—They can if Government permit. If a recommendation is made by the Tariff Board, we can make these.

*President.*—There we have the old Testament against us! The Fiscal Commission has ruled it out. They mention cordite which they say must remain in the hands of Government. We want to see the cordite factory at Aruvankadu. There the cordite is manufactured but other explosives have to be imported. What I wish to know is that even in European countries is it not a fact that the manufacture of explosives, when it is in the hands of any private enterprise, is under Government control?



*Mr. Vakil.*—There is a control but the capital as well as the enterprise is in the hands of private individuals.

*President.*—Do you refer to munitions or industrial explosives?

*Mr. Vakil.*—For mining purposes and other industrial explosives also.

*President.*—Do you suggest that these should be thrown open to the public?

*Mr. Vakil.*—To selected capitalistic firms or people who may come forward as in the case of excise. The manufacture of alcohol is open to the public. It is manufactured by selected parties under special licenses.

*President.*—Now that you are not allowed to carry firearms without license do you think it is a practical proposition that the manufacture of explosives should be thrown open to the public?

*Mr. Tairsee.*—We have been tied up in so many ways, whether it is the Fiscal Commission, or the Arms Act or whatever it is, the chemical industry suffers.

*Dr. Matthai.*—We went into the question of consumption of sulphuric acid in the cordite factory at Aruvankadu, but the figures given to us were confidential. But supposing the question of manufacture of sulphuric acid for that factory were left to private manufacturers I don't know whether this would add perceptibly to the quantity. I don't know about other factories such as Kirkee. But taking the cordite factory alone the total consumption of sulphuric acid is small.

*Mr. Vakil.*—The spirit of the Chamber's representation is that the explosives are not the only pegs on which we hang our coats. There are thousands and thousands of chemicals used in India to-day. The whole thing is so interlocked that the chemical industry requires a very different treatment from steel or match and so on.

#### *Fertilisers.*

*Dr. Matthai.*—We were looking up the consumption of sulphuric acid or other industries. Take a country like the United States of America. You will find the largest consumption is in explosives, and the next largest in fertilisers.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—Therefore it may be in the direction of fertilisers that in the near future we too might be able to find increased consumption of sulphuric acid.

#### *Education.*

*President.*—From this point of view is it not sufficient for you to state that apart from all commercial reasons the Chemical industry is really a means of educating people not only in chemistry but in commerce and other things. That is a wide national aspect of the question. It is not merely the making of explosives which is important but the education it gives.

*Mr. Vakil.*—Now you are arguing for the Chamber and not against the Chamber!

*President.*—This Board does not express any opinion except in its reports.

*Mr. Tairsee.*—That is what I had in mind when I stated "mother industry" and not "key industry".

*President.*—As I told you before, the general argument might be put as emphatically as you like, but the whole point is, having dealt with the general argument we have this special argument in any proposals that we submit. I am now concerned more with the special argument than the general argument.

*Mr. Vakil.*—That is a very important and sound argument.

*Dr. Matthai.*—I suppose you will accept this proposition that you cannot have industrial development in a country unless opportunities of industrial

training in the direction of chemicals and mechanical engineering are there, and therefore whether the conditions of the Fiscal Commission are satisfied in the case of chemicals or not, so long as we are committed to a policy of industrial development it is essential for us to provide opportunities for industrial training.

*Mr. Vakil.*—May I point out that I was a member of the Industrial and Technical Training Committee and we fought the case as hard as we possibly could. The result was that our recommendations did not suit the policy of the Government and for the last six years our recommendations have been shelved. So, however, hard the country may try for technical education if the Government does not want to listen to us there is an end to the matter.

*Mr. Tairsee.*—Coming from the Tariff Board perhaps it will have more weight than if it came from other sources.

*President.*—If the Tariff Board really based its recommendations on general arguments they will never go through, and we must support our recommendations by special arguments. Unless it is an obvious argument it is very hard to persuade the Legislature or the Government to accept it.

*Mr. Vakil.*—May I in this connection give a pertinent instance and that will clear up the point. Sir Willis, who was then Colonel Willis, was the Mint Master in Bombay. He was also one of our colleagues on the Viswesaraya Committee. At that time he opposed the foundation of technical college and technological institutions for higher training on the ground that there was no demand for highly trained technical men in India. We argued at that time, both the Chairman and myself, that it was not a condition precedent to the establishment of a technological institute, but that if the institute was there the men would be trained and when demand did arise the men would be available. Only a few months ago in the Chamber we had occasion to discuss about the establishment of the Currency Paper and Printing Press at Nasik. Several appointments were made by Sir Willis from England and we asked why a chance to Indians was not given, as we had anticipated six years ago. He said that no Indians fully trained and capable are available in the country. I will leave this argument there!

*Embargo on nitre, bones, etc.*

*President.*—On page 4 of your representation you are asking us to put an embargo on nitre, bones, chrome ores, manganese ores and other similar products. This is a very old argument.

*Mr. Vakil.*—It is an old argument.

*President.*—We can only look at it from this point of view. If you prohibit the export of these, there is no guarantee that the producers of these articles would continue to produce them. If he doesn't get the proper export price, why should he produce it? The same thing would happen to bones. A man will not collect the bones if he is not going to get at least the export price. He will say "I am not going to collect it for the benefit of these gentlemen". Really it happened in cases where export duty was put. Therefore the whole point is this that these articles which are exported now would be kept in the country if a use is found for them by the development of other industries.

*Mr. Vakil.*—May I be permitted to point out that India has been in an atmosphere of the exports ever since the East India Company and we have been brought up in an atmosphere that we can only export raw materials, but not finished articles.

*President.*—I am just drawing your attention to this fact that if you prohibit the export of these materials, there is no guarantee that these articles would be produced by these people.

*Mr. Vakil.*—Nobody can guarantee.

*President.*—Is it not obvious? If a man finds by selling his articles in the country he gets a lower price than by exports, he will say, "I am going to close down".

*Mr. Vakil.*—Will he not fertilise the soil?

*President.*—The nitre will remain in the ground; bones will not be collected and not necessarily he will fertilise the soil. If you limit the market for these articles, there is no incentive to anybody to collect them and to supply.

*Dr. Matthai.*—At present practically the whole of the bones that we export from India are exported in the form of crushed bones.

*Mr. Vakil.*—Yes.

*Dr. Matthai.*—Of course the orthodox argument against the prohibition of exports is that once you stop it, these people who at the various ports are organized in crushing these bones will suspend their business as it is not worth their while. Once they stop it the poorest classes of the population who collect these bones will not get any price.

*Mr. Vakil.*—Unless the Agricultural Department comes to our assistance side by side.

*Dr. Matthai.*—As a matter of fact your position is entirely supported by the Board of Agriculture in this country. The Taxation Committee also supported it, but the Royal Commission on Agriculture has turned it down.

*President.*—Don't you think that your best salvation lies in the development of industries which would necessitate the retention of these various articles in the country that you have mentioned purely on economic grounds? For instance nitre is required for fertilisers.

*Mr. Vakil.*—The will may be there, but not the wherewithal.

*President.*—The mere prohibition of export will not necessarily lead to the production of these articles.

*Mr. Vakil.*—It does give an incentive.

*President.*—To whom?

*Mr. Vakil.*—To the local manufacturers.

*President.*—These people who export will not produce for you.

*Mr. Vakil.*—Not the same people.

*President.*—There is nothing to prevent you from exploiting these. Are you not suggesting that these producing industries must be punished for the benefit of other industries which use these as raw materials. This is purely an orthodox argument, but still it is a very strong argument.

*Mr. Tairsee.*—We are thinking of one interest as a whole. The depressed classes, no doubt, will lose a little bit of the trade as was mentioned, but after all they form only one unit as far as this business is concerned.

*President.*—Let them lose the business. The whole thing is, will the materials be made available by prohibiting export? It does not matter whether some depressed classes get out of business. The whole point is will the commodities continue to be produced if there is no market in the country.

*Mr. Vakil.*—May I point out the case of leather and hides?

*President.*—That is a very controversial point. There is a Committee going to enquire whether it has done good or harm. The case of Burma is that it has done harm. The case of Madras is that it has done good.

*Mr. Mehta.*—So far as the manufacturers are concerned, they are all of one opinion.

*President.*—But the production of hides is going down.

*Dr. Matthai.*—It looks to me the orthodox argument for accepting your position would be this: if you want to increase the market for fertilisers in India you have got to make fertilisers cheap and the export during the past few years has almost doubled the price of bones. At this cost it would

be difficult to put fertilisers on the market and ensure a sufficiently big market.

*Mr. Vakil.*—I said the Agricultural Department ought to come to our assistance. May I point out in this connection a very important case? In the year 1911 I was associated with the exporters who were dealing very largely in the export of different oil cakes. At that time Dr. Harold Mann had written to me that it was a great economic drain on India and he himself felt that something ought to be done to stop that, but then we saw no prospect of oil cakes getting popular in India and this drain continued for a long time. Immediately the war was declared and conditions were made unfavourable for export, the oil cakes began to be used in the country by the agriculturists and to-day we have come to a stage at which castor seed cake is used by the cultivators which was a very difficult article to sell 20 years ago. I am speaking from personal knowledge that we had to send castor seed cake to Ceylon. Those conditions have changed and a demand from the cultivators has arisen for oil cakes to-day. Before the war there was no such demand. The demand came, because the oil cakes could not go out of the country.

*Dr. Matthai.*—With regard to oil cakes the position is complicated by the fact that there is a higher duty on the finished product in the countries to which we export. They want the things really in the raw condition. If you send it in a finished condition, it affects their industries. Of course as far as bones are concerned, I don't believe that the man who actually collects the bones in the villages gets anything like the full benefit of the increase in export price.

*Mr. Vakil.*—He may not get a higher price. The Indian consumer will not be able to pay as high a price as the foreign exporter will pay. I quite agree with you there. There are several instances in other commodities, but I must say as regards the question of bones you will find hardly any civilised country allowing a valuable article like bones to go out of the country.

*President.*—You cannot make use of it until people use more fertilisers.

*Mr. Vakil.*—That is what I say. The Agricultural Department ought to help us.

#### *Bounties.*

*President.*—That is the idea of this new Council of Agricultural Research that they are establishing. We will leave it at that for the moment. You suggest that protection should take the form of bounties. That I think we have discussed before. But the method of finding money for the bounties is not a very happy one, because if we protect sulphuric acid, in course of time the revenue will disappear. If protection succeeds at all, it means all the acids will be produced in the country and therefore there will be no revenue duty available.

*Mr. Venkatrao.*—When the state of the finances increases, it will be in a better position.

*President.*—The idea is that the industry must eventually supply the whole demand, so that there is no import.

*Mr. Tairsee.*—Giving these bounties will be like giving with one hand and taking it by the other. The industries to that extent will benefit taking the country as a whole. Therefore the taxable capacity will rise.

*President.*—That is another point. I am trying to suggest to you that the method is not a happy one. It is a vanishing source to which you are appealing for our support.

#### *Magnesium Chloride.*

*President.*—On page 5 of the representation you say that magnesium chloride is recovered as a by-product in German Chemical Works.

*Mr. Vakil.*—We are not putting it forward.

*President.*—You suggest that the duty on magnesium chloride will not add to the cost, but you must remember that magnesium chloride is not the only thing which the industry uses and if everything that it uses is going to be taxed, the cumulative effect would be substantial, is not that so?

*Mr. Vakil.*—That is so.

*President.*—Therefore we have got to take that point into consideration. If the prices of all the articles which are used in the Textile industry into which we are enquiring go up, it should not matter, because in the long run prices will go down. But if you are to say that the rise in price of those articles will have no effect, that argument will not be sound. As regards magnesium chloride, I agree with you if you take that only into account, but we have got these 10 or 11 other chemicals. A difference of 3 or 4 per cent. in the cost is a heavy one in the Textile industry where the margin is small.

*Mr. Vakil.*—The Textile enquiry must have shown to you.

*President.*—It did nothing of the sort. It didn't show us anything on that ground. They didn't go into that question. They simply said that these were articles which were likely to increase the cost and they recommended the removal of the duty on those articles.

*Mr. Vakil.*—The percentage of chemicals used taking the total cost of production is extremely low.

*President.*—The whole trouble arises in this way that there are a number of articles used by the Textile industry. Now there are some for which you are asking protection, there are others for which protection may be given hereafter and there are others about which there is no question at all. There is really no means of finding out what exactly is the burden on the industry by the retention of these duties. We are asking the Millowners' Association to give evidence and I hope they will be able to give us something definite, but it was unnecessary for the Textile Board to go into that question.

*Mr. Vakil.*—You can throw a little light on the paradox—while one article was allowed to come in without any duty, why on another article a duty was retained.

*President.*—You mean copperas.

*Mr. Vakil.*—I am referring to zinc chloride and magnesium chloride.

*Dr. Matthai.*—As far as the Textile Tariff Board was concerned, they suggested that the duties on three articles, *viz.*, zinc chloride, magnesium chloride and epsom, might be removed, and for some reason Government decided to remove the duty on magnesium chloride, but no action was taken on zinc chloride and epsom.

*Mr. Lalkaka.*—We were discussing this question and it was directly due to the list given by the Millowners' Association.

*President.*—We have got the Textile Tariff Board's report. They have given the cost per loom per day. Under stores they include everything which comes to 25 per cent. of the total cost, but we have not got any means of finding out what that means. Supposing 15 per cent. is put on 25 per cent. of the stores, it is a substantial amount.

*Mr. Vakil.*—It is an increase of 3.75 per cent.

*President.*—It is not a small sum to my mind.

*Mr. Mehta.*—The Committee of the Chamber were opposed to the removal of the duty on stores, because they observed that it would be tantamount to killing so many small industries which are just growing up.

*Dr. Matthai.*—I notice from the Millowners' Association's representation that they were not very keen on this kind of relief.

*President.*—I hope the representative of the Millowners' Association will explain to us what this means. I am not prepared to commit myself to the

view that 3 or 4 per cent. is a small addition to the cost. It is a large addition to my mind. If you say in a few years' time it would disappear, that is another point.

#### *Alkalies.*

*Dr. Matthai.*—Supposing there was an increase in the duty on alkalies, say 10 or 15 per cent., would that affect industries perceptibly? I suppose it is one of those chemicals which is used in small quantities by a very large number of industries. Therefore any extra burden like 10 or 15 per cent. would be very widely distributed.

*Mr. Vakil.*—To that extent I agree, but there are certain very big industries which ought to have been established in India and which cannot be established, such as paper, soap, etc. These industries are suffering from a heavy price which they have got to pay for alkalies. Paper and soap are the most important ones.

#### *Freights.*

*President.*—On page 7 of your representation you talk of freights. Everybody says that the freights are too high, but nobody has suggested to us how the freights should be reduced. It is a legitimate complaint to make. Every industry says that freights are high, but we want to know how the freights are to be reduced and in what way. I may tell you that we are examining the Agents of the Railways. Your point is this: in the case of protected industries, when an industry is declared protected, then the freights on the raw materials used by that industry and the finished products of that industry should be as low as possible. That is as far as one can go on general grounds.

*Mr. Tairsee.*—Government give subsidies to Transport Companies, and when giving these subsidies, they must make it a condition.

*President.*—Are you talking of Shipping Companies?

*Mr. Tairsee.*—Yes.

*President.*—I am talking of the railways. There is one point which you must remember as regards railways. You know the agreement between the railways and the Government. Government as owners of the railways have entered into an agreement that the railways ought to contribute certain revenues. Now this is the only country that I know of where Government make a profit on railways as such, that is to say, the railways have undertaken not only to pay the charges but also they have to contribute 1 per cent. every year on the total capital to the general revenues. That was a condition imposed by the legislature and therefore you cannot have it both ways. If you are going to make a profit of Rs. 7 or 8 crores and benefit the general taxpayer, then the railways' answer is that they will not reduce the rates. That is the point. It requires some consideration. As you know, the members of the Assembly insisted upon this profit being made. The answer of the railways is that if you want this profit, then the freights must be high. What is your suggestion? This agreement—they called it a convention—is certainly in the way. If you follow the budget, this is what happens. Government get 1 per cent. on the total capitalisation. Money is borrowed at 4 per cent. or 5 per cent. but Government get on top of that 1 per cent. profit. Then, they get a certain share of the surplus profit. Beyond that, during the last budget debate the Commerce Member said that a reserve fund was built at Rs. 16 crores out of the same profits after paying depreciation and other things. This year it may come to about Rs. 20 crores. If you add all this up, it is a very large burden which has been thrown upon the railways not by the Government necessarily but by the Legislative Assembly.

*Mr. Vakil.*—Why can't we utilise that money for bounties?

*President.*—The whole point is this. If it is the policy of the country—this is a point which your Chamber may take up—to make a profit out of

its railways, well then, the country must be prepared to have high freights. It must either abandon that policy or continue to have high freights.

*Mr. Vakil.*—Let the high freights remain but let us claim a little out of that by way of bounties.

*President.*—How can you get it from the railways?

*Mr. Vakil.*—Not from the railways but from Government.

*President.*—Supposing we recommend a bounty it will have to come from some source. We don't say stores, salt, railways, excise. We have to say that this has got to come from some source. Now you are appearing before the Board on behalf of the Chamber. This is a question of policy. I believe that the Chamber was very strong on that point. When the railways were taken over by the State, the Chamber was of the opinion that the railways must make this contribution along with other public bodies. But now the position is this. If you are going to take away Rs. 7 or 9 crores a year to the general revenues from railway administrations, then our industrial development must to that extent suffer. I am not suggesting anything. I am merely saying that it is a question that the Chamber might consider as to how these two things should be reconciled—low freights and high profits.

*Mr. Tairsee.*—I am thankful to you for the suggestion and you may be quite sure that the Chamber will follow it up. The whole thing is bound up with other considerations. Anyway, this cannot be used as a plea for keeping up high freights.

*President.*—I do not suggest that.

*Mr. Tairsee.*—With a little amount of conscientious retrenchment, the railway administrations can even now reduce freights.

*President.*—If you read that agreement, you will see that the first thing that the railways have got to do is to ensure to Government this one per cent. return.

*Mr. Mehta.*—Our point is that while doing that, the railways need not necessarily enhance the rates.

*President.*—You weaken the hands of Government. Government cannot say to the railways to reduce the freight. Supposing I claim from you Rs. 9 which you have got to give me in any case, I cannot come and tell you "Mr. Mehta, look here, you must do this, that and the other". You will say in that case 'give up your nine rupees'.

*Mr. Mehta.*—There are other ways of doing that. There is so much wastage. There are so many abuses to which we have been drawing attention. If they drive away all those abuses they can give one per cent. to Government and at the same time give us the advantage of cheap freights.

*President.*—The whole point is: are the people prepared to give up the profit on railways?

*Mr. Mehta.*—They will not.

*President.*—There you are.

*Mr. Mehta.*—There is the other side. If they wipe out the abuses and avoid the wastage, they can give 1 per cent. to Government and give the benefit of cheap freights to the commercial community.

*Mr. Tairsee.*—If they buy only in the cheapest market, they can easily save 1 per cent.

*Dr. Matthai.*—If they only buy as much as they require?

*President.*—I am not discussing that. Don't be under the impression that I have given any opinion. I am only saying that it is an easy answer for the railways to make that if you want this profit, if they have to make it for you, if they have to insure you against loss, their first consideration is to earn that for you. Now I am willing to admit that there may be directions in which economies are possible.

*Mr. Mehta.*—The report of the Retrenchment Committee presided over by Lord Inchcape shows how a huge stock of wagons and other things was lying idle.

*President.*—I have also made some speeches on that point.

*Mr. Tairsee.*—As long as the mouth is there, the excuse won't be wanting.

*President.*—It is a commonsense argument that if you insist upon your side of the bargain I am entitled to say 'I must guard mine'.

*Mr. Mehta.*—This is our answer to it. The railways can do both the things by merely looking properly to their own stores, buying them as and when they require them. That is our answer to them and that is the answer of several members of the Assembly.

*Mr. Tairsee.*—This should not be used to cloak the other things which must be set right.

*President.*—It is a legitimate argument to make. I am not disputing that. The position is complicated by the fact that there is this agreement between the railways owned by Government and the Government as such at the instance of the legislature. It is for the Chamber to consider that.

*Mr. Mehta.*—As the Chamber has stated, the position is perfectly logical. The railways can give 1 per cent. to the general revenues.

*President.*—I am asking you as a businessman: can railways be made a source of profit in any country?

*Mr. Mehta.*—They have been.

*President.*—Give me an instance.

*Mr. Mehta.*—In England, America, they have been made a source of profit.

*President.*—Those are railways belonging to private companies. I am talking of the State Railways. It is a worse form of taxation.

*Mr. Mehta.*—May be, but we have got it.

*President.*—If you are going to have industrial expansion in the country, then the first thing is that transport must be made as cheap as possible and therefore if you make a profit out of transport to that extent you make it more expensive. I am not disputing that there is room for effecting economies. Supposing every possible economy was made and yet you make a profit out of transport, to that extent transport is made more expensive.

*Mr. Mehta.*—In England, America and other countries, they make profit out of railways.

*President.*—They don't get anything like the return you get in India.

*Dr. Matthai.*—Your suggestion is that Government might tax transport.

*President.*—Take the case of South Africa. There a four per cent. return is considered a good return. Here it comes to 6 or 7 per cent. if you take into account reserves and other things. Last year it was 5.58 per cent., that is after allowing large sums for depreciation, replacements, etc., which will make the return 1 or 1½ per cent. more. That is the whole point and the Chamber has some responsibility in this form of taxation.

*Mr. Tairsee.*—We will look into it.

#### *Alkali industry.*

*President.*—As regards this question of alkali industry, there is no alkali industry.

*Dr. Matthai.*—It is the position of the Chamber that at present there is no case for protection.

*Mr. Vakil.*—On the *prima facie* case, no.

*Mr. Tairsee.*—Except as part of an important industry.



*Dr. Matthai.*—Does the Chamber want us to make proposals for the protection of alkalis?

*Mr. Tairsee.*—As a matter of general policy, our position is this. The Chemical Industry because of its importance must be given protection and therefore it does not lie in our mouth to say that we want protection for the whole industry and not for a part because after all it is part of the industry. But why this paragraph was put in was that as it was not coming for consideration we did not stress it except in general terms of the Chemical Industry that was predominant.

*President.*—I can tell you this much. We are not prepared to say that this is entirely excluded by our terms of reference, but there is no application before us.

*Dr. Matthai.*—That is the real point.

*President.*—Though Government did not mention it by name, the terms of reference are sufficiently wide as to allow us to enquire into others on a proper case being made out.

*Mr. Tairsee.*—May I suggest that those people may be informed.

*President.*—They have been informed.

*Mr. Tairsee.*—In the sense that though the enquiry starts with these 11 articles, the Board will be pleased to consider the whole thing by putting a generous interpretation on the terms of reference.

*President.*—Yes.

*Dr. Tairsee.*—I thought that it might be just possible that some of those people were thinking that this was cut out from the purview of the present enquiry.

*Dr. Matthai.*—We have tried to give as wide publicity as we possibly can.

*President.*—In a Press Communiqué which we issued on the 24th of August, 1928, we said:—“Eleven acids and heavy chemicals have been expressly mentioned in the Resolution, but the scope of the Board’s enquiry is not limited to these and those interested in the manufacture of similar chemicals are at liberty to submit representations to the Tariff Board of investigation”. After that at every public sitting of some importance, we have made some reference to that. Now, the enquiry is fairly well advanced.

*Dr. Matthai.*—It won’t do for the Board to solicit applications. It is the duty of a commercial body like you to inform intending applicants.

*Mr. Tairsee.*—We have no objection to our circularising it.

*President.*—Except this that the enquiry is now fairly well advanced. Of course we will do our best and we will be going on for some time. You can get a copy of our communiqué. You can interpret the communiqué in any way you like and write to us. We cannot as you know commit ourselves to any view at present.

*Mr. Tairsee.*—Yes.

*Mr. Vakil.*—With regard to alkalis may I point out one thing? The Committee in placing their views on alkali had before them the need of expressing their opinions not from a sentimental point of view that all articles must be blindfoldedly given protection but that they wanted to place before you the rational aspect that if a case is made out, they will support it. But the Committee cannot go out of its way and recommend protection to alkalis on which it has absolutely no information.

*President.*—Much less can we make a recommendation in those circumstances. If the Chamber is not prepared to make any representation, on what ground can we make any recommendation?

*Mr. Vakil.*—I am only explaining the views of the Chamber on that point.

*President.*—As my colleague has rightly said, we cannot go and solicit applications. We give as much publicity as possible to our proceedings.

*Dye stuffs.*

*President.*—I want to ask you one question about the dye stuffs. Are dyes manufactured in the country?

*Mr. Vakil.*—None at all.

*President.*—Then that is a question which does not yet arise?

*Mr. Vakil.*—No.

*Chamber's view of the function of the Board.*

*President.*—In your representation you suggest that there should be a standing committee of the Tariff Board. I don't know what you mean by a standing committee. What was your idea? We cannot constitute ourselves as a committee.

*Mr. Tairsee.*—My idea was that the Tariff Board is only set up when the disorder has reached a stage when even the best help may be too late and that is why I said that the enquiry sometimes takes the form of an inquest. What I suggest is this. You are at present considering the case of these 11 articles. As soon as this enquiry is finished the case for one article out of these 11 may again arise which may have to be considered. To start an enquiry of this nature on the particular article alone would mean waste of time and money. For that reason, if there is a standing committee, whenever occasion arises this committee can go into the matter and report to Government.

*President.*—The Tariff Board is not a permanent institution but it is the policy of Government that, when an application is received and they are satisfied that a *prima facie* case has been made out, it is referred to the Tariff Board. This in itself is a committee you have in mind.

*Mr. Tairsee.*—Sometimes references have to wait; sometimes references which are of a later date, because of their importance, take precedence whenever there are important considerations behind them. What I had in mind was that if there was a standing committee, as soon as something happened, it will put the whole matter before the Government for consideration, and without going into the whole formality of a pucca discussion the thing can be considered on its own merits and such action can then be taken as is justified by the facts placed before the committee.

*Dr. Matthai.*—That is to say the Tariff Board should keep themselves permanently in touch with industries which have been protected, there you are speaking like the Fiscal Commission.

*Mr. Tairsee.*—That was the object.

*Mr. Vakil.*—May I point out one thing, Sir? When the last enquiry on magnesium chloride was made and the report published, the *Times of India* in a very bantering tone placed it before the public that about a lakh and a quarter of rupees were spent on the enquiry. There are thousands of chemicals to-day which can be made and which are sure to be made in India, and if for such chemicals time after time we have got to go to Government and ask for an elaborate enquiry and give us the necessary help, the amount that Government has to spend would be disproportionate and would not meet the needs of the enquiry. I think a perpetual, big Tariff Board will have to be established to look into the case of thousands of chemicals.

*President.*—Mr. Vakil, there are no applications undisposed of under Chemicals, and therefore you are anticipating something which may not arise.

*Mr. Vakil.*—My Committee is merely drawing your attention to similar practices in other countries.

*President.*—Quite true. If the Board gets flooded with applications then you must have a committee. At present Board has not sufficient number of applications.

*Mr. Vakil.*—We are indirectly drawing your attention to practices in other countries. So far as our information goes we know in America if protection is wanted in similar cases, a *prima facie* case has to be made and tentatively for a year or two protection is granted and the results obtained act as evidence when the future policy of the State is decided.

*Dr. Matthai.*—The United States Tariff Commission can initiate enquiries in certain cases.

*Mr. Vakil.*—That is what we say. Your power should be such.

*President.*—The United States of America has not got the policy of discriminating protection. That is protection pure and simple. Here we have got discriminating protection.

*Mr. Vakil.*—If we get the political aspect removed we can do exactly what the United States are doing.

*President.*—That is a point with which we cannot deal. That there is no case just now for the existence of a permanent committee of the Tariff Board to enquire into chemicals because there are no applications before it.

*Mr. Tairsee.*—What we had in mind was this. Just after the enquiry into the Match industry information was received by us which may be tainted, but there may be something in it. You cannot hold another enquiry because certain things have arisen, but if it was within the power of this body or a standing committee, they would be watching it from time to time and suggesting on their own initiative certain measures which when adopted immediately would have a greater effect like an operation on a patent at the right time than waiting for the thing to grow worse. That was the general principle we had in mind.

*Dr. Matthai.*—The Fiscal Commission was entirely with you on that point.

*Mr. Vakil.*—I fully agree that it is a matter for the Legislature and not for the Board.

## CORDITE FACTORY, ARUVANKADU.

**Evidence of Mr. G. S. BUTLER, recorded at Ootacamund on  
Thursday, the 11th October, 1928.**

### *Introductory.*

*President.*—Mr. Butler, what is your official designation? Are you the Superintendent of the Cordite Factory?

*Mr. Butler.*—I have been officiating as Superintendent, but I am really the Works Manager of the Cordite Factory. Lt.-Col. A. M. Urquhart, the Superintendent, has returned from leave to-day and has joined.

*President.*—You are the principal expert, I take it, in the Cordite Factory.

*Mr. Butler.*—Yes, as regards the manufacture of explosives.

*President.*—Do you have to deal with the chemical part of the work?

*Mr. Butler.*—I am in charge of the manufacture of cordite which includes all the technical operations in making cordite.

*President.*—Is there a Chemist also?

*Mr. Butler.*—Yes, we have several other chemists.

*President.*—I don't mean in any subordinate capacity. Have you got any Head Chemist who chiefly looks after the chemical part of the works?

*Mr. Butler.*—The whole of the superior staff is chemical excepting one mechanical and electrical Engineer and an officer-in-charge of Stores. The staff consists of a Superintendent, Works Manager, Works Inspection Officer and 5 Assistant Works Manager. Out of that at the present moment the Superintendent is not a Chemist and also two of the Assistant Works Managers.

*Dr. Matthai.*—You are primarily a Chemist.

*Mr. Butler.*—Yes, I am.

*President.*—I take it your qualifications are mainly chemical.

*Mr. Butler.*—Yes. I took a degree in Chemistry at Oxford. I am a Fellow of the Institute of Chemistry.

*President.*—I take it that your knowledge of chemistry extends to all branches so far as it is applicable to this industry.

*Mr. Butler.*—It should. As regards the manufacture of explosives, I have been engaged in it in India for 18 years.

*President.*—Have you visited any other countries?

*Mr. Butler.*—Yes. I have visited England, Switzerland, France, Italy and Germany.

*President.*—Did you visit Nobel's Works?

*Mr. Butler.*—Yes. It is purely a British concern. It is part of "Imperial Chemical Industries".

### *Fertilizers.*

*President.*—Have you at any time studied fertilizers?

*Mr. Butler.*—No, only in so much as we use one of the principal fertilizers in the Cordite Factory, which is nitrate of soda. I have not studied them as regards their use as fertilizers.

*President.*—As regards manufacture?

*Mr. Butler.*—As regards manufacture I have studied them very extensively. One of the questions I have studied exhaustively is the question of the synthetic manufacture of nitric acid from the air. I have visited Switzerland, Italy, Germany and France and saw a number of works making

synthetic nitric acid and ammonia. I have all along been considering its application here, because we wish to make ourselves independent of outside supplies of nitrogen.

*President.*—Nitrogen is one of the components of fertilizers, but there are two others, phosphates and potash.

*Mr. Butler.*—I am not interested in them.

*President.*—Have you studied them at all?

*Mr. Butler.*—No, not from the practical point of view.

#### *Heavy Chemicals.*

*President.*—We are enquiring into the grant of protection to certain heavy chemicals. There are about 10 or 11 of them. The enquiry is not confined to them only.

*Mr. Butler.*—It would be as well to confine the scope of your examination or myself to nitrate of soda and brimstone. These are the chief chemicals which we import at present.

*President.*—You manufacture acids out of these?

*Mr. Butler.*—Yes.

*President.*—Do you have to manufacture any other acids?

*Mr. Butler.*—No.

*President.*—The two acids with which you are concerned are nitric and sulphuric.

#### *Glycerine.*

*Mr. Butler.*—Yes. In addition to those chemicals, I should have said, we import glycerine.

*President.*—How is it manufactured?

*Mr. Butler.*—Glycerine is a bye-product from the manufacture of soap. It is produced in large quantities.

*President.*—Is it organic?

*Mr. Butler.*—Yes.

*President.*—It comes out of oil and fats.

*Mr. Butler.*—Yes, such as coconut oil and palm oil.

*President.*—Is it obtained in large quantities as a bye-product here?

*Mr. Butler.*—There are small soap factories and glycerine is obtained as a bye-product, but in a very dilute form which is simply thrown away as far as I know.

*Dr. Matthai.*—You have not used any quantity of local glycerine.

*Mr. Butler.*—No. It must be concentrated before we can use it.

*Dr. Matthai.*—Could the concentration be done in the factory by your selves?

*Mr. Butler.*—Yes, but it is too expensive to bring the dilute liquor to the factory. It must be concentrated on the spot. Several years ago works in Calcutta offered to make refined glycerine and I understand Government gave them a subsidy for putting up the plant and for doing the refining.

*Dr. Matthai.*—Has it not materialised?

*Mr. Butler.*—No, not up to the present.

#### *Nitrate of Soda.*

*President.*—There are two principal raw materials that you use. You said you use nitrate of soda.

*Mr. Butler.*—Yes.

*President.*—Is that from Chili?

*Mr. Butler.*—Yes.

*President.*—And also sulphur.

*Mr. Butler.*—Yes.

*President.*—As regards nitrate of soda, I suppose the synthetic process might enable you to dispense with that.

*Mr. Butler.*—My scheme for that is to use ammonium sulphate as the source of nitrogen. Ammonium sulphate is produced in large quantities in India as a bye-product from coke ovens.

*President.*—That is really a chemical that uses sulphur.

*Mr. Butler.*—Yes, but the amount of sulphur which is used in that is less than the amount we have to use in making nitric acid.

*President.*—You would use it to get the nitrogen.

*Mr. Butler.*—Yes and do away with large quantities of brimstone. The quantity of brimstone required every year now is 154 tons. With this new process, we should only use 44 tons of brimstone.

*Dr. Matthai.*—Has that been actually tried?

*Mr. Butler.*—Not here. It is a well known process.

*President.*—You have not tried it here.

*Mr. Butler.*—No, it cannot be tried without a considerable amount of capital.

*President.*—I understand that sulphate of ammonia could be manufactured by a synthetic process, is that so?

*Mr. Butler.*—Yes, ammonia can be so made. It is also produced in large quantities as a bye-product.

*President.*—Do you know much about the manufacture of ammonia by the synthetic process?

*Mr. Butler.*—That is being carried out all over the world now.

*President.*—For that process what principal raw materials would you require?

*Mr. Butler.*—Nitrogen comes from the air. Hydrogen may be made in various ways. It can be made by the electrolysis of water. That requires very cheap electric power; or it can be made from burning coke. Nitric acid can be made direct from ammonia without turning it into ammonium sulphate. It is merely for convenience and cheapness of transport that we should get it as ammonium sulphate. It is produced from the coke ovens as ammonia gas. They combine it with sulphuric acid in order to be able to transport it. Sulphuric acid is of no use at all for the material to be used as a fertilizer. It is simply the means of holding it.

*President.*—What are the difficulties in India with regard to the synthetic process?

*Mr. Butler.*—It is merely a question of cost. The demand in India for ammonium sulphate is very much below the present production from the coke ovens. It is all a question of price. People can't afford to buy at present costs.

*President.*—So far as fertilizers are concerned, it is important that it is not a question of natural raw materials.

*Mr. Butler.*—How do you mean?

*President.*—If they are chiefly manufactured from the air.

*Mr. Butler.*—It is all an economic question. You would only manufacture from the air if you can produce at a cost which will compete with the ammonia from coke.

*President.*—In this enquiry we have always got to enquire into the question of the raw materials. Before we recommend any protection, we must be satisfied that the raw materials exist.

*Mr. Butler.*—You have also to consider the market.

*President.*—That is true. So far as the principal raw material is concerned, it is at your door.

*Mr. Butler.*—Yes.

*Dr. Matthai.*—The cost depends primarily on fuel.

*Mr. Butler.*—In the first place they have to compete with nitrate of soda. It is a question of the price of nitrogen. No body knows how cheaply nitrate of soda can be produced. It has a world market. All these things are interlocked. The price of nitrate of soda has steadily come down ever since the synthetic process of ammonia was introduced.

*President.*—If you look at India as a country, there is a tremendous possibility for the manufacture of these synthetic products, because the market eventually must come.

*Mr. Butler.*—Yes.

*Dr. Matthai.*—Is the synthetic process adopted in England or is it confined to countries on the Continent?

*Mr. Butler.*—There is a very large industry in England.

*President.*—How do they get the electricity? There it is not very cheap.

*Mr. Butler.*—They make the hydrogen from coke. They need not necessarily have cheap electric power.

*President.*—One of the witnesses stated that cheap electricity was an essential thing. Electricity could be produced in other ways than by hydro-electric power. If it was necessary your coal could be used.

*Mr. Butler.*—The first method for making synthetic nitrates was by combining the nitrogen and the oxygen of the air and making nitric acid; then combining that with lime and making nitrate of lime. That process did require very cheap power, something in the neighbourhood of 1 of an anna per unit or less. That process has now practically been killed by the synthetic ammonia process. The synthetic ammonia process does not require cheap power. The former process depended entirely on power. The other process depends on the raw material. You have to make hydrogen and you have to separate nitrogen from the air. That requires expensive machinery and a large capital expenditure and as I say it also requires electric power, but not in such large quantities.

*President.*—Take the price of coal in India at the present moment at the pitsmouth. First class coal is sold at Rs. 5-8-0 a ton and second class coal at Rs. 3 a ton. If you had a plant in the coalfields, the question of power would not be so very difficult.

*Mr. Butler.*—I have at various times made estimates for these schemes and I came to the conclusion that as regards competing with the price of imported nitrogen, there is no reason at all why India should not do it, given the market.

*President.*—We will have to ascertain how many units of electric power can be produced out of one ton of first class coal.

*Mr. Butler.*—That is one factor, but you have the capital cost.

*President.*—The capital cost of what?

*Mr. Butler.*—Of the generating plant.

*President.*—Yes. Take the countries like Norway and Sweden which use hydro-electricity on a very large scale. Where there is practically no coal, for them it is cheaper. In England they are going to use coal and produce electricity a penny a unit.

*Mr. Butler.*—A penny a unit is really expensive. It is a very simple problem to work out the cost of power. If you give the price of coal, any power Engineer will work out for you what it would cost.

*President.*—We have to get some general idea of it. Take the case of Bombay. If they reduce the power to 9 of an anna or 7 of an anna, then they would find it cheaper to use electric power than coal which is sold at Rs. 22 per ton.

*Mr. Butler.*—As regards the manufacture of ammonia by the synthetic process, it is a question of providing the capital and finding a market, but I don't think India could compete in the world market outside India.

*President.*—India itself does not want to export. Supposing it wanted to manufacture for its own use, provided there is a market, there should be no insuperable difficulty.

*Mr. Butler.*—The market does not exist now; this is proved by the fact that ammonium sulphate is practically all exported.

*President.*—Now they are using more and more of it. During the last 4 years they have been using a good deal more of sulphate of ammonia.

*Dr. Matthai.*—At present it is a monopoly of Chili.

*Mr. Butler.*—Yes, nitrate of soda. There is a certain amount produced by the electric arc process. They make nitrate of lime as the chief product, but nitrate of soda is also produced.

*Dr. Matthai.*—Is that exported?

*Mr. Butler.*—Yes. Nitrate of lime used to be made in Norway in tremendous quantities; now they are pulling down their plants for making nitrate of lime and putting up synthetic ammonia plant.

#### *Sulphur or Gypsum.*

*President.*—The whole point is that India has not got any sulphur.

*Mr. Butler.*—No.

*President.*—If all the chemicals at present—apart from the nitric acid which can be produced by a synthetic process, depend on sulphur, the raw material for sulphuric acid, the problem is to discover whether there is a possible substitute for that.

*Mr. Butler.*—There are possible substitutes, but it is all a question of cost. Calcium sulphate or gypsum is found in very large quantities in India. You can make sulphuric acid from gypsum.

*President.*—What percentage of sulphur does it contain?

*Mr. Butler.*—It contains a high percentage. It is very expensive to get it out. It is really calcium sulphate. It requires a very high temperature and it has to be done in a furnace which is very expensive and which wears away very quickly. It is really a question of costs.

*Dr. Matthai.*—Do you get gypsum in Southern India?

*Mr. Butler.*—Yes, in the Madras Presidency.

*President.*—There is plenty in the Central Provinces. Don't they make plaster of paris from gypsum?

*Mr. Butler.*—Yes, they do.

#### *Pyrites.*

*President.*—We are now writing to the Geological Survey of India to find out something about pyrites that exist in India. Have you ever investigated that?

*Mr. Butler.*—Pyrites is only used for making sulphuric acid in place where they also make iron.

*President.*—Have you discovered any pyrites from which you can get a reasonable quantity of sulphur?

*Mr. Butler.*—We have not worried about the question of pyrites, because we know the question of transport would prevent it being used for making sulphuric acid.

*President.*—Statements have been made that they do exist in some parts of India.

*Mr. Butler.*—The Tata Iron and Steel Works at Jamshedpur make sulphuric acid from pyrites.



*President.*—No, they don't. They use imported sulphur.

*Dr. Matthai.*—There was a proposal and that was dropped. Supposing these pyrites were discovered in some part of India, then the Steel Works would be the proper place.

*Mr. Butler.*—Yes, Steel Works would be the proper place for making sulphuric acid. There again it is a question of transport.

*Dr. Matthai.*—That is true. The whole point is have we got pyrites in sufficient quantities? We were told that although iron pyrites might be raised in India, the percentage of sulphur would be low.

*Mr. Butler.*—I can't tell you about that.

*President.*—The Geologist may be able to tell us something about that.

*Mr. Butler.*—Yes.

#### *Potash nitrate.*

*Dr. Matthai.*—Going back to the question of sodium nitrate, could potash nitrate be used as an alternative?

*Mr. Butler.*—It could be used for making nitric acid.

*Dr. Matthai.*—Is that available in India?

*Mr. Butler.*—Yes, but not in very large quantities.

*Dr. Matthai.*—Would it be sufficient for a factory like yours? You are keen on getting your materials as far as possible locally.

*Mr. Butler.*—We have considered that question, but it is very impure and before we can use it, it must be refined.

*Dr. Matthai.*—Where is it found?

*Mr. Butler.*—It is found somewhere near Bombay.

*Dr. Matthai.*—Somebody wrote to us that India could produce large quantities of potassium nitrate and it was possible apparently to get all the supplies of nitric acid from potassium nitrate.

*Mr. Butler.*—They exist as a very impure material and it is a question of cost.

*Dr. Matthai.*—Compared with sodium nitrate.

*Mr. Butler.*—Yes.

#### *Sulphuric acid produced in a year.*

*Dr. Matthai.*—What quantity of sulphuric acid do you make in a year?

*Mr. Butler.*—We make about 450 tons on an average.

*Dr. Matthai.*—Do you import your sulphur direct?

*Mr. Butler.*—Yes.

*President.*—Do you have a regular cost accounting system?

*Mr. Butler.*—Yes, we have got very accurate costs. I can let you have them in detail.

*President.*—We shall be obliged if you will send them.

*Mr. Butler.*—Yes. Our costs are high, because we have the heavy cost of transport on the Nilgiri railway and our overhead costs are high. Please treat them as confidential.

*President.*—If you will let us have them first, we will let you know whether they should be published or not.

*Mr. Butler.*—Yes.

#### *Chemical Industry from the point of view of defence.*

*President.*—Speaking as an expert, do you think, as far as possible, for the manufacture of explosives the country must depend on its own resources?

*Mr. Butler.*—Certainly.

*President.*—The existence of a fairly well established Chemical Industry might be a great help towards it, is it not?

*Mr. Butler.*—Yes.

*Dr. Matthai.*—I suppose from the point of view of defence, there is a stronger case for making a self-sufficing Chemical Industry than any other industry, is not that so?

*Mr. Butler.*—From the point of view of defence, explosives is only one of the munitions of war. The Steel industry also is absolutely essential.

*President.*—Most of the industries that we have been enquiring into have a considerable amount of bearing on defence, for instance, tinplates.

*Mr. Butler.*—You can hardly find an industry which has not a bearing on defence.

*Dr. Matthai.*—The importance is so direct in this case.

*Mr. Butler.*—Yes.

*President.*—It is important from the country's point of view that if it is to keep more or less in touch with the rest of the countries, it should have a considerable amount of knowledge as regards these chemicals and ought to be able to produce them.

*Mr. Butler.*—Yes.

#### *Explosives making in India.*

*Dr. Matthai.*—Is there any other Government military factory making explosives in India?

*Mr. Butler.*—With the exception of fulminate of mercury, which is made at the Ammunition Factory, Kirkee, military explosives are made solely at the Cordite Factory. We don't make gunpowder.

*Dr. Matthai.*—What about dynamite?

*Mr. Butler.*—It is practically all imported. We make a very small quantity of dynamite.

*Dr. Matthai.*—What does it consist-of?

*Mr. Butler.*—It consists of nitro-glycerine mixed with an absorbent earth called kieselguhr.

*Dr. Matthai.*—What does cordite consist of?

*Mr. Butler.*—Cordite consists of nitro-glycerine, gun cotton and mineral jelly.

*Dr. Matthai.*—Instead of gun cotton you use earth in the case of dynamite.

*Mr. Butler.*—It is not quite comparable. Gun cotton and nitrogen are both explosives. In the case of dynamite the earth is simply a medium for holding the nitro-glycerine.

*Dr. Matthai.*—Then I suppose half the material would be earth.

*Mr. Butler.*—There would be a large proportion of earth.

*Dr. Matthai.*—Why is it dynamite is not produced here? Could you not get absorbent earth? You are producing nitro-glycerine.

*Mr. Butler.*—Yes, we could produce any amount required. In fact in 1921 there was a scheme for the Ordnance factories entering the open market and producing dynamite and other explosives for sale in India, but it caused so much opposition from private firms that it was dropped. I got out estimates for various commercial explosives for blasting purposes. We could make them.

#### *Sodium carbonate.*

*Dr. Matthai.*—A point that has been interesting us about these import figures in regard to chemicals is that a large quantity of sodium carbonate is imported. In what form is it used?

*Mr. Butler.*—It is used in large quantities for making caustic soda.

*President.*—It is a sort of raw material for caustic soda.

*Mr. Butler.*—It is used in a small way for all sorts of things.

*President.*—They get the chlorine first, is it not?

*Mr. Butler.*—No, they make from common salt. They make chlorine and caustic soda at the same time.

*President.*—First take the chlorine.

*Mr. Butler.*—Chlorine is a bye-product of caustic soda.

*President.*—That they treat it with lime.

*Mr. Butler.*—No, they make caustic soda from sodium carbonate by treating it with lime.

*President.*—When they make the chlorine, what remains is bicarbonate of soda.

*Mr. Butler.*—No. What remains is caustic soda and the chlorine comes away as a gas.

*Dr. Matthai.*—So that sodium carbonate is really the raw material for other materials.

*Mr. Butler.*—Yes, it is used for other purposes.

*Dr. Matthai.*—For what kind of purpose?

*Mr. Butler.*—It is used for domestic purposes very largely. It is used in a small way in a very large number of industries so that the total consumed is very large.

*Dr. Matthai.*—Generally it is for cleaning purposes.

*Mr. Butler.*—Yes.

*President.*—Sodium carbonate can be manufactured out of sulphate.

*Mr. Butler.*—That is the original process, viz., the Leblanc process. Following that came the ammonia soda process where it is made from common salt and carbon dioxide, using ammonia.

*President.*—So that if they had a synthetic ammonia plant, they could use it for this purpose also.

*Mr. Butler.*—Yes. In England where they are making synthetic ammonia, they use ammonia in the manufacture of sodium carbonate and it passes through the process, but it is not consumed in the process and they get ammonium chloride and sodium carbonate from the common salt. The ammonium chloride they are selling as fertilizer, I believe.

*President.*—Do you use very much sodium carbonate yourself?

*Mr. Butler.*—Not very much. A certain amount is used in the manufacture of nitro-glycerine.

*President.*—In England they use rock salt.

*Mr. Butler.*—They pump it up in solution.

*President.*—In India they make a lot of salt by evaporation. Will that salt be as good as the imported?

*Mr. Butler.*—It is the same material. It is all a question of cost.

*Dr. Matthai.*—I suppose all the sodium carbonate that now comes from the United Kingdom is made by the ammonia soda process.

*Mr. Butler.*—I believe there is a lot of sodium carbonate coming from East Africa. There are large deposits of sodium carbonate which are being worked by the Magadi Soda Company.

*Dr. Matthai.*—It seems to us rather important that if the bulk of the demand for chemicals in India is in the form of sodium carbonate, the future of the industry would depend very largely on the manufacture of sodium carbonate.

*Mr. Butler.*—Caustic soda is essential for the Soap Industry. Large quantities of caustic soda are consumed in the manufacture of soap all over the world.

*Potash Sulphate.*

*President.*—Is potash sulphate a natural raw material or is it manufactured?

*Mr. Butler.*—Chloride is found as deposits. I think it is chiefly potassium chloride, but it doesn't matter from the point of view of using it as a fertilizer.

*President.*—What I want to know is whether you consider it as a natural raw material or whether it is partially manufactured. That is what I can't make out.

*Mr. Butler.*—They get the raw material as potassium chloride and sell it as fertilizer.

*President.*—They get the bulk from the Stassfurt deposits, and treat them with sulphuric acid.

*Mr. Butler.*—It is correctly described as a raw material.

*Dr. Matthai.*—Would it be correct to describe it as mineral deposit?

*Mr. Butler.*—I really do not remember whether the Stassfurt deposits contain potassium sulphate. I am under the impression that it is chiefly potassium magnesium chloride.

*President.*—It is stated in one of the representations that sulphate of potash, sulphur and sodium nitrate are not likely to be manufactured, because they are natural products obtainable in enormous quantities from Germany.

*Mr. Butler.*—I should think it is correct to say that it is not likely to be manufactured excepting as a laboratory chemical. These deposits consist of a mixture of a number of compounds of sodium, potassium, magnesium, calcium, etc. Probably potassium is present as both chloride and sulphate.

*Explosives.*

*President.*—What percentage of the cost of cordite (explosives) is represented by the manufacture of (a) sulphuric acid and (b) nitric acid?

*Mr. Butler.*—I will send you this later on.

*President.*—I take it the explosives here are manufactured only by Government.

*Mr. Butler.*—The explosives that we make at the Cordite Factory are not made anywhere else in India.

*President.*—What about other countries? Do Government manufacture these themselves or are they manufactured by private agencies?

*Mr. Butler.*—Both. Every country has its own military explosives factory, but at the same time the explosive industry flourishes in most of the big countries. In England for instance the navy has its own cordite factory and the army has its own cordite factory. Imperial Chemical Industries Limited manufacture large amount of explosives for blasting purposes. Mining industries require a large quantity of explosives for breaking up the rock.

*Sulphuric Acid.*

*Dr. Matthai.*—I suppose the sulphuric acid that you use is in the form of concentrated acid.

*Mr. Butler.*—Yes.

*Dr. Matthai.*—Have you any idea of what would be the sort of plant that would be an economic unit for making sulphuric acid? You are making only 500 tons.

*Mr. Butler.*—Our plant is capable of making considerably more.

*Dr. Matthai.*—How much more could it make?

*Mr. Butler.*—It could make about 5 or 6 times more.

*Dr. Matthai.*—We were told the other day that 5,000 tons of sulphuric acid would be the economic unit.

*Mr. Butler.*—In India it is all a question, at what price sulphuric acid can reach the particular spot at which manufacture is proposed, as compared with the cost of manufacture.

*Dr. Matthai.*—Sulphuric acid as such is never imported.

*Mr. Butler.*—A certain amount of refined sulphuric acid is imported.

*Dr. Matthai.*—Only a small quantity is imported for hospitals, laboratories and so on.

*Mr. Butler.*—It is all a question of the price at which outside supplies of sulphuric acid can reach that particular spot.

*Dr. Matthai.*—It might depend on the extent to which you can find a market for the secondary products of sulphuric acid. If you can make use of sulphuric acid in large quantities for salts and so on, to that extent you practically increase the market for sulphuric acid.

*Mr. Butler.*—There are sulphuric acid plants in India and they no doubt compete in the area lying between them. In this area lying between them, it is quite conceivable another plant might be able to compete with them, but it is very difficult to say what the economic unit would be. One cannot give any absolute figure.

#### *Railway freight.*

*Dr. Matthai.*—Don't you get any special railway freight for your material?

*Mr. Butler.*—We get the ordinary military rate.

*Dr. Matthai.*—Is that half the usual rate?

*Mr. Butler.*—No. I can't tell you the exact rate.

*President.*—Has your Military Department got its own wagons for carrying explosives?

*Mr. Butler.*—We don't own the explosive wagons. The railways keep a particular type of explosive wagon for us.

#### *Price of Sulphur and Nitrate of Soda.*

*Dr. Matthai.*—The price of sulphur is coming steadily down. Do you remember approximately how much it is now?

*Mr. Butler.*—45 tons cost Rs. 5,900.

*President.*—Is that landed at the works?

*Mr. Butler.*—Yes. It is between Rs. 5 and Rs. 6 a cwt.

*Dr. Matthai.*—The same thing applies to nitrate of soda. Price is steadily coming down.

*Mr. Butler.*—It should come down.

#### *Other chemicals used.*

*President.*—I take it the amount of other chemicals used by you is very small.

*Mr. Butler.*—Yes. We use a certain amount of caustic soda.

#### *Acetone.*

*Dr. Matthai.*—You use a certain amount of acetone.

*Mr. Butler.*—Yes. We have a plant for making acetone from acetate of lime which is made from wood distillation in Mysore.

*Dr. Matthai.*—Where does the lime come from?

*Mr. Butler.*—Locally.

*Dr. Matthai.*—Is that good enough for your purpose?

*Mr. Butler.*—Yes, as regards the quality, not as regards the price.

*Dr. Matthai.*—For what other purpose it is used?

*Mr. Butler.*—It is used in the manufacture of cordite.

*Dr. Matthai.*—Before you began getting it from Mysore, where did you get it from?

*Mr. Butler.*—It was all imported. A plant was put up at Nasik for making acetone, but the cost was so enormous that it was given up.

*Dr. Matthai.*—Is it produced in connection with any distilleries?

*Mr. Butler.*—How do you mean?

*Dr. Matthai.*—Messrs. Parry and Company tried to make acetone.

*Mr. Butler.*—It is produced by a fermentation process.

*Dr. Matthai.*—That was never attempted in Southern India.

*Mr. Butler.*—No. There is no sale for acetone in India excepting for the manufacture of cordite.

*President.*—Government has still a factory at Nasik, where they manufacture alcohol. Do you have to use much alcohol?

*Mr. Butler.*—Practically none.

#### *Sulphur Combine.*

*Dr. Matthai.*—You have no information as to the arrangement of the Sulphur Combine. We have been told that between the producers in Sicily and America there is a kind of understanding with regard to prices, allocation of output and things of that kind.

*Mr. Butler.*—I have no knowledge of them. I think there is such an arrangement for ammonium sulphate.

#### *Question of Bounty on Sulphuric Acid discussed.*

*President.*—There are several proposals before us here. One is by increasing the duties on the various chemicals and another is by payment of a bounty. Supposing the payment of a bounty would be the most suitable form of giving assistance, would it be possible to devise a scheme by which a bounty on sulphuric acid alone might just suffice, because sulphuric acid enters very largely into the manufacture of most of these heavy chemicals?

*Mr. Butler.*—I should say that would have exactly the same effect.

*President.*—We have asked for figures, but that might be a very convenient way of dealing with the question.

*Mr. Butler.*—We have to determine what products would depend on sulphuric acid.

*President.*—We can take only a few typical products and say that sulphuric acid forms such and such a percentage in the manufacture of these various products and that a bounty given on sulphuric acid so much per ton would mean a bounty of so much per ton on the various products.

*Mr. Butler.*—Without going into details, I cannot answer the question.

*Dr. Matthai.*—What we were really thinking is that most of these chemicals referred to us, *e.g.*, epsom salt, aluminium sulphate and various other things would all mean a considerable amount of sulphuric acid. Now the question before us is to make it possible for the local manufacturers to reduce their costs in the face of foreign competition. An effective way of doing it we thought might be by giving them a bounty on sulphuric acid. To that extent the cost of the basic raw material is brought down.

*President.*—There is also the other factor. Sulphuric acid enters very largely in the manufacture of fertilizers, and if we were to put a duty, it would increase the cost of fertilizers to the agriculturists and there would be objection.

*Mr. Butler.*—Yes.

*President.*—In this way if we took some of the fertilizers of which we have no evidence as to what they are likely to be used and also we took these acids and salts where sulphuric acid enters very largely, it may be possible for us to formulate a scheme without raising the price of the other products.

*Use of fertilizers.*

*Mr. Butler.*—I should say that it would be many years before there is a market for fertilizers in India.

*Dr. Matthai.*—I think it has been increasing at a rapid rate during the last three or four years.

*Mr. Butler.*—Yes, but the quantity is small and it is chiefly used by the planters of tea and coffee.

*Dr. Matthai.*—Messrs. Parry and Company do a certain amount of business in fertilizers. The representative who came to give evidence before the Board told us that in Southern India ryots are using more fertilizers than they were doing before.

*Mr. Butler.*—I understand they use a certain amount of fish manure.

*Dr. Matthai.*—They get their phosphates from Morocco and then they treat it with sulphuric acid. That they say is used even by the small cultivator.

*Mr. Butler.*—They also get phosphates in fish manure and they make them from bones.

*President.*—We really do not know. There is a lot of these organic phosphates in the country and they may be using them without our knowing.

*Mr. Butler.*—Quite so.

*Dr. Matthai.*—You are not interested in phosphoric acid.

*Mr. Butler.*—Not at all.

*Dr. Matthai.*—You have not considered the question of the phosphate deposits in Trichinopoly.

*Mr. Butler.*—No. As regards the question of bounty, I might be able to express an opinion if I have the detailed information in front of me.

*President.*—We have asked for certain details. The first thing is to ascertain the quantity of sulphuric acid used in each of the principal products that we are enquiring into.

*Mr. Butler.*—Yes.

*Dr. Matthai.*—Without going into details you would accept more or less as a correct assumption that one of the most effective ways of cheapening the cost would be to cheapen the cost of sulphuric acid.

*Mr. Butler.*—Undoubtedly.

*President.*—When you go on leave who officiates for you?

*Mr. Butler.*—Last time when I went on leave, Dr. Robson officiated for me. He is at present officiating as Chief Inspector of Explosives.

## AGRICULTURAL ADVISER TO THE GOVERNMENT OF INDIA.

Oral Evidence of Dr. D. CLOUSTON, C.I.E., recorded at Calcutta on Thursday, the 28th February, 1929.

### *Introductory.*

*President.*—Dr. Clouston, you are the Agricultural Adviser to the Government of India?

*Dr. Clouston.*—Yes.

*President.*—What connection is there between your department and the provincial departments of agriculture?

*Dr. Clouston.*—Since 1920 there has not been any close connection. Agriculture has been transferred and as provincial departments are more or less self contained now they don't come to us for advice as often as they used to in pre-Reform days.

*President.*—Is there no co-ordination between you and the various provincial departments as regards statistics and so on?

*Dr. Clouston.*—Only in so far as the provinces supply me with information for my review of agricultural operations in India. I write an Annual Review and get for it certain figures from the provinces.

*President.*—As regards Agricultural Research, is there no connection between you and them?

*Dr. Clouston.*—Not a very close connection. Whenever any research worker in the provinces wants helps from Pusa, he applies direct to the head of the corresponding section in Pusa. But at present there is little co-ordination and for that reason the Royal Commission on Agriculture have recommended the establishment of a Research Council which will be the co-ordinating body between the Imperial and Provincial departments in future.

*President.*—Have you got a special fertiliser department in Pusa?

*Dr. Clouston.*—No.

*President.*—Did you not have somebody there before—Mr. Hutchinson, I think?

*Dr. Clouston.*—Mr. Hutchinson was the bacteriologist. He carried out certain experiments with manures, but we have no special Fertiliser department. Our experiments with manures are carried out by the Imperial Agriculturist.

*President.*—Who is that?

*Dr. Clouston.*—Mr. Henderson.

*President.*—Does he carry out any experiments in various manures as applied to different soils?

*Dr. Clouston.*—He carries out experiments on the Pusa estate. I have some figures here showing the results of the experiments carried out by him. About 5 years ago I asked the provinces to let me have the results of such manurial experience as they had carried out.

*President.*—If you have got that information, it would be very valuable to us.

*Dr. Clouston.*—The provinces had at that time carried out no experiments with super-phosphates. They had experimented with phosphatic manures such as bonemeal, but not with any form of "super". Since then they have conducted experiments in which they have included super-phosphates. Speaking generally, their object in view has been to ascertain whether the soil was deficient in phosphates.



*Super-phosphate.*

*President.*—I am dealing now with Indian soil. What is the effect of super-phosphate on the soil? Supposing there is a deficiency of super-phosphate, what does it mean? Does it mean deterioration in the quantity or quality or what?

*Dr. Clouston.*—It affects the yield to a considerable extent. It also affects the quality of the crop. Phosphoric acid produces early ripening. If you apply nitrogenous manures, it tends to lengthen the growing period of the crop, while the application of a phosphatic manure makes the crop ripen early.

*President.*—It was said, I think, by several witnesses before the Agricultural Commission that, speaking generally, there is more deficiency of nitrogen in the soil.

*Dr. Clouston.*—Much more.

*President.*—What is that due to?

*Dr. Clouston.*—I think it is due to the fact that in India we have what we may call optimum conditions for nitrification. When we apply organic matter to the soil, it nitrifies readily owing to the high temperature and nitrites and nitrates are formed which are easily washed out of the soil. The soil thus readily loses its nitrogen; but it is not depleted to anything like the same extent of phosphoric acid. When we apply to the soil soluble forms of nitrogenous fertilisers such as sulphate of ammonia or nitrate of soda, they too are readily washed out of the soil.

*President.*—There is one point. Supposing you use both super-phosphates and nitrogenous fertilisers or sulphate of ammonia, then more residue would be left of the phosphate than of the nitrogen.

*Dr. Clouston.*—That is so. The residue of the phosphate would tend to give increased yields for two or three years, while the effect of the sulphate of ammonia would disappear almost entirely after the first year.

*President.*—Therefore it may come to this that you may require, say, sulphate of ammonia for three consecutive years, whereas phosphate you may require once in three years.

*Dr. Clouston.*—Quite so.

*President.*—It has rather an important bearing on these combined fertilisers that some manufacturers recommend, that is to say, that in that case the combined fertiliser may not be quite as suitable as the separate fertilisers.

*Dr. Clouston.*—Yes, and a soil may be very deficient in nitrogen and only slightly deficient in phosphoric acid. It may be economical in such cases to apply large dressings of bulky nitrogenous manures such as green manures and to apply separately smaller dressings of a phosphatic manure.

*President.*—So in your opinion it would be better to use phosphatic manures separately?

*Dr. Clouston.*—In the case of soils like rice soils of Burma and Madras which are about equally deficient in phosphoric acid and nitrogen, it may be more economical on the other hand to apply a concentrated form of mixed manure.

*President.*—As a phosphatic fertiliser lasts much longer than the nitrogenous fertiliser, it may mean that there may be a certain amount of waste of the former.

*Dr. Clouston.*—Yes, there would be if the ratio of the nitrogen to phosphoric acid in the mixture were faulty as it would be in a badly balanced mixture.

*Mr. Mathias.*—Nitrogenous elements in the soil can be supplied by green manure or cake?

*Dr. Clouston.*—Yes or by cattle manure.

*Mr. Mathias.*—That would be the most convenient form for the cultivator and probably as he has his cake and the green crop at his door, it would be easier to persuade him to adopt that form of fertilisation rather than use artificial manure entirely.

*Dr. Clouston.*—Yes.

*Mr. Mathias.*—So that perhaps from that point of view it would be advisable to have on the market a certain amount of super-phosphate which he could use in conjunction with the green crop or cake?

*Dr. Clouston.*—He has been using green manures for ages and knows their value. When he comes to realise that for certain soils green manures do not provide the quantity of phosphates required, he may apply a phosphatic manure in conjunction with a green manure.

*Mr. Mathias.*—So for years to come there would be a demand from the agriculturists for super-phosphate. Then once he has adapted himself to the use of fertilisers, there will probably be a considerable increase in the purchase of super-phosphates by itself.

*Dr. Clouston.*—Quite so. As a matter of fact the planters in Bihar are using super-phosphate and cake for sugarcane.

*Dr. Matthai.*—Can you give us any approximate estimate of the present consumption of super-phosphate in India?

*Dr. Clouston.*—I have just received a telegram from Messrs. Shaw Wallace and Company. They say:—

“Approximate figures of import of single ‘super’ that is containing 20 per cent. phosphoric acid—in India 1,400 tons in 1926, 4,700 tons in 1927 and 7,000 in 1928. Double or concentrated super 300 tons in 1926, 650 tons in 1927 and 1,700 tons in 1928.”

*Mr. Mathias.*—You say the use of super-phosphate tends to ripen the crop quicker?

*Dr. Clouston.*—Yes.

*Mr. Mathias.*—Is the time of ripening shortened?

*Dr. Clouston.*—I have noticed that when we applied it to cotton in the Central Provinces, we got slightly earlier pickings from the plots which got the super-phosphate. It tended to ripen the crop quicker.

*Mr. Mathias.*—The difference is not so marked as to lead to the use of super-phosphate for the purpose of avoiding seasonal calamities such as frosts and so on?

*Dr. Clouston.*—No.

*President.*—The main difficulty just now is, I suppose, that the ryot has not really learnt to appreciate the benefit of fertilisers.

*Dr. Clouston.*—That is the main difficulty, and another difficulty is that when he does realise the economic value of fertilisers, he generally finds that he cannot afford to buy them.

*President.*—That is true. The idea therefore must primarily be to teach him the use of fertilisers and then to give it to him as cheaply as possible.

*Dr. Clouston.*—For that reason the Taxation Committee recommended that in the event of an export duty being put on oil-cakes and bonemeal, part of the money thus raised should be used for propaganda purposes with a view to popularising the use of these manures in India.

#### *Organic fertilisers.*

*President.*—Which are the principal organic nitrogenous fertilisers in India?

*Dr. Clouston.*—Cattle manure, oil-cakes, green manures and fish manure: fish supplies both nitrogen and phosphoric acid.

*President.*—What Sir Edwin Pascoe's memorandum shows is that about 801,000 tons of these different manures were exported out of the country.

*Dr. Clouston.*—On the other hand, the bulk of the oil-cakes exported are edible and would not ordinarily be used as manure in this country. Linseed cake and cotton cake which are largely exported are valuable cattle foods and therefore too dear to use as manures.

*Mr. Mathias.*—What cake do they use as manure?

*Dr. Clouston.*—Til (sesamum), castor, mustard and mahua: but mahua contains little nitrogen and that nitrogen, moreover, is not in a readily available form.

*President.*—The principal cakes exported are the groundnut cake and rape and sesamum?

*Dr. Clouston.*—Groundnut and linseed cake are used as cattle foods and rape and sesamum as manures mainly.

*Dr. Matthai.*—I suppose we may take it that so far as potash is concerned, the deficiency in the Indian soil is not very considerable.

*Dr. Clouston.*—That is correct. I carried on many experiments in the Central Provinces and we never found potash to be of any value as a manure.

*Dr. Matthai.*—So that the problem of fertilisation in India is primarily one of nitrogen and secondarily of phosphate?

*Dr. Clouston.*—Yes.

*President.*—There is plenty of lime in the country.

*Dr. Clouston.*—Some of our soils are deficient in lime.

#### *Encouragement of use of artificial fertilisers.*

*Mr. Mathias.*—Have you any idea at what price big advances would take place in the use of super-phosphates by the cultivator?

*Dr. Clouston.*—Experiments have not been carried out with a view to throwing light on that question.

*Mr. Mathias.*—What are the economics of the question? For instance super-phosphate sells at Rs. 75 a ton at present. Supposing a reduction of Rs. 10 per ton takes place, will that make any extensive difference to its use?

*Dr. Clouston.*—It would not create an extensive demand immediately but it would stimulate the existing demand.

*Mr. Mathias.*—It would make the propaganda efforts of the Agricultural Department easier?

*Dr. Clouston.*—Yes.

*President.*—Take Burma for instance. They experimented with super-phosphate and they found that there was an increase of 40 per cent. in the yield.

*Dr. Clouston.*—That was Ammophos which contains 20 per cent. phosphoric acid and 20 per cent. nitrogen.

*President.*—Is there any place where they have experimented only with super-phosphates?

*Dr. Clouston.*—Yes, experiments have been conducted with a view to finding out whether certain classes of soil are deficient in phosphoric acid but these experiments have not thrown much light on the economic value of phosphatic manure applied by itself. It took years of experiment to find out the constituents of plant food deficient in our soils. Having ascertained by experiment that our soils are deficient in phosphoric acid and nitrogen, agricultural experts have within recent years been experimenting with a view to finding out the price per hundredweight at which it will pay to apply phosphatic and nitrogenous fertilisers.

*President.*—What is the point in ascertaining whether there is less phosphate in the soil, if you don't pursue the investigation further and say that there is this deficiency which we have detected and we have rectified and this is the result?

*Dr. Clouston.*—It took them years to put their finger on the deficiency. No one knew that certain soils are deficient in phosphates and some in nitrogen and some in lime. Now they are beginning to ascertain at what price it would pay people to apply each of these manures to the soil, but they have not gone far enough. When I asked them five years ago to let me have the results, obtained from their manurial I did not find super-phosphates in any of the series of experiments they had carried out.

*Mr. Mathias.*—The use of superphosphates has been well known all over the world for many years and it is rather curious that experiments have been carried out only recently in India.

*Dr. Clouston.*—Phosphatic manures have been under trial in India but they have nearly always been applied along with nitrogenous manures such as cattle dung, green manures, oil cakes, sulphate of ammonia, etc.

*Mr. Mathias.*—Have no experiments been carried out in the application of super-phosphate alone?

*Dr. Clouston.*—I am not aware that phosphatic manures are being applied by themselves in any part of India. On tea estates they are applied mainly with green manures, I understand.

*Dr. Matthai.*—You mean tea plantations?

*Dr. Clouston.*—Yes. In the past the manure used on tea estates was mainly green manure. This manure is now being supplemented with phosphates, I understand.

*Mr. Mathias.*—So that it cannot be said definitely that there are not types of soil in India in which super-phosphate would be advantageous by itself?

*Dr. Clouston.*—In the Central Provinces, I had a whole series of manurial experiments carried out. The first plot got nitrate of soda, potash and phosphoric acid, the second nitrate of soda and potash, the third potash only; the fourth super-phosphate only and the fifth got nitrate of soda only. The results obtained showed that on black cotton soil super-phosphate was of very little manurial value when applied by itself and that the value of the increased yield was much less than the cost of the manure.

*Mr. Mathias.*—That is so far as cotton is concerned. Cotton is not one of the crops in which you would use super-phosphate while rice and sugar cane are crops where you would use super-phosphate?

*Dr. Clouston.*—In the rice tracts they are growing rice year after year. The soil is being depleted of its phosphates needless to say as the grain which it produces is not returned to the land. Sugarcane removes much plant food including phosphoric acid from the soil and responds readily in parts of India to manuring with phosphates. Cotton is usually grown in rotation with leguminous crops which do not make such heavy demands on this plant food; for that reason phosphatic manures would not ordinarily be applied to cotton.

*President.*—We have got a very big rice growing area in Bengal and Burma.

*Dr. Clouston.*—In the Central Provinces I carried out experiments with phosphatic manures in rice fields. The result showed that phosphates were applied at a loss.

*President.*—Probably because rice has not been grown for such a length of time as in Bengal, Madras and Burma.

*Dr. Clouston.*—Yes, and some soils are so rich in phosphoric acid that it may take thousands of years to reduce the percentage of this plant food therein to the dangerous point.

*Mr. Mathias.*—It is generally accepted that Central Provinces is fairly rich in phosphates, is it not?

*Dr. Clouston.*—It is.

*Mr. Mathias.*—It differs from some of the other provinces of India.

*Dr. Clouston.*—Yes. The soils that are most deficient in phosphoric acid are our lateriate soils and old rice soils which have been cropped with rice for hundreds of years.

*Mr. Mathias.*—But the black cotton soils of the Central Provinces are not deficient in phosphates?

*Dr. Clouston.*—No.

*Mr. Mathias.*—And a very large percentage of the soil in the Central Provinces is black cotton soil?

*Dr. Clouston.*—Some of the soils in Bihar and Orissa are deficient in phosphates.

*President.*—You have sent us a Committee's report. Which Committee was that?

*Dr. Clouston.*—A Sub-Committee of the Board of Agriculture, the Chairman of which was Mr. Milligan.

*President.*—Were all the provinces represented on this committee?

*Dr. Clouston.*—No. All the provinces were not represented on this sub-committee but the members of it were all interested in the manurial experiments being carried out in their provinces.

*President.*—Which were the provinces that were represented?

*Dr. Clouston.*—Here are the names:—

Mr. W. A. Davis . . . . .	Indigo Research Chemist to the Government of India.
Mr. H. A. F. Lindsay . . . . .	Director-General of Commercial Intelligence.
Mr. R. S. Finlow . . . . .	Fibre Expert to the Government of Bengal.
Dr. Harold Mann . . . . .	Agricultural Chemist and Principal Agricultural College, Poona.
Mr. H. C. Sampson . . . . .	Deputy Director of Agriculture, Trichinopoly.
Mr. A. A. Meggitt . . . . .	Agricultural Chemist, Assam.
Mr. C. Somers Taylor . . . . .	Agricultural Chemist, Sabour.
Mr. R. G. Allan . . . . .	Principal, Agricultural College, Nagpur.
Mr. R. D. Anstead . . . . .	Deputy Director of Agriculture, Bangalore.
Mr. P. Thompstone . . . . .	Deputy Director of Agriculture, Burma.
Mr. S. K. Kilavkar . . . . .	Bombay.
Mr. A. B. Modak . . . . .	Bombay.

*President.*—That seems to be a very well constituted committee.

#### *Results of experiments.*

*Dr. Clouston.*—Yes. I have here results of certain experiments carried out at Pusa in which we applied super-phosphate and oil-cake as manures to cane land. Five maunds of mustard cake gave a net profit of Rs. 61 per acre; 10 maunds gave Rs. 74 per acre and 15 maunds Rs. 92. 2 maunds of super-phosphate applied along with 5 maunds of cake gave a net profit of Rs. 73, as against a net profit of Rs. 61 only from the plot manured with

5 maunds of mustard cake. The largest net profit was obtained from the plot manured with 15 maunds of mustard cake applied by itself. That would appear to indicate that the soil was specially deficient in nitrogen and that we had not applied a sufficiently large quantity of cake to give the best results. In increasing the yield in other words, the nitrogenous manure accounted for more than the super-phosphate.

*Dr. Matthai.*—Taking the two experiments and taking the extra cost of this additional cake, would it be more economical to use this extra quantity of cake than to use the same quantity of cake plus a certain amount of "super", taking the price into account?

*Dr. Clouston.*—As far as I know experiments have not been carried out with a view to solving that problem.

*Dr. Matthai.*—May I take it that it is generally admitted that it is better to use super-phosphate than bonemeal, apart from the question of price and taking into account only the manurial qualities?

*Dr. Clouston.*—Yes. Bonemeal acts very slowly and, moreover, a good many cultivators are prejudiced against it. They realise that it is made from the bones of cows and bullocks.

*Dr. Matthai.*—Therefore if the price of super-phosphate can be brought down sufficiently, then I think the ryots could be easily persuaded to use "super" against bonemeal?

*Dr. Clouston.*—Yes.

*Dr. Matthai.*—At present it is a question of the price that he has to pay for super-phosphate?

*Dr. Clouston.*—Yes.

*President.*—Do you agree that one objection there is against the use of these concentrated fertilisers is that the mechanical properties of the soil are not helped by their use?

*Dr. Clouston.*—That is correct. If you go on applying nitrate of soda, for example, year after year, the manure affects the texture of the soil and makes it very impervious. In other words, it tends to produce a condition of the soil which leads to water-logging.

*President.*—That may be an objection to the constant use of concentrated fertilisers in India.

*Dr. Clouston.*—Yes, it would be an objection; but we may take it that cultivators are not likely to apply concentrated fertilisers in sufficiently large quantities to produce that result. These manures will ordinarily be applied to particular crops which are grown in rotation with others which are not manured as a rule. Moreover, for most crops it will pay them to use bulky organic manures such as cattle-manure and green-manure in preference to fertilisers. Fertilisers will not be applied year after year to the same field, in short, and for that reason there is little danger of their being applied in sufficient quantities to affect the mechanical texture of the soil.

*President.*—In conjunction with phosphatic manure if possible?

*Dr. Clouston.*—Yes.

*President.*—Who appointed this Committee?

*Dr. Clouston.*—The Board of Agriculture for India appointed it. We have an All-India Board which meets once in two years.

*President.*—Does it still exist?

*Dr. Clouston.*—The Royal Commission on Agriculture have given it as their opinion that the Board should continue to meet. This question of manures has been discussed by the Board time and again: we last considered it in the year 1924 at the Board meeting held at Bangalore. Here are some of the conclusions arrived at (Handed in). The Board recommended that a Committee should be appointed to go into the whole question of the use of fertilisers in India: that Committee has not as yet been constituted. The

Government of India came to the conclusion that as the Royal Commission was to report on agricultural conditions generally, it should take up that question.

*Mr. Mathias.*—What about the use of super-phosphates for sugarcane? Has that proved successful?

*Dr. Clouston.*—Yes. The planters are using a good deal now in Bihar: but they are I think using it along with organic manures such as cake,

*Mr. Mathias.*—Not by itself?

*Dr. Clouston.*—No.

*Mr. Mathias.*—It has been proved definitely that the application gives a better yield, has it not?

*Dr. Clouston.*—Yes.

*Mr. Mathias.*—As planters are using it, it must be a commercial proposition, otherwise they would not have used it, isn't that so?

*Dr. Clouston.*—Yes.

*Mr. Mathias.*—We may take it that for the growth of rice and sugarcane and in the tea gardens super-phosphate as a fertiliser has been proved to be of commercial value?

*Dr. Clouston.*—Yes. Some of the planters are also using it for tobacco, too—a crop which gives a big money yield per acre.

*President.*—In this report it is stated that in Bengal and Assam on the old alluvium there is ample evidence that phosphatic manuring is of value and has given considerable increase with paddy (40 per cent.).

*Dr. Clouston.*—Yes, they have been carrying out experiments there with bonemeal.

*President.*—We can't say what would happen if rock phosphate was used in place of bone, but one can say generally that super-phosphate if used would give similar results?

*Dr. Clouston.*—Yes, it should. As regards the mineral phosphate deposits at Trichinopoly and in Bihar, the general opinion is that it is so impure that it would not pay at the present time to use them. It contains so much calcium carbonate that the amount of sulphuric acid required to convert it would be very great.

#### *Local manufacture of super-phosphate.*

*President.*—We are now considering the manufacture of super-phosphate from imported rock phosphate and on evidence such as this it may be possible to say that so far as these two provinces are concerned, they would be distinctly benefitted by the use of super-phosphate. Is that correct?

*Dr. Clouston.*—Yes.

*President.*—I suppose you have not got the evidence on which they make this statement.

*Dr. Clouston.*—The evidence is, I take it, more or less the same evidence that they have supplied me with. They have given the increased profits obtained by the use of bonemeal when used as a manure for paddy.

*President.*—Will you kindly let me have those figures?

*Dr. Clouston.*—Yes (Hands in a statement).

*Dr. Matthai.*—What do you call basic super-phosphate? Is it lime added to super-phosphate?

*Dr. Clouston.*—Yes, a basic super-phosphate is produced by the addition of lime to ordinary super-phosphate.

*Dr. Matthai.*—That is to say, where there is deficiency not merely of phosphate but also lime, there you use basic super-phosphate?

*Dr. Clouston.*—Ordinary super-phosphate of lime is an acid manure which upon light soils and certain clays containing little or no lime is not so

desirable as those of a neutral or alkaline nature. Moreover, finger-and-toe and certain other diseases of root crops are encouraged by acid manures and discouraged by basic "super".

*Dr. Matthai.*—Basic slag?

*Dr. Clouston.*—I had tried experiments with slag obtained from Tatas. It was guaranteed to contain 10 per cent. phosphoric acid. The phosphoric acid was in a very insoluble form and it certainly did not pay to transport this fertiliser for any considerable distance.

*President.*—We have got a note from the Tata Iron and Steel Company and it does show that it can't be a great success, because there is not much phosphorus in the silica.

*Dr. Matthai.*—I think they tried to get a certain amount of phosphatic rock from Singbhum and mix with it, but they did not succeed.

*President.*—It contained 10 per cent. phosphoric acid?

*Dr. Clouston.*—Yes.

*President.*—As regards Burma, the Committee say: "In general, however, it appears that phosphates will probably prove to be an essential manure in the great rice growing areas of Burma". What is your opinion on that?

*Dr. Clouston.*—I think there is evidently a deficiency of phosphoric acid and nitrogen in the rice soils of Burma. Mixed manures which contain 20 per cent. phosphoric acid have given profitable yields there when applied to rice land, so it is evident that the soil is deficient both in nitrogen and phosphoric acid.

*President.*—That is more or less the same experience they had in Bombay, I think.

*Dr. Clouston.*—Yes, and in Madras, too.

*President.*—I think we can say more or less this; that in two of the big crops, especially the rice crop, it has been more or less established that there is deficiency of phosphates?

*Dr. Clouston.*—In the Central Provinces there is no pronounced deficiency I should say.

*President.*—I am talking of the big rice growing tracts like Bengal, Burma and the south.

*Dr. Clouston.*—That is correct as far as these tracts are concerned.

*President.*—And experiments have shown that the addition of super-phosphates and bonemeal have improved the soil.

*Dr. Clouston.*—Yes.

*President.*—At present we are dealing with the question rather on a small scale. We are not suggesting that the time has already arrived when India may absorb 2 million tons of super-phosphates. We are not dealing with such large quantities; we are only concerned with a reasonable demand, that in course of time there may be a reasonable demand for super-phosphates in the country—10,000 to 15,000 tons or something like that. They have already got 7,000 tons during the last two years.

*Dr. Clouston.*—The demand will grow. Provinces are introducing heavier yielding varieties of the different staple crops. These will require more nitrate and more phosphoric acid, because the heavier yields which they produce take more of these plant foods out of the soil.

*President.*—We may tell you that the point we are considering is this: we are enquiring into these chemicals just now, of which sulphuric acid is the principal ingredient. We are considering how sulphuric acid can be cheapened in the country, so that all industries and agriculture may benefit. One of the ways by which sulphuric acid could be cheapened is if it could be used for purposes of manufacturing super-phosphates.

*Dr. Clouston.*—You will still import your sulphur, I suppose?



*President.*—That we would deal with separately. Assuming that the importation of sulphur is not an objection, then the question to consider is how best we could cheapen sulphuric acid.

*Mr. Mathias.*—The question of the cost of sulphuric acid is mainly a question of output.

*Dr. Clouston.*—Yes.

*President.*—So if you can have an economic unit for the manufacture of sulphuric acid, it may be produced as cheaply as in other foreign countries. We have got to get that result. For that purpose we have got to increase the quantity of sulphuric acid manufactured in the country and encourage the use of larger units. If, therefore, there is a reasonable demand for super-phosphates in the country now or in the near future, larger quantities of sulphuric acid could be manufactured. But we don't wish to put up the price of super-phosphate by recommending increased duties and we are considering therefore whether, if we recommended a certain amount of bounty to be paid for a temporary period on the manufacture of sulphuric acid used for the purpose of producing super-phosphates, it might enable the industry eventually to produce super-phosphates cheaply.

*Mr. Mathias.*—It is to the interest of the manufacturer to turn out as much super-phosphates as he can.

*Dr. Clouston.*—The difficulty that I foresee is this: To turn out sulphuric acid economically, a fairly big factory and a highly paid technical staff will be required, but the demand for super-phosphate for some time to come will be small and the quantity of super-phosphate required may not be sufficient to justify the manufacture of sulphuric acid on a large scale.

*President.*—I may tell you that we have not formulated any conclusions, but what appears to be the position is that a unit of 8,000 to 10,000 tons of sulphuric acid would so reduce the costs that it may be possible to manufacture super-phosphates.

*Dr. Clouston.*—Certain firms are already manufacturing sulphuric acid in India, I understand.

*President.*—So if we pay a bounty which would on the one hand reduce the cost of sulphuric acid and on the other reduce the price of super, it may be desirable in the interests both of the industry and of agriculture.

*Dr. Clouston.*—By reducing the price of super-phosphate, you would almost certainly create a larger demand for it and thereby benefit agriculture.

*Mr. Mathias.*—That would be the best form of propaganda. I believe the Agricultural Commission is keen on that.

*Dr. Clouston.*—Yes. At the present time there is no great inducement to push the sale of super-phosphate. The profit obtained from its use is not big, for in most parts of India a high railway freight has to be added to the cost of this manure. When we brought super-phosphate from Calcutta to Nagpur, we used to pay about Rs. 25 a ton for freight.

*President.*—I think the railways have reduced the freight since then. I don't think it would now cost as much as that. It would be about Rs. 10 a ton now. They have now brought it under the minimum rate which is now 1 of a pie per mile.

*Dr. Clouston.*—If the price of super-phosphate were to be materially reduced, the planters would, I take it, use much more of it for their tea, coffee and rubber. The immediate increase in demand would come from them mainly.

*Dr. Matthai.*—I suppose also that it would be an advantage to have manufacture of manures done locally. So much depends on the conditions of the soil in India that if you could have an industry manufacturing manures in touch with the agricultural experts in India, it would be very much more satisfactory than to be dependent on imported manures.

*Dr. Clouston.*—Yes, the demand for sulphate of ammonia has increased considerably during the last few years. The increased demand is partly due to the fact that it is now being manufactured in India.

*Dr. Matthai.*—So that if we can devise a scheme by which a local industry for manufacturing manures can be started, without putting any burden on the ryots, then apart from the question of its being cheaper for the ryot, there is also the greater advantage of having precisely the type of fertiliser required for the country.

*Dr. Clouston.*—Yes.

*Dr. Matthai.*—We were asking one of the representatives of the chemical industries who came before us about imported rock phosphate. Supposing you started a manure industry here, rock phosphate would come from the Red Sea, I take it. If you take the freight on rock phosphate from Red Sea to India and then compare it with the freight to Holland from Algeria, the local industry might save to the extent of Rs. 9 to Rs. 10 a ton, so that if in addition to that we gave these people a bounty to cover the rest of the difference in cost, it might be possible to start an industry economically.

*Dr. Clouston.*—The quantity of bones available in India is very large. Much more could be collected, than is being collected at present. It might be cheaper to use bones than rock phosphate in the manufacture of super-phosphate.

*Mr. Mathias.*—But the price is fixed by the demand for gelatine in Europe and its price is at present so high that the manufacture of super-phosphate from bonemeal would not be economical.

*Dr. Clouston.*—Perhaps, that may be so.

*Mr. Mathias.*—If you have to pay more for bones, you will have to pay more for your super-phosphate.

*Dr. Clouston.*—I have not worked out the relative costs.

*Dr. Matthai.*—Do you consider that there is a difference in quality between rock super-phosphate and bone super-phosphate?

*Dr. Clouston.*—Yes, there is. Bone super-phosphate contains a small percentage of nitrogen.

*President.*—It is about 3 per cent. How much does the rock super-phosphate contain?

*Dr. Clouston.*—None at all. When we try to put a valuation on bone manure, our calculations are somewhat complicated by the fact that it contains two important plant foods.

*Mr. Mathias.*—Speaking personally, I think the proposal for assisting the manufacture of super-phosphate should not necessarily exclude the use of bones and it would rest with the manufacturer to decide whether it is profitable to undertake the manufacture or not.

*Dr. Clouston.*—It should be possible to get cheap bones in a district by collecting them locally. The local price is considerably lower than that which bones fetch in Calcutta. Factories for the manufacture of super-phosphate, if set up in the provinces, will thus be able to get their raw material at a lower price.

#### *Propaganda.*

*Mr. Mathias.*—How much is the Agricultural Department spending on propaganda in connection with the popularisation of fertilisers?

*Dr. Clouston.*—They are spending very little money at present on propaganda with respect to fertilisers. The exact amount spent in the different provinces is not known for each Provincial Department has a budget which covers the expenditure on research, experiment, education, demonstration and propaganda. Moreover, the officers who are doing research and experimental work are employed to some extent in carrying on propaganda, too.

*Mr. Mathias.*—If this proposal that the President was suggesting now materialised, we could rely on the Agricultural Department to undertake the necessary propaganda, can we not?

*Dr. Clouston.*—Yes, you could.

*President.*—If there was a local industry for manufacturing artificial fertilisers in the country itself, the chances are that the propaganda can be made more effective.

*Dr. Clouston.*—Yes.

*President.*—The Agricultural Department would be in constant touch with the manufacturer and tell him what is required and they will be in constant touch with the Agricultural experts in the country.

*Dr. Clouston.*—Yes, and the factory itself would do a certain amount of propaganda work no doubt. At the present time firms interested in the sale of manures and agricultural implements are inclined to leave the propaganda work almost entirely to the provinces.

*Mr. Mathias.*—On this question of local manufacture I think it has been proved rather successful to have a factory for manufacturing ploughs in India from the point of the Agricultural Department. They have been able to get into closer touch with the manufacturer and suggest alterations in design and so on.

*Dr. Clouston.*—That is so. Messrs. Kirloskar Brothers of Bombay Presidency claim that they have manufactured and sold more than 150,000 implements mainly ploughs since starting operations.

*Mr. Mathias.*—That was, I understand, partly as a result of consultation with the Agricultural Department.

*Dr. Clouston.*—Yes. In the Central Provinces we co-operated with this firm in the sale and hire of ploughs. Agricultural Associations were organised in the districts. They kept ploughs and certain other implements for sale and hire. By placing large orders with Kirloskar Brothers, they were able to get a big discount.

*Mr. Mathias.*—Something on that line with regard to fertilisers would probably be very successful, would it not?

*Dr. Clouston.*—Yes.

*Mr. Mathias.*—If you had in Bombay a firm manufacturing super-phosphates, the Agricultural Department could get in touch with them and place lump orders for the Central Provinces, say 500 tons, it would be possibly more advantageous to the firm and also advantageous to the province generally.

*Dr. Clouston.*—It would.

*Mr. Mathias.*—It would mean probably a reduction as far as the firm was concerned of the incidental expenses such as transport from works to railway station and so on?

*Dr. Clouston.*—Yes, by taking truck loads at a time, the freight charge per maund would be much less.

*Mr. Mathias.*—So from the point of view of the Agricultural Department it would be a sound business to run a factory on proper lines.

*Dr. Clouston.*—Yes, I think, it would. I would make another suggestion and that is that the Tariff Board should ask the Agricultural Research Council when established to enquire into this question of fertilisers on the lines suggested by the Board of Agriculture in 1924. We anticipate that the Research Council will, when constituted, form different committees and that there will be one committee formed to deal with manures including fertilisers.

*President.*—I believe that is going to be one of the functions of the Research Council and the Agricultural Commission said—I am speaking from memory—that it would be a better way of doing it than subsidising the manufacture of fertilisers. The Fertilisers Propaganda Company, Limited,

had asked for a subsidy and the Agricultural Commission has turned that down, because Government said that it cannot subsidise a party interested in propaganda, which was interested in the production of certain kinds of fertilisers. Therefore, what you aim at is that the Research Council should without identifying itself with any particular manufacturer, carry on experiments and advise the manufacturers generally and the agriculturists also.

*Dr. Clouston.*—Yes. The Research Council will give grants to the provinces for research and experimental work approved by the Council; but it will not identify itself with any particular manufacturer or firm.

*Mr. Mathias.*—You were very successful with your co-operative Associations in regard to cotton seed. Something on similar lines, if adopted, might lead to placing large orders for fertilisers?

*Dr. Clouston.*—Yes. Those co-operative societies undertake to sell manures and to sell and hire out improved implements.

*Mr. Mathias.*—Adopting the same system you would be able to place orders with the manufacturers of manures, would you not?

*Dr. Clouston.*—Yes, and the Co-operative Department would also be able to give assistance.

*Dr. Matthai.*—I see from Messrs. Parry and Company's price list that they give a discount of 5 per cent. to Co-operative Societies.

*Dr. Clouston.*—Yes. Most firms give a discount. Kirloskar Brothers give a discount of as much as 15 per cent., if I remember well, on large consignments. Firms interested in the sale of fertilisers would have to be prepared to sell at a small profit in the hope that the turn-over would be large.

*Mr. Mathias.*—Are they also selling cake?

*Dr. Clouston.*—Yes.

*President.*—Has nitrate of soda been found satisfactory as a fertiliser used by itself? It is dying out in most countries.

*Dr. Clouston.*—The demand for nitrate of soda is decreasing in India but this, I think, is partly due to the fact that sulphate of ammonia which is manufactured in the country, is cheaper per unit of nitrogen. Moreover, nitrate of soda has in the past been tried on such crops as cotton and the results have not always been satisfactory. When applied in the rains to cotton much of the manure is washed down into the sub-soil where it is beyond the root range of the plants.

*President.*—What is the proper time for applying nitrate of soda?

*Dr. Clouston.*—It should be applied after the crop has made some growth; to cotton we apply it to the plants about a foot high. Super-phosphate, on the other hand, is applied before sowing.

*President.*—But the sulphate of ammonia would be applied later, wouldn't it?

*Dr. Clouston.*—Yes, sulphate of ammonia, too, would be applied later, because like nitrate of soda it is readily washed down into the sub-soil.

*President.*—Supposing you used this compound fertiliser and then a heavy rain came, then the nitrogen would be washed out and the phosphate would remain, is that correct?

*Dr. Clouston.*—Yes. There will always be a demand in certain tracts for super-phosphate. Cultivators who find it necessary to apply phosphatic and nitrogenous manures to their crops will in many cases prefer to apply phosphatic manure along with a bulky organic manure such as cattle manure or green manure. To provide the nitrogen required by the soil the tendency both in India and Europe will be for the farmer to apply locally available nitrogenous manures. Super-phosphate, on the other hand, is not locally available: so the tendency will be to apply it separately.

*Dr. Matthai.*—Looking at the super-phosphate industry as a whole, do you think there is any possibility in the near future of super-phosphate as a whole being displaced by compound fertilisers?

*Dr. Clouston.*—Cultivators who find it necessary to use super-phosphate and nitrogenous manure may prefer to use super-phosphate by itself and to add their nitrogen to the soil in the form of green manure, cattle-manure or cake.

*Dr. Matthai.*—That of course is a condition which specially applies to India. I was thinking of the conditions in Europe.

*Dr. Clouston.*—At home, too, this will continue to be done by many farmers. As a matter of fact, it is the exception rather than the rule to apply combined manures there, for the reason that farmers have with them available supplies of nitrogenous manure in the form of farmyard manure.

*Dr. Matthai.*—After all the test would be the unit cost?

*Dr. Clouston.*—Yes.

*Dr. Matthai.*—The suggestion is that there is a method of manufacturing compound fertilisers which would dispense with the need for manufacturing sulphuric acid. If you got the phosphoric acid and combined it with the nitrogenous material then of course the cost would come down considerably, and therefore the unit cost would be less.

*Dr. Clouston.*—I should think that Messrs. Brunner Mond and Company are in a position to manufacture fertilisers very cheaply, because they turn them out on a large scale and that again means low overhead charges. It would most probably be difficult for a fertiliser factory in India to compete on equal terms with a firm of that standing.

*Dr. Matthai.*—Messrs. Brunner Mond and Company are more interested in ammonia sulphate than super-phosphate.

*Dr. Clouston.*—They are also supplying mixed manures, the names of which will be found in the letter I wrote you the other day.

*President.*—At present the total production of super-phosphates in the principal countries amounts to 11 million tons and it will take a long time before it dies as an industry.

*Dr. Clouston.*—Yes.

*Dr. Matthai.*—Most of the super-phosphate that you get in India really comes from the continent, does it not?

*Dr. Clouston.*—A good deal of it comes from Belgium.

*President.*—The total world's production of nitrogen is 1,300,000 tons and sulphate of ammonia contains 20 per cent. nitrogen.

*Dr. Clouston.*—Yes.

*President.*—That corresponds to the sulphuric acid figures: it is said that they use about 50 or 60 per cent. of the world's sulphuric acid in the production of super-phosphate and about 30 per cent. in the production of nitrogenous fertilisers.

*Dr. Matthai.*—I have not been able to get your latest review of agricultural operations, but a summary of it which I have seen gives separate figures for sodium nitrate and ammonia sulphate and then there is the group "other mineral fertilisers". The total figure for 1927-28 is 18,676 tons. There is a note to say that out of that 3,000 tons is calcium cyanide. May I take it that the rest of it is super-phosphate?

*Dr. Clouston.*—Not all.

*Dr. Matthai.*—Do they import saltpetre?

*Dr. Clouston.*—Yes, I think so.

*Dr. Matthai.*—The figures that we got from Messrs. Shaw Wallace and Company come to about 10,000 tons. There might be other imports, too, besides Shaw Wallace's.

*Dr. Clouston.*—Messrs. Shaw Wallace and Company have given the figures for all India.

*President.*—But it does show that its use is growing rapidly from 1,400 tons to 7,000 tons in three years.

*Dr. Clouston.*—Yes.

*President.*—What sort of figures have you got that you can give us?

*Dr. Clouston.*—I will give you a copy of a note which I wrote on the subject 5 years' ago.

*President.*—It would be useful if you send us a copy from Pusa and also any other figures that you think would be of use to us in this enquiry. We want some information as to what results have so far been obtained by experiments or by the actual use in various places of fertilisers, specially super-phosphates.

*Dr. Clouston.*—Mr. Anstead will be able to supply you with some useful figures as his Department has used more phosphatic manures than any other in India.

*President.*—In Bengal and Madras apparently there is a growing demand for super-phosphates.

*Dr. Clouston.*—Yes, but the demand in Bengal comes almost entirely from tea planters. In Madras and Mysore, too, a good deal of the super-phosphate used is on tea and coffee.

*President.*—We want information about the use of super-phosphates for the paddy crop.

*Dr. Clouston.*—Mr. Anstead will supply you with that information.

*President.*—This statement that you have give us is evidently based on evidence. Have you got a copy of the evidence? I mean this statement about an increase of 40 per cent. in the case of paddy must have been made, I take it, on some very reliable evidence.

*Dr. Clouston.*—The statement is based on the results obtained by experiment on Government farms.

*President.*—If there is 40 per cent. increase in the crop of paddy you know the price of paddy and you know what the super-phosphate is going to cost.

*Dr. Clouston.*—Yes, but the manure used in this case was bonemeal—a phosphatic manure which contains about 4 per cent. of nitrogen. The increase in yield of paddy is not entirely due to the phosphate in such a case.

*President.*—We can split it up into units and get the unit cost of the nitrogen and the unit cost of the phosphoric acid and in that way we may be able to say that so much of the increase per unit is due to phosphoric acid and so much for nitrogen.

*Dr. Clouston.*—There again it is difficult to tell exactly the extent to which the increase is due to phosphoric acid alone. A phosphatic manure when applied to the soil is not easily washed out and its residual value after the first year is much greater than that of the residual value of a nitrogenous fertiliser.

*President.*—Rock phosphate would do the same.

*Dr. Clouston.*—Yes. Rock phosphate applied to the soil would leave a residue after the first year.

*President.*—Is not bone more affected by micro-organisms than rock?

*Dr. Clouston.*—Bonemeal being coarser than super-phosphate made from rock is much less soluble. It is a better manure in so far as it encourages to a greater extent than rock phosphate bacterial life in the soil.

*President.*—But the action of the bacteria would be more rapid on the bone than on the rock?

*Dr. Clouston.*—From the chemical point of view the finer the manure the more readily it breaks up and disappears.

*President.*—This is as far as we can go with the materials at our disposal just now. We hope Mr. Anstead and Messrs. Shaw Wallace and Company will be able to give us more information.

*Dr. Clouston.*—I will send a telegram to all the Directors of Agriculture and get the information you require.

*President.*—If you kindly do that and get us this information we shall be obliged, and if we think it necessary to examine the other Directors on this information we shall do so.

**DIRECTOR OF AGRICULTURE, MADRAS.**

**Oral Evidence of Mr. R. D. ANSTEAD, C.I.E., Director of Agriculture,  
Madras, recorded at Calcutta on Tuesday, the 12th of March 1929.**

*Introductory.*

*President.*—Mr. Anstead, we are very much obliged to you for coming up all the way from Madras to assist us in this enquiry. You may wonder why we did not examine you when we were in Ootacamund. The reason was that at that time we had not any information in our possession which would have justified our taking evidence on these points. Now we have got a lot more evidence and we feel that your evidence may be very useful to us. It supplements to a very large extent the evidence which Dr. Hutchinson gave two or three days ago on the same points.

*Mr. Anstead.*—I imagine that Dr. Hutchinson's views and mine are very much the same.

*President.*—Yes, very much the same. You are Director of Agriculture, Madras, are you?

*Mr. Anstead.*—Yes.

*President.*—How long have you been in Madras?

*Mr. Anstead.*—I came to the Madras Presidency in 1909 originally. From Colonial Service I changed over to Indian Service and came out to a special appointment to look after the planters' interests under the Government of course. Then I became Director in 1922.

*President.*—Since then you have been carrying on as Director.

*Mr. Anstead.*—Yes.

*President.*—I gather from your note and from the evidence you gave before the Royal Agricultural Commission that you have devoted a considerable amount of attention to soil study.

*Mr. Anstead.*—Yes. I may tell you I am an agricultural chemist.

*President.*—And you have collected considerable amount of evidence also as to the action of fertilisers on the soil.

*Mr. Anstead.*—Yes, as far as possible.

*President.*—Have you got any more recent results than those you have given in your evidence?

*Mr. Anstead.*—No, I don't think so.

*President.*—You have not discovered any facts which will make you alter your views.

*Mr. Anstead.*—None whatever: probably the reverse I think.

*President.*—That is all right then.

*Fertilisers.*

*Mr. Anstead.*—I may say, while we are on this subject, that down in Madras—of course I can only speak for Madras—we are quite convinced and quite satisfied in our own minds that what we need is the combination of nitrogen and phosphate. We have applied them separately and we did not get the full results. It was only when we applied them together that we got satisfactory results. Having satisfied ourselves on that point we left that. That is finished. We are now working to find out in what proportion we should use the two—whether it should be in the proportion of 1 to 1, or 1 to 2. I think that it should be somewhere about 1 to 2, but we are not sure. That is the line we are now taking.

*President.*—I take it that it is your opinion that so far as the Madras soil is concerned—particularly for the paddy crop—it is very deficient in phosphate.



*Mr. Anstead.*—Yes. I think that it is the big deltas which have been cropped year after year which have run out of their phosphates. In addition to these the other classes of soil which are deficient in phosphate are the laterites. I imagine that what I have said applies to all-India. All the time you must remember that I can only speak for my own Presidency, but from what I know of the rest of India, that applies generally. Up in the Punjab they might need phosphates, but that is another matter.

*President.*—The paddy crop is one of the staple crops of the country.

*Mr. Anstead.*—It is not only the paddy crop but there are other crops too. It is the soils you must look at.

*Dr. Matthai.*—When you say that we must look at laterites, it includes the bulk of the Presidency?

*Mr. Anstead.*—Not by any means. Along the West Coast down to Travancore, we get laterites.

*Dr. Matthai.*—What about the Ceded Districts?

*Mr. Anstead.*—You get a certain amount there. It is chiefly in the West Coast that you get laterites. When you come to the eastern side you get cotton soil which also needs phosphates.

*President.*—You have used this expression in your evidence that phosphate is the limiting factor.

*Mr. Anstead.*—It is the controlling factor.

*President.*—What exactly do you mean by that? What other fertilisers do you use?

*Mr. Anstead.*—What I mean is this. If you put nitrogen by itself—it does not matter in what form you use it, either organic or mineral—you get a certain result and if you put phosphate by itself, you get a certain result, but neither result will be as good as when you combine the two. Let me put money value into it. If you put nitrogen by itself, you will roughly get about Rs. 10 or Rs. 15 extra profit. If instead of putting nitrogen you put super or bone meal phosphate, you will probably get a similar result of Rs. 10 or Rs. 15 extra profit. But if you combine the two, you will find that your profits run into anything between Rs. 20 and Rs. 50. You must combine the two and the combination will suit all crops.

*President.*—Reading your note, I understand that the best results are obtained from the use of superphosphate along with organic nitrogen. Is that correct?

*Mr. Anstead.*—Yes. You must have organic nitrogen.

*President.*—Organic nitrogen would of course be available in India to some extent.

*Mr. Anstead.*—Yes, to some extent.

*President.*—Anyhow more easily available than inorganic matter?

*Mr. Anstead.*—I don't think I would say that just at present.

*President.*—Inorganic nitrogen has to be bought.

*Mr. Anstead.*—True.

*President.*—Organic nitrogen need not be bought.

*Mr. Anstead.*—It may be found.

*President.*—You suggest green leaves as one of the forms of organic nitrogen.

*Mr. Anstead.*—Yes.

*President.*—Green leaves you can grow on the spot.

*Mr. Anstead.*—Yes, if you can.

*President.*—At present they are not grown because the soil is poor and the raiyat cannot afford to miss his ordinary crop.

*Mr. Anstead.*—Partly that. The difficulty of course is to get water at the right time. There are only limited areas in which you can grow green

manures. In the case of other areas where you cannot do so, you have to fall back on cattle manure and then supplement that with inorganic nitrogen. The point is that whatever you do, unless you put in phosphate, you will not get the best result that is possible.

*President.*—I agree. The position therefore is this that part of the organic nitrogen is available at times.

*Mr. Anstead.*—Yes.

*President.*—As regards phosphates, they are not available in that form, that is to say, you have got to use either bonemeal or bone phosphate or rock phosphate or any such compound. Is that correct?

*Mr. Anstead.*—Yes.

*President.*—I think that in one of the instances you furnished to the Royal Commission on Agriculture you stated that in the Guntur District where you used 3 cwts. of super your net profit was higher than in any other case. Is that correct?

*Mr. Anstead.*—Yes.

*President.*—There was no nitrogenous matter so far as that particular instance was concerned.

*Mr. Anstead.*—Those experiments were made to find out the effect of phosphate by itself.

*President.*—The results obtained by the use of phosphate by itself did not seem to be very unsatisfactory.

*Mr. Anstead.*—Oh, no.

*President.*—In fact, this result is better than the combination of the two so far as I can read the figures, but I may be wrong.

*Mr. Anstead.*—That is true on that particular soil. But then in the Guntur District you are dealing with a dry tract.

*President.*—In some of the soils at any rate in Madras, of which Guntur is one, superphosphates alone might lead to very satisfactory results without the nitrogenous matter whether organic or inorganic. Is that correct?

*Mr. Anstead.*—Yes. It only shows that you cannot lay down any hard and fast rule.

*President.*—It does show that there are some soils where superphosphate alone would give good results.

*Mr. Anstead.*—Yes.

*Dr. Matthai.*—Is that a deltaic area?

*Mr. Anstead.*—No, it is a dry soil. You will get a similar result in the Punjab.

*President.*—Can a similar result be obtained in the Punjab?

*Mr. Anstead.*—Yes, from what I know.

*President.*—And probably in Burma?

*Mr. Anstead.*—I daresay you would.

*President.*—Your statement comes to this—and Dr. Clouston also agrees with you—that speaking generally there is a deficiency of phosphates in all soils.

*Mr. Anstead.*—In a large majority of cases.

*President.*—In most of them, there is a deficiency of nitrogen.

*Mr. Anstead.*—Yes.

*President.*—But in some cases the phosphatic deficiency is so great that if a phosphatic manure is put, the soil would yield good results.

*Mr. Anstead.*—That is quite true.

*Mr. Mathias.*—We have been told that in tea gardens super is used by itself very often. Is that because organic nitrogenous matter is in the soil?

*Mr. Anstead.*—Yes. What happens in the tea gardens is that you have got very large quantities of organic matter very often because they grow

green dressings. In Southern India, you would hardly find any tea garden where they are not growing green dressings. In some cases they are dealing with soils rich in organic matter derived from a heavy jungle full of leaves and under those conditions they have got more nitrogen than they want and they find that phosphate is giving them profit. You must remember that when you grow tea, you don't want the crop to rush away into leaves. You want to get a steady flush. Tea is rather a special crop. Therefore in a great many tea gardens in Southern India they need phosphate more than nitrogen. So, they use super very largely but they use other things besides. They use a very large quantity of bone meal.

*President.*—How about the sugar cane crop?

*Mr. Anstead.*—Superphosphate can be used to a certain extent.

*Mr. Mathias.*—What about rubber?

*Mr. Anstead.*—I don't think anybody knows much about the rubber manuring.

*Dr. Hutchinson.*—May I say something about the sugarcane?

*President.*—Yes.

*Dr. Hutchinson.*—There has been some recent work at Pusa regarding the effect of artificial manures on the quality of the juice of cane. In it, it has been clearly shown that superphosphate is necessary in order to prevent an undue proportion of glucose as compared with sacchrose in the cane juice.

*President.*—Do you mean super by itself or in conjunction with other things?

*Dr. Hutchinson.*—If you manure your cane with nitrogen alone, you will get an undue proportion of glucose which does not appear as cane sugar in the final product: whereas if you use super, it has the opposite effect although it reduces the amount of crop. The idea is to increase the amount of sugar per acre by applying manure. If you apply super, you will get a higher proportion of cane sugar, whereas if you apply nitrogen you get a lower proportion of cane sugar.

*Mr. Anstead.*—That is true. But it does not mean that India is going to use super by itself.

*Mr. Mathias.*—Of the artificial phosphatic chemical manures, the only chemical manure that you use is superphosphate.

*Mr. Anstead.*—Yes.

*President.*—The point is this. As you yourself have stated we have got these organic nitrogenous manures available in the country. At present they are expensive, it is perfectly true. But when the fertility of the soil has been improved by the use of these fertilisers, when the raiyat is able to afford a better price for his nitrogenous organic fertilisers, it is quite possible that he may use some organic nitrogenous fertiliser and the superphosphate. He may find it to his advantage to do so wherever he can get the organic fertiliser at a price which he can then afford and not now.

*Mr. Anstead.*—I see your point.

*President.*—So that there is a possibility that simultaneously with the use of manure which is a combination of the nitrogenous matter and superphosphate, you may use these nitrogenous fertilisers as far as they are available and the superphosphate.

*Mr. Anstead.*—Yes, that is right.

*President.*—Before we proceed further I think there is one point which has been rather misunderstood by some of the witnesses to which I want to refer. It is this that here in this enquiry so far as fertilisers are concerned we are not considering any proposal for the protection of the Chemical Industry which would raise the price of the fertilisers. We are considering the contrary case: that is to say, is it worth while reducing the price of fertilisers?

*Mr. Anstead.*—Very much.

*President.*—You must get rid of the idea that there is any proposal before us now which would raise the price of fertilisers.

*Mr. Anstead.*—I should oppose any such proposal.

*President.*—We should turn that down ourselves. There is no question about that. The point we are investigating is the question of cheapening fertilisers as an aid both to agriculture and to the industry.

*Mr. Anstead.*—That is right.

*Cheapening of artificial fertilisers.*

*President.*—I shall explain to you a little more what the proposal is. Here we are dealing with certain classes of heavy chemicals—acids and salts in which sulphuric acid is largely used. We are not dealing with alkalis directly just now. Would you agree that the more cheaply sulphuric acid is produced the better it would be both from your point of view as well as from the industry's point of view because your fertilisers will be cheapened as well as the chemicals?

*Mr. Anstead.*—Yes, probably.

*President.*—One way in which we can cheapen sulphuric acid is by making it possible for the manufacturer to produce on a large scale. As you know, at present probably half the quantity of sulphuric acid produced in the world is used in the manufacture of superphosphates and therefore we are considering whether, if the use of superphosphates were encouraged in the country, it would absorb a certain quantity of sulphuric acid which in its turn would lead to a reduction in the cost of sulphuric acid, and the point we are now considering is how to bring that about. What we are considering is, supposing we recommended a bounty to be paid on the production of sulphuric acid which is used for producing superphosphates in the country; would the price of superphosphates be cheapened and the demand grow? That is the point.

*Mr. Anstead.*—I am personally rather doubtful whether the demand for superphosphate in the country will increase very much more than it is now. I am inclined to think that this combination of nitrogen and phosphate which we now get through sulphate of ammonia and superphosphate will disappear in competition with the new class of manures using the two things combined in one, viz., Lunophos, Ammophos and so on. I am also inclined to think that these will prove so successful that we shall give up using superphosphates.

*President.*—That will take time.

*Mr. Anstead.*—I don't think it will take a long time: I put it at five or six years.

*President.*—In the meanwhile you must get the ryot used to the application of superphosphate.

*Mr. Anstead.*—He is used to it now.

*President.*—On a very small scale. The total quantity at present used in the country does not exceed 10,000 tons and you can't say that it is a very large quantity.

*Mr. Anstead.*—I understand that 7,000 tons of superphosphates were sold in the Madras Presidency last year. I know the firms are very chary of telling you what they are selling but Messrs. Brunner Mond and Company told me that is what they put it at.

*Dr. Matthai.*—The kind of figure that we got was about 10,000 tons. Judging from the evidence given by the various directors before the Royal Commission on Agriculture we get the impression that phosphatic manure is used very largely in Madras—much more than anywhere else.

*Mr. Anstead.*—That is right. Ryots in Madras use more manure than anywhere else. But my point is this. It is a small quantity and I don't think it will ever grow bigger. If we use 10,000 tons now I doubt whether we shall ever use more.

*Dr. Matthai.*—Why?

*Mr. Anstead.*—Because I think these other manures will take its place.

*President.*—You can take the two together. I have no objection to your doing so. At present it is quite immaterial in what form you get the superphosphate, so long as the use of the combined fertiliser goes up in which superphosphate must be an important factor.

*Mr. Anstead.*—Superphosphate will disappear; we shall use a thing like ammophos. What I want to warn you against is the danger of your basing your sulphuric acid costs on the assumption that the sale of superphosphate is going to increase enormously in the future. I don't think it will. You must not reckon on that. If you are looking to an enormous sale of superphosphate to help the sulphuric acid industry I think you will make a mistake.

*Dr. Matthai.*—Whatever increase there is in the demand for a combined fertilizer like ammophos there would at the same time, as things develop, be a demand also for superphosphate by itself?

#### *Advantages of combined fertilizers.*

*Mr. Anstead.*—I think that will balance itself. Where we use superphosphate and teach the ryot to use superphosphate with green dressing, there its sale will increase, but at the same time there will be a decrease in its use by the use of these other things and my feeling is that these two things will balance that is to say, if during the next three or four years propaganda work of the Agricultural department increases the use of superphosphate by a few thousand tons, I think there will be more propaganda to teach them to use things like Ammophos which will reduce the sale of superphosphate by itself. The point is this. These fertilisers are quite new things. Nobody knows very much about them. Where they have been tried they have been found to be very successful. As we go on and there is more success with these manures we shall teach the ryot and ask them to use these instead of superphosphate. Here are the results obtained in Burma. These show the result of the use of Ammophos (hands in). There is one enormous advantage of using these combined fertilizers from the Agricultural Department point of view and that is this: we consider phosphate very important. When we go to a ryot he knows about nitrogen but he knows nothing about phosphate and he is not willing to buy phosphate. He only goes halfway. He says 'I will buy manure but I am not going to spend more money on phosphate', but if we make him buy the combined manure he has got to put in phosphate whether he likes it or not, and therefore we should always choose the combined manure.

*President.*—So far as the Board is concerned there is no objection whatsoever to combined fertilizer being manufactured in the country. Sulphuric acid will then go out; there is no question about that. We are not necessarily suggesting that it is only the sulphuric acid which matters in this: it is the fertilizer itself which matters because we are prepared to treat it as a chemical and therefore if we can devise any method by which combined or separate fertilizers could be produced in the country we should be prepared to do it.

*Mr. Anstead.*—All I want to do is to sound a note of warning that if you are thinking that the enormous increase in the use of superphosphate will help you to do what you propose to do, you will make a mistake. You will have to look for other uses of your sulphuric acid.

*Mr. Mathias.*—In the course of the next five years the use of superphosphate in the tea gardens in combination with green manure may be anything from 10,000 to 20,000 tons; if it was that, it would be worth producing it, would it not?

*Mr. Anstead.*—I don't think the tea gardens will take more than what they are taking now.

*Mr. Mathias.*—Take 10,000 tons. Even 10,000 tons is worth producing in the country, I mean 10,000 tons for the whole of India.

*Mr. Anstead.*—We reckon it as 7,000 tons of superphosphate in the Madras Presidency. How that is going to be divided between the ryot and the tea gardens I cannot tell you.

*Mr. Mathias.*—Even if it remained at 10,000 tons, from the point of view of cheapening sulphuric acid it would be worth while, would it not?

*Mr. Anstead.*—That may be, but I want to warn you that you cannot count on its going up to 20,000 or 40,000 tons.

*Dr. Matthai.*—Taking nitrogenous and phosphatic fertilizers, I suppose it would be necessary to apply nitrogenous fertilizer every year, that is to say you won't need to apply phosphatic fertilizer quite so frequently as nitrogenous fertilizer?

*Mr. Anstead.*—If you are going to put in big doses than you can leave it. But the ryot does not do that.

*Dr. Matthai.*—If there is a possibility that in the application of phosphatic fertilizer the quantity has got to vary from year to year, then isn't there some advantage in the application of nitrogen and phosphatic manure separately because according to the condition of the soil you can vary it from time to time?

*Mr. Anstead.*—That is true, but I don't think you will get it done. The ryot is not going to be persuaded to putting in a heavy dose of phosphate this year and wait for two years. He would much rather put a small dose every year than put a big dose and wait for two years, because first of all he has not got the money; he has to live from hand to mouth, and secondly after the two years he may not be there.

*President.*—There is nothing to prevent the ryot from buying the combined fertilizer, nitrogen and superphosphate mixed by somebody who manufactures both. It doesn't matter also whether it is Ammophos or any other article provided it is possible to combine the nitrogenous fertilizer and superphosphate. That is all we want. We are not wedded to any particular form of manufacture; there is nothing to prevent a man from making a sort of prescription for making combined fertilizer. There is no physical impossibility about that provided you are giving the whole thing together. You are not concerned with whether it is manufactured in one way or another so long as you get the proper units of both.

*Mr. Anstead.*—That is not altogether true. The point is this: At the present moment you are getting your combination with sulphate of ammonia and superphosphate; now, I propose to give that up. Instead of using these two I propose to use ammonium phosphate.

*President.*—We will put it this way: superphosphate, we will say, contains 30 units of soluble phosphate and sulphate of ammonia contains 21 units.

*Mr. Anstead.*—The point is this that I shall get these units very much cheaper from Ammophos, and therefore we should use it.

*President.*—It has not yet been decided whether it is more economical or not. We don't know yet what our proposals are going to be. Here you have got these 30 and 21 units: you have got to decide how much of the two you want and so long as you get from the combination of these two the same number of units as you get from your combined patent fertilizer, what objection have you?

*Mr. Anstead.*—It is not quite as simple as that.

*President.*—The soil study has not taken you sufficiently far to know how long the soil is going to retain nitrogen and how long it is going to retain superphosphate?

*Mr. Anstead.*—It has.

*President.*—What I want to know is, have you come across any recorded instance which would show, after you have used both fertilizers, nitrogenous as well as phosphatic, how long the nitrogen remains in the soil and how long the phosphate?

*Mr. Anstead.*—Yes.

*President.*—Will you please give me these figures?

*Mr. Hutchinson.*—You get better results by using Ammophos?

*President.*—I admit it: as a general proposition we will admit it at once, but, as you know, general propositions have to be considerably modified when applied to practice, and I want to know what is the information you have got as regards Indian soils on these points to show exactly what is happening in your experiments where you have actually used the two?

*Mr. Anstead.*—We will look them up.

*President.*—Have you got any price for these combined fertilizers you have been buying?

*Mr. Anstead.*—Yes.

*President.*—We really want to know how much cheaper it is.

*Mr. Hutchinson.*—Ammophos is Rs. 220 a ton. May I make another point? When you want to combine these two things, remember this that you are putting together ammonium sulphate and superphosphate against my ammonium phosphate and you are making him use a considerably bulky article and therefore mine is very much cheaper than this because of the freight.

*President.*—We just want to see how it compared. We can only do it in terms of units.

*Mr. Anstead.*—I don't think you will get very far in terms of units.

*President.*—That is the only way in which we can compare the two. There is no other way of doing it. Could you suggest any other way?

*Mr. Anstead.*—Are you not assuming that if you offer me a combination of nitrogen and superphosphate at a certain price, say, as cheaply as I could buy ammophos, I should take it in preference to ammophos?

*President.*—Not at all. I am trying to study what the position is.

*Mr. Anstead.*—Is it not your suggestion that I should take it if it would be cheaper?

*President.*—The whole point is this: it may be cheaper than the price at which sulphate of ammonia and the superphosphates are being sold in the country just now.

*Mr. Anstead.*—Yes.

*President.*—Supposing you get superphosphate and the sulphate of ammonia produced in the country at the same price as in England, then would the ammophos be still cheaper?

*Mr. Anstead.*—Supposing it was not so, you are assuming—are you not—that if it was not, if your combination were cheaper, I should use it in preference to ammophos?

*President.*—I am not.

*Mr. Anstead.*—It makes a lot of difference to you whether we use it or not.

*Dr. Matthai.*—Your point is that it is not merely a question of cost, but it is a question of action on the soil. On the point of cost there is first the question of bulk and secondly there is the question of cheaper manufacture, because there is no sulphuric acid in it.

*Mr. Anstead.*—That is how the position stands.

*Mr. Mathias.*—On the other hand there would always be some superphosphate used in the country.

*Mr. Anstead.*—Yes, and my opinion is that the demand will remain the same as at present and that it will always be there.

*President.*—The question of cost is of very great importance. I want to make a comparison firstly as regards the cost in terms of units and of course you may say that the properties are different. That we are prepared to consider separately. Have you made any comparison as to the costs?

*Mr. Anstead.*—Yes. We can make a comparison in regard to costs very easily.

*President.*—We are talking at cross purposes. If you take the price of sulphate of ammonia and the phosphate to-day, that would not give the kind of comparison that I wish to make. The comparison that I shall make is this: supposing superphosphate and sulphate of ammonia were sold in the country at the same price as in Europe, how would the cost compare with the combined imported fertiliser.

*Mr. Anstead.*—That is a point we have to consider. I quite agree.

*President.*—Supposing superphosphate were produced in this country and marketed at about the same price as in Holland, would ammophos be still cheaper? That is the point to be investigated.

*Mr. Anstead.*—That we will have to look at.

*President.*—I wish to know whether you have investigated that point of view.

*Mr. Anstead.*—It is impossible for me to do that. I can only deal with present prices. I don't know at what price you can make superphosphate.

*President.*—We will put it this way: your opinion is that if the price of imported superphosphate and the price of imported sulphate of ammonia are taken into account, then ammophos is cheaper. Is that your contention?

*Mr. Anstead.*—Yes.

*President.*—You are not prepared to say that ammophos would be cheaper even if superphosphates and sulphate of ammonia could be produced at the same price in this country as in Europe.

*Mr. Anstead.*—No. If you could produce in this country sulphate of ammonia and superphosphate at the same price as they are now produced in England, then undoubtedly ammophos would be dearer, but I don't know how far the people who make ammophos would immediately drop their price.

*President.*—There are ways in which Government can protect the country. That will have a world price. If it is found that the price in India is deliberately lowered in order to kill an infant industry, the Government will see that it is not done. If they drop the price only for India, the inference is obvious that they don't want the indigenous industry to prosper.

*Mr. Anstead.*—I may tell you another point. If you are thinking of making superphosphate in this country, I am sure you don't propose to import rock phosphate and make it out here. You can make it out of bones.

*Dr. Matthai.*—If your view is that there is no room at all for superphosphates in the country then what is the point of stopping the export of bones?

*Mr. Anstead.*—Possibly none. All I want to warn you about is that I don't think there will be an increase in the use of superphosphates if you reduce the price. Not necessarily. That is the only point I want to make. What I want to avoid most of all is that this Board should at any time say "we understood from the Agricultural Department that if we made superphosphates very cheap, the amount used would be 4 times as great as now".

*Dr. Matthai.*—What would be your opinion on a proposition like this: you would admit that in the Madras Presidency and probably in the other Presidencies whatever happened with regard to combined fertilisers, there would be a demand for superphosphates to the extent of 10,000 tons.

*Mr. Anstead.*—Undoubtedly.

*Dr. Matthai.*—Supposing we made the suggestion that 10,000 tons of superphosphate should be made in this country at a fairly reasonable price, that would be a sound proposition.

*Mr. Anstead.*—Undoubtedly, we should be delighted.

*Mr. Mathias.*—We understood from Dr. Clouston the other day that Madras has certain advantages from the point of view of the Agricultural



Department in having their fertilisers manufactured on the spot, since the Department is able to keep in close touch with the manufacturers and to arrange suitable times for delivery.

*Mr. Anstead.*—The only point I want to make is that you must not expect its use to go up suddenly by leaps and bounds, because it is made cheaper. We will still use 10,000 tons, but not 20,000 tons.

*President.*—Do you mean to say that the price factor will not come in at all?

*Mr. Anstead.*—Not to the extent you seem to think.

*President.*—Have you considered that?

*Mr. Anstead.*—Certainly.

*President.*—Have you made any allowance for the reduction in the price of superphosphate?

*Mr. Anstead.*—Yes. The present price has been taken into account. Supposing you could sell it at Rs. 60 a ton, I still do not think that we should double our consumption. I may be wrong, but it is my opinion. What I should like you to do very much is to sell me superphosphate at Rs. 45 a ton which is about the price in England.

*President.*—Rs. 45 at the works?

*Mr. Anstead.*—Yes.

*President.*—Supposing it was Rs. 45 at the works, then you consider that there would be an increase.

*Mr. Anstead.*—Even if you did that, there would not be a very great increase.

*Mr. Mathias.*—What it comes to is this: the Agricultural Department in Madras view with favour any proposal to grant a bounty on fertilisers using sulphuric acid which would result in a decrease in the price of superphosphate.

*Mr. Anstead.*—Of course we should.

*President.*—I understand you rather advocate the use of bone meal by itself or bone superphosphate.

*Mr. Anstead.*—I think you will find that if you use bone meal with green leaves and superphosphate with green leaf, you get the same result.

#### *Bone superphosphate.*

*President.*—Do you advocate the use of bone superphosphate?

*Mr. Anstead.*—Yes. If you make superphosphate out of bones, you will get a very much better and purer superphosphate than out of rock phosphate.

*President.*—I think you are in favour of stopping the exports of bones.

*Mr. Anstead.*—Yes.

*President.*—If the export of bones was stopped, we must find some use for it.

*Mr. Anstead.*—True.

*President.*—Do you think that supposing the export of bones were stopped entirely, superphosphate made out of bones would find a market in the country?

*Mr. Anstead.*—It would. My point is this: we use 10,000 tons of superphosphate. At the present moment we get it from England. Why should we do that; why not make it out of bones here and use 10,000 tons.

*President.*—100,000 tons of bones are being exported. If you want to stop the export, you must find a market for the 90,000 tons.

*Mr. Anstead.*—I don't care a bit what happens to the rest.

*President.*—You must take into account the economic point of view.

*Mr. Anstead.*—My point is this: here you have bones lying at your door; you allow them to be exported and force them up to such a price that I cannot use. Now I want them at such a price that I can use them. What I want is to have these bones at a reasonable price. Whether Ceylon or some other country goes short, it doesn't matter to me. Whether some firm dealing in exports declares a dividend which is 5 per cent. or 10 per cent. less, leaves me cold.

*President.*—Let me tell you this: when you say, you want only 10,000 tons and 90,000 tons should be kept in the country, people would not agree. If you are able to say that 100,000 tons would be used in the country, it is a different proposition. You are not prepared to say that.

*Mr. Anstead.*—No.

*Mr. Mathias.*—If you stop the export, the price will drop. I imagine that that is your object.

*Mr. Anstead.*—Yes.

*Mr. Mathias.*—In that case possibly the price might drop so far that they might not be collected.

*Mr. Anstead.*—I don't think that would ever happen for this reason that there is an enormous difference between the price of bones collected and the price at which they are sold. You can collect bones for something round about Rs. 40 a ton and you sell the bone meal at Rs. 120 a ton. It is not the people, who collect the bones, who get the money.

*Mr. Mathias.*—Bones which were easily available would still be collected at a low price. The quantity would be reduced, but it would still be sufficient for our purpose.

*Mr. Anstead.*—Yes.

*Dr. Matthai.*—I take it that this big increase in the export of bones from India started from somewhere about 1912.

*Mr. Anstead.*—Yes.

*Dr. Matthai.*—In 1910 the export price of bones was Rs. 65 a ton. I take it that, if the exports were stopped, you would get bone meal now at Rs. 65 a ton.

*Mr. Anstead.*—Very likely.

*Dr. Matthai.*—At Rs. 65 a ton on the experiments that you have made, the ryot will get an increased profit of Rs. 14-3-0. At Rs. 120 a ton he will get an increased profit of Rs. 11-7-0, that is to say the difference that would make to the ryot would be only Rs. 2-12-0 an acre. Is that likely to make any material difference to the ryot? What is the average size of holding in the Tanjore area?

*Mr. Anstead.*—Say 3 acres.

*Dr. Matthai.*—That makes about Rs. 7 extra.

*Mr. Anstead.*—You should not look at it that way. Instead of asking me what is the average size of holding, ask me how many acres of paddy there are in the Tanjore area? There are 11 million acres of paddy in the Madras Presidency. An extra Rs. 3 on 11 millions would come to Rs. 33 millions, is it not worth while?

*Mr. Mathias.*—How much bone meal per acre would be used?

*Mr. Anstead.*—At the present moment we use one cwt.

*Mr. Mathias.*—For 1 cwt. there would be a difference of Rs. 3.

*Mr. Anstead.*—Yes.

*President.*—At what price do you take the bones?

*Mr. Anstead.*—Rs. 65 to Rs. 120.

*Mr. Mathias.*—Would it not result in a loss to the country if bones are sold at Rs. 65 per ton instead of being exported at Rs. 120.

*Mr. Anstead.*—Who gets it? The ryot doesn't get it.

*Mr. Mathias.*—It goes to other classes of persons in the country.

*Mr. Anstead.*—It goes to big firms who have nothing whatever to do with the farmer. Some big firms—X, Y, Z—may drop 5 per cent. on their dividends. It leaves me cold as a farmer. I am here to represent the raiyat. I admit the difficulties, but that is my point. I don't say for a moment that it can be done. What I do say is and I have said this for many years, that nobody takes the trouble to really look at it and see what can be done. I am hoping that the Board at least will look at it. People say "We do not think that it is really worth looking at it and it cannot be done", and there is an end of it. Has anybody taken the trouble to see it so far? If somebody will go into it properly and say that it cannot be done, I shall be content, but I am not content until somebody has gone into it.

*Dr. Matthai.*—The Royal Commission on Agriculture have turned it down.

*Mr. Anstead.*—Have they gone into it?

*Dr. Matthai.*—I presume they have gone into it.

*Mr. Anstead.*—I think they have not.

*President.*—First of all, before we make any proposals, we must be satisfied that there is a demand for it and that the Agricultural Department would make use of the material, but if you say that you do not care whether 90,000 tons is thrown away or not, we are quite helpless.

*Mr. Anstead.*—Are you?

*President.*—Absolutely.

*Mr. Anstead.*—In that case, I must give it up.

*President.*—Because we must look at it from the economic point of view?

*Mr. Anstead.*—Where does economics come in? What is the use of bolstering up one or two firms who are interested in the export of bones to other countries? They do nothing for the farmers.

*President.*—The money will go to the *chamar*.

*Mr. Anstead.*—To whom? That is the point. It does not go to the raiyat in the country.

*President.*—The raiyat does not produce bones?

*Mr. Anstead.*—Does he not?

*President.*—Does he? If he does, why doesn't he stick to them?

*Mr. Anstead.*—That is rather getting away from the point. The bones come out of the land.

*President.*—If it is your view that there is only room in the country for 10,000 tons of superphosphates—in whichever form it may be used—then we should find it very difficult to say that for this amount, 90,000 tons of bones should be kept in the country.

*Mr. Anstead.*—I admit the difficulty. I only want you to look at it no matter how difficult it is.

*President.*—I am trying to point out the great difficulty in the way.

*Mr. Anstead.*—I realise the difficulty.

*President.*—Would you advocate the use of bone meal by itself or would you convert it into bone superphosphate?

*Mr. Anstead.*—I would do both. There is a certain amount used by itself and the rest I would convert into bone superphosphate. I would want about 10,000 tons. How much we should take over and above that, it is impossible to say at the moment. It is all a question of price.

*President.*—This price of Rs. 120 a ton appears to be higher than what we have got.

*Mr. Anstead.*—That is the export price in the Madras Presidency at the moment.

*President.*—Here we find in the Chemical Trade Journal that the price at Liverpool of Indian bone meal is given as £8-12-0. A Bombay firm gave us a price of Rs. 75.

*Mr. Anstead.*—The price I have given you is the export price in Madras.

*Mr. Mathias.*—Do these bones belong to the cultivator?

*Mr. Anstead.*—I do not know to whom they belong.

*Mr. Mathias.*—Do they belong to *chamars*?

*Mr. Anstead.*—They collect these bones.

*Mr. Mathias.*—Does not the cultivator get something out of it?

*Mr. Anstead.*—No. The cultivator does not collect these bones.

*Mr. Mathias.*—Even if he cannot collect, cannot he sell them?

*Mr. Anstead.*—The raiyat sells away his cattle before they die, and he himself won't touch the bone.

*Mr. Mathias.*—He won't touch the bones.

*Mr. Anstead.*—No, but he will get it touched.

*President.*—As regards the price, that is the present price of Messrs. Parry and Company, f.o.r. Madras.

*Mr. Anstead.*—Before I left Madras, I had that checked.

*President.*—Is that for bone meal?

*Mr. Anstead.*—Yes.

*President.*—It is delivered at £8-12-0 at Liverpool.

*Mr. Anstead.*—A lot of this stuff goes to Ceylon and not to Liverpool.

*President.*—The price will be about £7 f.o.b.

*Mr. Mathias.*—On page 2 of your letter, you give certain figures showing increased grain yields from the use of superphosphate. I want to know whether the figures given there are correct or not. For 100 lbs. of super, you get 130 but for 200 lbs. of super, you get only 123 which is less.

*Mr. Anstead.*—I know.

*Mr. Mathias.*—Is that correct?

*Mr. Anstead.*—Yes, though I cannot explain it.

*Dr. Matthai.*—On these figures, it would be best to apply 100 lbs. of super.

*Mr. Anstead.*—Yes.

*Dr. Matthai.*—Where you apply ammonium sulphate and super, in what proportion are they used?

*Mr. Anstead.*—The ryot usually applies 12 cart loads (6 tons) of village-cattle manure per acre. We advise him to halve this dose, so as to distribute it over double the acreage and supplement it with artificials. Our mixture is, 6 cart loads of cattle manure, 80 lbs. sulphate of ammonia and 1 cwt. superphosphate per acre.

#### *Ammophos.*

*President.*—How long have you been using the compound fertiliser?

*Mr. Anstead.*—Do you mean the ammophos?

*President.*—Yes.

*Mr. Anstead.*—Not used it at all. In Burma they have been using it for three years. We have only got it just now.

*Dr. Matthai.*—Have you done any experiments on it in Coimbatore?

*Mr. Anstead.*—We are just starting on very big scale to find out its possibilities. It is a brand new thing.

*President.*—Your opinion is rather based on what you expect from its use.

*Mr. Anstead.*—My opinion is based on two things. Theoretically speaking, as a chemist, I say, it should be the right thing. It is what we have

been looking for for many years, and to back that up, where experiments have been made in Burma, they have got satisfactory results. Messrs. Shaw Wallace and Company are selling a lot of the stuff in my Presidency and demonstrate its use.

*President.*—The actual results of this are in Burma. So far as your part is concerned, it is in the experimental stage. In fact you have not even started making experiments.

*Mr. Anstead.*—There is no reason to suppose that the results in Madras will be any different.

*President.*—Will you give me the price?

*Mr. Anstead.*—Rs. 220 a ton.

*President.*—I do not know its chemical contents.

*Mr. Anstead.*—It contains 13 per cent. of ammonia, 16 per cent. of nitrogen, 20 per cent. of phosphoric acid. It contains about 18 to 20 per cent. of superphosphate.

*President.*—Can't you get me this information? We want the analyses and separate figures for superphosphates and ammophos. We want the price in each case so that we may work out per unit. The price factor weighs somewhat with us.

*Mr. Anstead.*—Mr. Hughes says that it is Rs. 220 a ton f.o.r. Madras.

*President.*—That is to say, you have got to incur the landing charge.

*Mr. Hughes.*—It is roughly Rs. 7 from the ship to rail.

*President.*—What is the price of superphosphate?

*Mr. Hughes.*—Rs. 80 per ton f.o.r. Madras.

*President.*—In this case also, the landing charges will come to about Rs. 7 I think.

*Mr. Hughes.*—Yes.

*Mr. Anstead.*—It contains about 18 to 20 per cent.  $P_2O_5$ .

*President.*—Does it contain as much as that?

*Mr. Anstead.*—Yes, it is high grade. It is guaranteed at that.

*President.*—If it is less than 18 per cent, you make some allowance.

*Mr. Anstead.*—At never is.

*President.*—What about sulphate of ammonia?

*Mr. Hughes.*—Rs. 156 per ton f.o.r. Madras less Rs. 7 for landing, etc.

*President.*—Does it contain 20.6 per cent. nitrogen?

*Mr. Anstead.*—Yes.

*President.*—I shall have to do the arithmetic later on.

*Mr. Anstead.*—There is one other point about this and I want to lay all the facts before you. You must remember one thing about superphosphate and that is, it is an expensive stuff to handle because it is acid and destroys the bag. I find that there is a charge for repacking. If it is stored for any period of time, the bag is eaten up and so it has to be repacked. That does not apply to some of these other things.

*Mr. Mathias.*—That would be an argument in favour of manufacturing phosphates in this country.

*Mr. Anstead.*—That is a strong point.

*Dr. Matthai.*—If you are making it at Ranipet and sending it on to Trichy, you would not have to repack it.

*Mr. Anstead.*—No.

*Dr. Matthai.*—On your figures, the cost of repacking is Rs. 6.

*Mr. Anstead.*—It is a high figure, but that is the figure which a firm gave me.

*President.*—Apart from chemical action, it is certainly not cheaper in terms of units. What I mean is, on these figures, apart from the chemical

advantages it may have, taking the price factor alone into account, it is not cheaper.

*Mr. Hutchinson.*—It is cheaper on the field, but it is not cheaper in Madras.

*President.*—The advantage must be decisive before we turn down a thing which is used all over the world. 50 per cent. of the sulphuric acid is used to-day in the manufacture of superphosphate all over the world and before the whole of the world takes to Ammophos or other patent fertilizers the advantages must prove to be decisive.

*Mr. Anstead.*—That is true.

#### *Manufacture of superphosphate.*

*President.*—I want to go into the figures. I am glad, Mr. Hughes, you are here, because you will be able to assist us. I find that between the port and the warehouse there are many charges. Mr. Anstead has given us some figures. Take the Algerian rock phosphate, for instance, 65.68 per cent.: the price given in the trade journals is 3½*d.* a unit. That I take it is the unit of the phosphate contained in it, is it not?

*Mr. Hughes.*—If you take it at *d.* per unit it will be 16 shillings f.o.b. That is more likely.

*Mr. Anstead.*—There is just a point. When you take a thing like rock phosphate you must remember that you have got to be quite sure what you buy, and see that it has got a low content of calcium carbonate. That is why we cannot handle our own deposits in this country.

*President.*—But we expect the manufacturer to get the right sort.

*Mr. Anstead.*—I am not quite sure about that.

*Dr. Matthai.*—Messrs. Parry and Company gave us a figure of £2-0-4 per ton ex-Morocco for rock phosphate. That would make it Rs. 27 a ton f.o.b.

*President.*—If it was Rs. 27 a ton f.o.b. superphosphate could not be sold here!

*Dr. Hutchinson.*—Have you got any figures to show what is the economic unit of manufacturing superphosphate in India, that is to say the smallest amount that you can manufacture economically?

*President.*—It is always a very difficult proposition to find out what is an economic unit. It must have reference to local conditions.

*Dr. Matthai.*—Really it would mean that it must have reference to the price at which you want it to be sold here. If you can get the imported stuff at, say, Rs. 80 per ton, the scale at which you can produce here at a price which would enable you to get Rs. 80 per ton, that would be the economic unit.

*President.*—With reference to any country that unit is economic, which enables you to produce an article at or below a price at which you are able to import it.

*Dr. Hutchinson.*—You can't say what that economic unit is. You can say that for India with reference to nitrogen.

*President.*—What is the unit suggested?

*Dr. Hutchinson.*—100,000 tons of nitrogen to compete with the import price.

*President.*—100,000 tons of nitrogen, that is to say 2 million tons of sulphate of ammonia. The whole question is a very difficult one. Nobody, so far as I know, has investigated what would be an economic unit in this country having regard to the cost of coal, for instance. The comparisons that are made are very unreal. Take the cost of hydro-electricity for instance and compare it with the cost of coal; that is not a real comparison. No one has shown that hydro-electricity is cheaper than electricity produced from coal at 4 shillings a ton.

*Mr. Anstead.*—There is another point. If superphosphate is going to be manufactured in this country, do you visualise a central factory making super for the whole of India or a number of factories?

*President.*—It may probably be one factory for the whole of India to start with.

*Mr. Anstead.*—In that case it depends greatly on where it is situated. Supposing that factory was in Calcutta, for us the railway freight to Madras would increase the price of superphosphate enormously.

*President.*—That is true but if it was produced on a large scale in Calcutta the freight would be very much reduced.

*Mr. Anstead.*—It would have to be.

*President.*—That is the idea, otherwise there is no point in it.

*Dr. Matthai.*—At the present rates the freight from Calcutta to Madras is somewhere about Rs. 12 a ton. At present you get superphosphate in Madras at Rs. 80 per ton. Obviously if a factory were to be situated in Calcutta you must be able to make the stuff at Rs. 80 minus the freight.

*Mr. Anstead.*—That is the point.

*President.*—Mr. Hughes, will you please tell me about these charges?

*Mr. Hughes.*—These are out of date: these operated before we came into the superphosphate market. The present rates are as follows:—

	Rs.	A.	P.
Landing charges from ship to rail . . . . .	7	0	0
Distributor's commission, 3 annas per bag of 1 cwt., or per ton . . . . .	3	12	0
Cartage and handling at destination, 2 annas 6 pies per bag on an average or per ton . . . . .	3	2	0

*President.*—How many bags to a ton?

*Mr. Hughes.*—20 bags to a ton. The allowance for rebagging . . . . . 7 8 0

*President.*—Share of depot rent.

*Mr. Hughes.*—There is no depot rent.

*President.*—Who pays it?

*Mr. Hughes.*—The distributor pays it out of his commission.

*President.*—As regards this cost of rebagging, if the stuff were manufactured here, that would not arise?

*Mr. Hughes.*—It would still arise.

*President.*—But not to the same extent.

*Mr. Hughes.*—It takes five weeks to come out from Rotterdam to Madras; the life of a bag is three weeks after that, so that two months is the life of a bag.

*President.*—Five weeks go out, three weeks remain, that is to say 1/3 of this charge must go out, if the stuff is to be manufactured here.

*Mr. Hughes.*—Stocks will have to be kept in places where they will be accessible to the ryot.

*President.*—That arises in every case. I can understand the other charges remaining the same but not these five weeks. Five weeks is extra compared from the factory to the depot.

*Mr. Hughes.*—If a factory is executing specific orders, it is quite all right. If we are putting them into depots and sell them to individual ryots . . . . .

*President.*—It will incur the same charges from Madras to depôt. There I quite agree that three weeks would be quite all right, but five weeks must go out, is it not so?

*Mr. Hughes.*—They still lose on bags.

*President.*—But rebagging would not be required if you had a factory in the country.

*Mr. Anstead.*—The point is where your charges are Rs. 7-8-0, would it not be safe to assume that we can reduce it to Rs. 3?

*President.*—The whole point is rebagging would not be required.

*Mr. Hughes.*—If you put it into stock, it would require a certain amount of rebagging.

*Dr. Matthai.*—It takes about five weeks for the thing to come out. That five weeks is about the time that would be required for distribution in this country.

*Mr. Hughes.*—It is for distribution and not for consumption.

*Mr. Anstead.*—I think you can reduce that rebagging cost from Rs. 7-8-0 to Rs. 4 or Rs. 5.

*President.*—The bags go from here and come back.

*Mr. Hughes.*—Yes.

*President.*—Your bagging and rebagging charges would be considerable. It is a big item.

*Mr. Anstead.*—What is the price of bags in England and in India? That is a point which has got to be taken into account.

*President.*—What happens, I take it, is this: that one third of the bags is practically damaged. That charge will not be incurred if the article is manufactured in the country. Why should there be rebagging?

*Mr. Hughes.*—If your manufacturers were doing development work, they would probably incur losses.

*President.*—We are now going beyond that stage. I want to see by how much the cost could be reduced if the stuff were manufactured locally. That is the point of my question. I put it to you that the question of rebagging would not arise. You know for exporting sulphate of ammonia, they had to do the double bagging.

*Mr. Hughes.*—Single bagging is enough.

*President.*—Double bagging has been given up by the Steel Company, because they don't have to export and they can sell the stuff in the country and therefore the cost of bagging is reduced.

*Mr. Hughes.*—Sulphate of ammonia is imported in single bag.

*President.*—The stuff has not got to cross the seas and therefore there is a tremendous amount of saving in bagging and rebagging and wastage.

*Dr. Hutchinson.*—The difficulty would become less. They would be able to place the order and get the stuff straight from the factory to the depôt which would be much cheaper.

*President.*—What is the c.i.f. price of superphosphate?

*Mr. Hughes.*—Rs. 56 to Rs. 58. Mr. Anstead has got Rs. 62.

*Mr. Anstead.*—These are 1926 figures.

*President.*—Probably there has been some reduction in freights. There is always a difference between the freights from Holland and from Great Britain.

*Mr. Hughes.*—Yes.

*President.*—We have found that there is that difference between British and Continental freights.

*Mr. Hughes.*—The whole thing comes from Holland and there is no super in Great Britain. Including the charges we are selling it only at Rs. 80. To whatever depôt we may sell, it is Rs. 80 plus the railway freight.

*President.*—What it comes to is this: supposing the factory is situated in Calcutta, this stuff must be delivered at Coimbatore at a price of Rs. 70 plus the railway freight to Coimbatore from Madras.



*Mr. Anstead.*—That is what it is going to come to if it is going to help us.

*Mr. Hughes.*—The c.i.f. price, Madras includes the manufacturer's profit.

*President.*—There is no profit here.

*Mr. Hughes.*—But it includes the profit of the manufacturer abroad.

*President.*—That is the way in which these big organisations work. There is a middleman which we don't contemplate. We have found that in every case the big Corporations always have a middleman. They have a selling company which also makes its own profit. In a country like this there is not yet room for that.

*Mr. Hughes.*—They must have salesmen.

*President.*—We must make allowance, but we have found that by coupling these big sales organisations of the Company, the costs generally go up as far as India is concerned.

*Dr. Matthai.*—If you have an ideal system under which the ryots would purchase through a Co-operative Society straight from the Indian factory.

*Mr. Anstead.*—That won't come for a hundred years.

*Mr. Hughes.*—Would it not demand profit.

*President.*—By the employment of this middleman Company, you don't get rid of the commission agent. What we do is we simply allow the manufacturer his charges up to f.o.r. works; then we add the charges of the commission agent. We don't have another middleman between the commission agent and the manufacturer as the Nitrams is. Why should Nitrams come in at all from our point of view? Where a big organisation has got to carry on sales in different parts of the world, it would be right, but from our point of view, we think it is an unnecessary charge on the industry. If you have got rid of the other middleman and if you have only the commission agent, well and good, but when you have the commission agent as well as the middlemen whose profits are considerable, we think it is an unnecessary charge.

*Mr. Hughes.*—It is all right if they take shelter behind the work we are doing. If they had started initially, they would be in a hopeless position. They would want a good deal of money.

*President.*—I am not grudging you your profits. I am trying to explain to you how we regard it. Supposing we started a factory here, we wouldn't see the point of Nitrams at all.

*Mr. Hughes.*—Nitrams wouldn't come in this.

*President.*—I am talking of the selling Company.

*Mr. Hughes.*—I maintain that the manufacturer would either sell to big firms or he would have his own selling staff.

*President.*—When you have a selling company working under a parent Company?

*Mr. Hughes.*—Do you visualise that if superphosphate is manufactured by a Company in this country it would sell direct to the ryot?

*President.*—No.

*Mr. Hughes.*—How are they going to sell it?

*President.*—They would sell to the Co-operative Society or to the commission agent just the same as they are doing now. Only there won't be another Company in between.

*Mr. Hughes.*—Will there not be another Company?

*President.*—Why should there be? You have got a producing Company; you have got a selling Company and you have got the commission agent. We say that we want to cut out the selling Company.

*Mr. Hughes.*—That is what you visualise doing.

*President.*—Yes.

*Mr. Hughes.*—Can that be done easily?

*President.*—Why not?

*Mr. Hughes.*—The stuff doesn't sell itself.

*President.*—I am not suggesting that. You are not selling it yourself. Even to-day you are employing agents.

*Mr. Hughes.*—We are doing much more than that. We have got men who are doing demonstration work.

*President.*—It is very good you are doing that and I hope you will continue doing it.

*Mr. Anstead,* I would like to summarise the discussion we have had this morning. Supposing we accept your figure of 10,000 tons and we proposed that superphosphates to the extent of 10,000 tons should be manufactured in the country and put into the market at a price at which superphosphates can be imported or at a price below that by means of a bounty or by any means, do you think that it would be a good thing to do,

*Mr. Anstead.*—Undoubtedly it would be. The only thing I want is cheaper fertilisers.

*President.*—What about the Trichinopoly rock phosphates? Can you make use of it?

*Mr. Anstead.*—We can do nothing with Trichinopoly rock phosphate . . .

*President.*—Until some other method is introduced,

*Mr. Anstead.*—Unless you introduce an electrical method.

*President.*—That I don't know.

*Mr. Anstead.*—There is a chance of doing it. But the quantity is limited.

*President.*—It is also scattered to some extent.

*Mr. Anstead.*—Yes.

*Dr. Matthai.*—Is any private Company experimenting on that?

*Mr. Anstead.*—Nobody is doing it. The only point I want to make is this: it does seem to me that if some method were invented, we should not allow it to go out of the country. I should like to keep it, but of course it cannot be used with sulphuric acid, because of the large quantity of calcium carbonate which it contained. You would waste acid and make a low grade superphosphate and there is the enormous expenditure. It is out of the question chemically. If you can use an electrical method, then it is possible. But when it is utilised I want to keep it in the Presidency and not allow it to be exported.

*President.*—Is there any cheap electric power in the neighbourhood?

*Mr. Anstead.*—There is the possibility of the Periyar Hydro-electric scheme.

*Dr. Matthai.*—You are an extreme swarajist economically.

*Mr. Anstead.*—Absolutely.

#### *Bone superphosphate.*

*President.*—Supposing this bone superphosphate was manufactured, and supposing we recommended that the manufacture of superphosphates ought to be undertaken in the country, provided the price to the ryot doesn't go up beyond the price at which it may be imported, would you allow a higher price for it than for the superphosphate?

*Mr. Anstead.*—No.

*Dr. Matthai.*—Because it contains a certain amount of nitrogen.

*Mr. Anstead.*—Yes, very little.

*Mr. Mathias.*—How much is it?

*Mr. Anstead.*—It is a very varying proportion. I suppose the average is 2½ per cent. You should not calculate it as 3 per cent. That is of very little value and I would not pay a higher price for it.

*President.*—If it is 2½ units, it is about Rs. 17 to Rs. 20.

*Mr. Anstead.*—But then I can get my nitrogen so cheaply and I am not prepared to pay you a bigger price for nitrogen in phosphate.

*President.*—You are paying Rs. 8 a unit for nitrogen.

*Mr. Anstead.*—I do not know. Anyway I won't buy it in that form. I am not prepared to pay you a bigger price.

*President.*—I am just putting it to you. At present nitrogen costs you Rs. 8; it has got a value.

*Mr. Anstead.*—It has a value but it has a small value.

*President.*—The maximum is about Rs. 8 a unit. You may be able to pay Rs. 20 for the 2½ units, but would you pay Rs. 10 extra for it?

*Mr. Anstead.*—I would not, for this reason that I should still have to put more nitrogen which is going to cost me money. So, I would much rather do it in some other way. The amount of nitrogen you are giving me is so little that it is not worth getting it in that form. Do you see what I mean?

*President.*—But you are paying more for it! We will put it this way. Supposing you wanted to use twenty, twenty?

*Mr. Anstead.*—The point is this. If I did that, you mean to suggest that if I am using 80 lbs. of sulphate of ammonia now, instead of using 80 lbs. I need only use 60. But there is a practical difficulty in doing that. In the first place the packages are 80 lbs. There would be a lot of trouble in splitting packages. I should not do so. I should put in a little extra.

*President.*—It is an expensive stuff. If you use about 3 units more, it costs you Rs. 20.

*Mr. Anstead.*—I know it does. We are not getting down to these bare units. We cannot make an absolute formula in a thing like that.

*President.*—The man says "My superphosphate contains something which has got a market value". You say that you are not prepared to pay that market value.

*Mr. Anstead.*—I don't think that you will get it. We must buy the cheapest stuff. What I would suggest to you is that when you are looking for a source of rock phosphate out of which you make super, you must take the possibility of your bones into account. I don't say that it can be done. But you ought to bear that in mind and let that extra nitrogen go. You are giving a better stuff at the same price at which we can buy ordinary super, you are giving the ryots at a cheaper price really good stuff.

*President.*—It simply means that he is giving you a much better stuff for a lower price.

*Mr. Anstead.*—Yes, I want that.

*President.*—Why should he do so?

*Mr. Anstead.*—It boils down to this: will it be cheaper in the end to make your superphosphate out of bones or will it be cheaper to make it out of rock phosphate? If you come to the conclusion that it is cheaper to make it out of Algerian phosphate, then let the bones go. I have nothing to say then. Let them be exported. But I would like you, when you are considering the source of rock phosphate, to consider the possibility of using your bones. I would not go further than that.

*President.*—Supposing we come to this decision that to produce bone superphosphate it costs Rs. 15 more.

*Mr. Anstead.*—Then, don't do it.

*President.*—It contains nitrogen, but then you say that you are not going to pay for it.

*Mr. Anstead.*—I won't. What will happen is that you will have two grades on the market here, both being made in India at two different prices. One will be better than the other. In that case, the riyat will buy the cheaper stuff.

*Dr. Matthai.*—At present, Parry's are selling both.

*Mr. Anstead.*—Yes.

*Dr. Matthai.*—Do they not get a higher price for the bone superphosphate?

*Mr. Anstead.*—I doubt whether they are selling much bone superphosphate in competition with the other stuff. They are selling it largely to planters who do not mind the price.

*President.*—Supposing we make a proposal—it is quite immaterial to us what stuff they use; it is left to the manufacturer and if the manufacturer finds that he can get a better price for bone superphosphate?

*Mr. Anstead.*—What I should like you to be able to arrange is that you should not only make the stuff at the same price at which it could be imported but that you should be able to make a better stuff than the imported stuff.

*Dr. Matthai.*—It really would come to this. If people could get bone superphosphate at Rs. 80 f.o.r. Madras, then you are really making bone superphosphate cheaper because you are putting on the market a better article.

*Mr. Anstead.*—But I don't want to pay Rs. 85. I am not going to give you extra Rs. 5. My suggestion is that you might be able to do that—not necessarily at once by prohibiting the export of bones. That is one of the several suggestions. Why should not these people who buy these bones pay a duty? Let us utilise the duty to subsidise the manufacture of sulphuric acid. I would not go to the extent of prohibiting the export; but put an export tax on bones.

*President.*—The export tax would fall on these people.

*Mr. Anstead.*—Which people?

*President.*—On these people who export?

*Mr. Anstead.*—That leaves me absolutely cold.

*Dr. Matthai.*—The advantage of the grower is really the amount lost by the Pariah.

*Mr. Anstead.*—What does he get?

*Dr. Matthai.*—I have not the faintest idea.

*Mr. Anstead.*—I believe that he gets about Rs. 40 a ton. Of course everybody exploits the pariah. It is not he who gets any profit. It is the exporter who does. You can get the bones collected by pariahs in Madras at Rs. 40 a ton. These things are ground and sold outside at Rs. 120 a ton, and it is the exporting firm who gets the difference of Rs. 80 per ton.

*President.*—Where is the principal source of bone supply?

*Mr. Anstead.*—It is scattered all over the country.

*President.*—I understood from Dr. Clouston that the largest centre was the United Provinces.

*Mr. Anstead.*—It depends on the cattle population. My point is that if you have an organisation you can sell your bone meal much cheaper. At present, the pariah is bled to the utmost. He is not paid an anna more. Apart from that, he is cheated in every possible way.

*Mr. Mathias.*—Do Government give a contract for collecting bones in Government forest?

*Mr. Anstead.*—No. The profit in this bone meal business of firms must be enormous, whatever they may say. The weak point is to get an organisation for collection. That could be arranged. I see no reason why it should not be arranged.

*President.*—It would not necessarily cheapen the price of bones to the raiyat in the country because instead of the exporter getting a higher price, it would be the pariah who would get it. The price of bones in the country would be regulated by the price at which he could sell them outside the country. Now he may sell them at Rs. 40 a ton but when he realises that they could be sold at Rs. 100 outside the country, he would also demand a higher price for the bones.

There is one point in your letter which I was not able to follow, and that as in connection with what Dr. Clouston said about the use of bones. You say "It should be borne in mind that there are possibilities of using bone meal in its raw state. Working on the utilization of the natural sulphur oxidising power of certain soil bacteria for the solubilization of the phosphate of bone meal by composting carried out at Pusa showed that in a compost of bone meal sulphur, sand and charcoal the percentage of soluble  $P_2O_5$  increased from 23.5 to 64.2 in 16 weeks and the superiority of the compost as a manure was well marked in field trials."

*Mr. Anstead.*—What I mean is this. You need not use your bones direct on the land. There are other ways of using it. When you put raw bones on the land, the phosphate is insoluble and you hope that it will become soluble by fermentation in the soil with green leaves. Supposing you carry out that process in a heap and mix it with sulphur and bacteria, then you would get your bones soluble for use in the land. That is another way of making superphosphate.

*President.*—Instead of making it out of sulphuric acid.

*Mr. Anstead.*—That is a bacterial method of making superphosphate. I merely put that to show to you that there are other ways of using bones. I am not using it as an argument for the manufacture of superphosphate.

## GEOLOGICAL SURVEY OF INDIA.

Oral Evidence of Sir EDWIN PASCOE and Dr. L. L. FERMOR,  
recorded at Calcutta on Monday, the 25th February, 1929.

*Introductory.*

*President.*—Sir Edwin Pascoe, you are the Director, Geological Survey of India?

*Sir Edwin.*—Yes.

*President.*—What position does Dr. Fermor hold?

*Sir Edwin.*—He is the Head Superintendent and officiates for me when I go on leave.

*President.*—Is this department directly under the control of the Government of India?

*Sir Edwin.*—Yes.

*President.*—In relation to the provinces what is the position?

*Sir Edwin.*—We write every year and ask Local Governments to suggest any work they would like us to undertake and try to meet their wishes as far as the size of our staff permits.

*Functions of the department.*

*President.*—What is the principal work of the department?

*Sir Edwin.*—The principal work is the making of the geological map of India. We also look out for fresh minerals and make a scientific study of the rocks. We also deal with mining leases and prospecting licenses. We have no administrative powers, but are consulted as an advisory body.

*President.*—That is to say, in what form the leases should be issued and so on?

*Sir Edwin.*—Yes, any question connected with a lease or a prospecting license; whether the terms are suitable or should be altered in any way, etc.

*President.*—I take it the Government does not give any perpetual leases as regards minerals?

*Sir Edwin.*—No, but there is a right of renewal. Leases are generally granted over a period of 30 years with the right of renewal for a further 30 years, in some cases there is a right to renewal which carries it to a total of 90 years.

*President.*—Is there a limit?

*Sir Edwin.*—There is a limit.

*President.*—It is generally on a royalty basis, is it not?

*Sir Edwin.*—Yes. If the royalty does not come to a certain amount, the lessee has to pay dead rent which is a sort of minimum royalty.

*President.*—As regards prospecting, how much does your department do?

*Sir Edwin.*—Hardly any. We only do actual prospecting work when we are asked by Government to do it for any special reasons. When a particular industry is to be encouraged for some particular reason, a Local Government may ask us to go a little further than the ordinary pioneer investigation and we undertake prospecting.

*Mr. Mathias.*—Prospecting is usually done by private parties?

*Sir Edwin.*—Yes.

*President.*—If a man really comes in for prospecting, what sort of information would he find in your department?

*Sir Edwin.*—The first thing he does is to come and ask for a geological map. Then he asks for any report we have regarding that particular mineral

or locality (our work is always published as soon as possible). He consults our publications and sees what actual pioneer work has been done on that mineral or locality.

*Dr. Matthai.*—Do you have an annual report or only a quinquennial report?

*Sir Edwin.*—We publish an annual as well as a quinquennial mineral review, and also an annual General Report.

*Dr. Matthai.*—Which is the latest mineral review that you have issued so far? Is there one for 1927-28?

*Sir Edwin.*—The 1927 review is out.

*Dr. Matthai.*—When do you expect the next quinquennial report to be out?

*Sir Edwin.*—It will be ready towards the end of this year.

*Dr. Fermor.*—The annual reviews are much shorter than the quinquennial reviews which give a lot of information which is not given in the annual review.

*Dr. Matthai.*—Dr. Fermor in his note has given the figures of output for these minerals for the year 1927. Would the department be able to give us output figures for 1928?

*Sir Edwin.*—We can give you them in August, some of them in July possibly, not before that.

*President.*—As regards the available quantities, your department has not much information, I mean as regards the actual reserves.

*Sir Edwin.*—In some cases we have.

*President.*—You have given some sort of estimate as regards coking coal and iron ore.

*Sir Edwin.*—It is a very rough estimate.

*President.*—That of course is a point of some importance in our enquiry.

*Sir Edwin.*—It is such an impossible question to deal with because so many factors have to be considered. Many of these factors are incapable of estimation. You can, for instance, increase your supplies of coking coal by blending it with non-coking coal.

*President.*—We are satisfied if we know that for 50 or 100 years under normal conditions we have got sufficient supplies. We don't want to go beyond that period. In the present enquiry also there are certain minerals as regards which we should like to know the quantities that are likely to be available.

*Sir Edwin.*—I made a rough estimate regarding coking coal for the Tariff Board before in connection with the iron and steel enquiry.

*President.*—In making your estimates what is the general line that you follow for any kind of mineral?

*Sir Edwin.*—We measure the thickness of the deposit, we get some idea of the width, how deep the ore is likely to go, how deep you can mine and whether there is going to be water trouble if you venture to go deeper. All these factors have to be taken into consideration.

*President.*—I take it in the case of surface minerals it is much easier to make an estimate than in the case of a mineral like oil?

*Sir Edwin.*—The question of oil is much more difficult; you have nothing to measure. In making your estimate for coal you can measure the thickness, the depth and so on, as also to some extent in the case of an ore body. It is a pure gamble in the case of oil.

*Dr. Fermor.*—It is easier to estimate in the case of a stratified mineral like coal, but it is difficult with other minerals because their method of formation is such that the deposits are of irregular shape. Coal is the easiest to estimate.

*President.*—What about limestone, magnesite and minerals of that sort?

*Dr. Fermor.*—Limestone is stratified like coal but magnesite is irregular.

*President.*—Still it would be possible to make an estimate which might be approximately correct.

*Dr. Fermor.*—We can usually make a minimum estimate which may be approximately correct but it may be falsified if the ore is extracted from deeper depths.

*Sir Edwin.*—You can make estimates of different minerals with qualifying factors. For instance in the case of coal you can estimate how much there is within 500 feet or you can say how much there will be when you go deeper to say 1,000 or 1,500 feet.

*President.*—The question is whether it is economic to go beyond a certain depth?

*Sir Edwin.*—Yes, that is one of the factors. In Assam they have so far found it impossible to go much below water-level because of the trouble with water.

*President.*—As regards the quality of the minerals that you come across do you have experiments made to find out whether they are suitable or not?

*Sir Edwin.*—Yes, we try. The trouble is to get a proper representative sample. Picked samples are sometimes sent.

*Mr. Mathias.*—What do you mean by representative sample?

*Sir Edwin.*—If we are to get useful analysis we must have a sample which is a true average of the mineral. We sometimes send a man down or ask a disinterested party to get samples for us.

*Dr. Fermor.*—Really getting a good sample may involve prospecting operations, cutting trenches and so on.

*President.*—Have you done it in any case?

*Dr. Fermor.*—I did it once for coal in the Karanpura fields. The seams were first tested near the surface by sinking shafts. Afterwards I got drilling operations carried out, re-tested the coal seams to 1,500 feet from the surface.

*President.*—Was that as regards the quantity or the quality?

*Dr. Fermor.*—The drilling was done to test the depth to which it would go, but the surface test was for quality; normally we cannot test the quality of the mineral in depth but have to take the surface sample. The general rule for mineral deposits, leaving aside coal and lime, is that they get worse as you go down.

*President.*—Has the Geological Department actually discovered any minerals that were not known before?

*Sir Edwin.*—Yes. We discovered the Singu oilfield in Burma.

*Dr. Fermor.*—We discovered the chromite deposits in Baluchistan. The Wolfram ores in Tavoy were discovered by Mr. Page of our department.

*Dr. Matthai.*—What about the magnesite in Salém?

*Dr. Fermor.*—I don't know. The iron ores in Singbhum were discovered in our office by Mr. Soubal, a cooly catcher. He took up a prospecting license over iron ore concessions under our advice which the Bengal Iron and Steel Company are now working. The deposits were found by him but they were recognized by us. Had we not examined the specimen that he brought nobody would have known what it was.

*President.*—Supposing we wished to find out whether there were any minerals in the country which were still available to the public, that is to say, apart from the licenses that have already been given:—take manganese for instance, license for which is held by the Central Provinces Mining and Prospecting Syndicate,—if anybody wanted to manufacture ferro-manganese would he have to depend on these licensees or are there manganese available elsewhere?

*Sir Edwin.*—The usual procedure is for the man to go out and look for it himself. As soon as he finds it is promising he takes out a prospecting license.



*President.*—I will tell you the difficulty I have in my mind. Take bauxite, manganese or magnesite. These things are being exported. Now take the case of potassium nitrate. If a person wanted to start an indigenous industry and if these minerals were not available to him except from these men who have got licenses, he is rather at their mercy. If we wanted to satisfy ourselves whether there was a certain quantity of these minerals available, would your department be able to tell us or would we have to enquire of the Director of Industries? Take the question of iron ore. Tatas have got a big area. Then there is an area on which Messrs. Bird and Company have been sitting for ten years or more. They don't even tell us where it is.

*Dr. Fermor.*—We know where it is.

*President.*—Then there is the Indian Iron and Steel Company, which have got its concessions. Now, if a new steel works were to be established here and anybody wanted to know whether any iron ore was available apart from these concessions, would your department be able to give that information?

*Sir Edwin.*—We could advise him where to look for it but it is not our business to find the ore for him.

*President.*—Would you be able to tell him that iron ore does exist here or is likely to exist and that this area has not been given to anybody? Would you be able to give him that information?

*Sir Edwin.*—The rule is that the first man who finds it gets a license.

*President.*—If he does not work, does it lapse?

*Sir Edwin.*—Yes.

*President.*—What is the normal period within which he must work?

*Sir Edwin.*—He must work it within a year—in some cases two years.

*Dr. Fermor.*—There are special cases where the Local Governments give exemption after consulting the Government of India.

*President.*—Supposing a man takes out a mining lease and then does not work it at all, what would happen?

*Sir Edwin.*—The lease is liable to be taken away.

*Dr. Fermor.*—Our main work is the making of Geological maps; the actual position of the minerals depends on the Geology. We refer a man to the Geology and it is for him to look for the particular mineral.

*President.*—I take it you will be able to tell him that certain areas are undisposed of.

*Sir Edwin.*—He gets that information from the district officer.

*Dr. Fermor.*—In the case of iron ore we could actually suggest places.

*Mr. Mathias.*—Take the case of manganese.

*Dr. Fermor.*—All manganese is taken up because it has an export value. All iron ore is not taken up because this ore is used in the country. Unless the ore is situated near the supplies of coal and fluxes it is not going to be used.

*President.*—When a man wants to manufacture ferro-manganese he has got iron ore but no manganese. The point is that if ferro-manganese is to be manufactured in this country, manganese can only be bought through or from these people.

*Dr. Fermor.*—If it is financially feasible to make ferro-manganese in this country the people who are working the manganese would do it as they already hold concessions. The fact that they don't do it shows that it is not feasible to do it in this country except in such quantities as are required by the industries in this country.

*President.*—The Tata Iron and Steel Company are manufacturing some for their own purposes.

*Dr. Fermor.*—The real trouble is the high phosphorus in the coal. If you smelt ferro-manganese in this country you get a product which contains more phosphorus than is the standard.

*President.*—I am not particularly interested in that just now. The whole point is this. If these minerals exist in the country but somebody or other has got a monopoly, then it is very difficult for the indigenous industries to be started.

*Dr. Fermor.*—There are no monopolies in manganese or iron ore. There are probably 10 or 20 companies of a reasonable size who hold manganese concessions.

*Sir Edwin.*—The question of monopolies is very carefully considered during the granting of leases.

*President.*—In what form is it considered?

*Sir Edwin.*—There is, for example, a limit to the area which a man can hold in any one province.

#### *Magnesite.*

*President.*—As regards magnesite, it is practically found only in Salem?

*Sir Edwin.*—There is some in the Mysore and Hassan districts of Mysore, and some in Baluchistan.

*Dr. Fermor.*—All known deposits of any economic value are generally in Southern India. Some has been found in Baluchistan but not in sufficient quantities.

*President.*—What is the principal use for magnesite?

*Sir Edwin.*—It is used in steel manufacture; it is also used for making cement. Those are the two principal uses.

*President.*—Is that for refractory linings?

*Sir Edwin.*—Yes.

*President.*—The Government of Madras told us that this magnesite—about 75 per cent. of it—is exported to America. Of course, they have now put a duty on that.

*Dr. Matthai.*—They have raised the duty from 14 to 21, and that accounts for the reduction in output, I suppose.

*Mr. Mathias.*—Is it used in the cement manufacture as a substitute for limestone?

*Sir Edwin.*—It is mixed with the limestone. It makes a quick setting cement, what they call oxy-chloride cement.

*Dr. Fermor.*—It is specially used for flooring purposes.

*Mr. Mathias.*—You can manufacture magnesium chloride from magnesite, can you not?

*Dr. Fermor.*—Yes, from sea water or from magnesite.

*Mr. Mathias.*—In the cement manufacture do I understand that they first manufacture magnesium chloride from magnesite and then use it with cement for flooring?

*Dr. Fermor.*—I don't know. It is a special process. It has nothing to do with Portland cement. It gives a very white surface to the floor. It makes very good heat resisting tiles.

*President.*—I understood that some of the railways require magnesium cement for carriages.

*Dr. Matthai.*—I think there is a demand for fused magnesium chloride in India. We were told in Bombay that about 1,000 tons were taken by the North Western Railway for carriages.

*Dr. Fermor.*—The main use for magnesite is for furnace linings, to make magnesia bricks.

*Mr. Mathias.*—How is it used for this quick drying cement?

*Dr. Fermor.*—I don't know. I think it is mixed with limestone.

*Mr. Mathias.*—Is it not considered important to eliminate magnesite from limestone for ordinary cement making?

*Dr. Fermor.*—Yes, for ordinary cement making.

*Sir Edwin.*—Dr. Coggin Brown says: "It slacks when exposed to the air and, in conjunction with magnesium chloride, is the chief component of the "oxy-chloride" or "Sorel" cements of the patent flooring and other trades".

*Mr. Mathias.*—It cannot be used in cement in large quantities.

*Sir Edwin.*—I don't think so.

*President.*—Do they make any magnesite brick in this country?

*Dr. Fermor.*—The Tata Iron and Steel Company are making some.

*President.*—I have some recollection that they have given it up.

*Sir Edwin.*—I think they use silica bricks mostly.

*President.*—The only chemical which uses magnesite is Epsom salt with which we are concerned just now, and though you are not able to give us the available quantities, the requirements of Epsom salt are so small that we may assume for another 50 years or so sufficient supplies of magnesite will be available.

*Sir Edwin.*—Yes, you can get as much as you want.

*Dr. Matthai.*—They don't want more than 1,000 tons.

*Dr. Fermor.*—Do not the Bombay Cotton Mills use magnesium salt?

*Dr. Matthai.*—Yes, it is magnesium chloride. They get it from the salt works in Kathiwar, but for epsom salt they get magnesite from Salem. The cost of magnesite is a fairly substantial factor in epsom, so I was wondering whether this decline in the export to America might not make some difference in the cost of epsom. Last year they were paying somewhere about Rs. 15 or Rs. 16 a ton at Salem. If they could get a reduction to Rs. 10, it might make a difference. If you had a fairly substantial demand for export purposes, that would certainly react on the price, would it not?

*Sir Edwin.*—As the supply in Salem may, for practical purposes, be regarded as unlimited, the cost price of the marketed material is more a matter of cost of extraction, treatment and transport. You would demand for magnesite is much less than the world's resources. Magnesite is a bad conductor of heat and it seems a pity it is not more used in buildings in a hot country like India.

*Mr. Mathias.*—It is surface mining, is it not?

*Sir Edwin.*—Yes, nearly all.

#### Salt.

*President.*—Then as regards common salt the bulk of the production in India is from sea water, is it not?

*Sir Edwin.*—There is a proportion of rock salt from the Salt range in the Punjab.

*President.*—For the production of some of these chemicals and salts, where they can use the rock salt, they get the brine from the mine and they use that brine, whereas in the case of salt they have again got to convert it and the contention is that for the manufacture of some of these alkalies where they can pump the salt water direct into the works they find it more economical. But the only place where you have got rock salts is where there is no coal available.

*Sir Edwin.*—Coal is present in the Salt Range at Dandot, Bhaganwala, Pidh, etc., but it is of poor quality. It is being worked at Dandot and Mullakbel.

*President.*—Where is the Salt Range.

*Sir Edwin.*—It is in the Jhelum, Shahpur and Mianwali Districts of the Punjab.

*President.*—But there the coal is very inferior.

*Sir Edwin.*—It is inferior but it is being used.

*President.*—Then of course whether you use rock salt or sea salt, it makes no difference so that so far as we are concerned, we must depend for the manufacture of the alkalies on the use of the ordinary salt.

*Sir Edwin.*—You could pump the water down into the salt, make the brine and then pump it out as they do in Cheshire. The water is actually introduced into the mine and dissolves the salt underground; then it is pumped out again as brine.

*Dr. Fermor.*—What is the purpose you are thinking of?

*President.*—I am thinking of the manufacture of alkalies. In England, for instance, they say that the cost of producing alkalies is low, because they get the brine in this liquid form, whereas if you use salt, it is brine converted into salt and salt again converted into brine and that makes it more expensive.

*Dr. Fermor.*—At any place on the coasts where they extract salt from sea water they could get brine cheaper.

*President.*—That you can do only part of the year except in Kathiwar where they can do it for 10 months in the year, but there is no coal. In Bengal and Bihar where you have got cheap coal, there is no salt except sea-salt.

*Dr. Fermor.*—The Singareni coalfield is not very far from the coast. There are plenty of salt works on the Madras coast.

*Sir Edwin.*—Madras is the most favourably situated province so far as sea-salt and coal are concerned.

*Dr. Matthai.*—If it were a question of making alkalies in Madras, you have coal from Singareni and you have salt, but what about limestone?

*Sir Edwin.*—There is plenty of limestone in Madras.

*Dr. Fermor.*—You have got limestone in the Kistna District.

*President.*—How far is the nearest coalfield from the coast?

*Dr. Fermor.*—The Singareni coalfield is in Hyderabad. You need not necessarily choose a place for your factory on the coast. You could choose a place in the North of Madras.

*Mr. Mathias.*—What would be the distance from the coal to the sea-salt?

*Dr. Fermor.*—I am afraid I should have to consult the map.

*President.*—Where is the salt actually manufactured in Madras?

*Sir Edwin.*—Salt is collected from sea water in a large number of factories scattered all along the Madras coast.

*Dr. Fermor.*—So that you could always choose your point. May I ask in what way is it possible to help the manufacture of soda by means of a tariff. If you put a tariff on imported soda, you are going to penalise a lot of industries such as the manufacture of soap and glass, which depend on soda.

*President.*—Some industries have to be penalised in order that our industries may be established. You cannot get away from that. Somebody has got to pay for protection.

*Dr. Fermor.*—Soda is one of the fundamental materials for the manufacture of chemicals.

*President.*—Quite true. We are not investigating that point except indirectly. Unless you have got a soda industry, that country has not industrialised at all.

*Dr. Fermor.*—Both soda and sulphuric acid must be as cheap as possible.

*President.*—That is the idea of protection. As regards common salt which is used in producing hydrochloric acid and other things, that is not found in the proximity of coalfields, is it?

*Sir Edwin.*—No, not in the immediate proximity.

*President.*—The nearest you can think of is Madras?

*Sir Edwin.*—Punjab coal and Punjab salt are the nearest that I can think of.

*Dr. Fermor.*—It is being produced and it can be produced in greater quantities if there is a demand for it.

*President.*—It wouldn't merely do simply to produce certain things in a certain place, because it has to be carted to some other place. Therefore I say that unless chemicals out of salt as well as other chemicals dependent on that are manufactured more or less in the same area, it is no good.

*Dr. Fermor.*—The Madras coast is then the next best place.

*Dr. Matthai.*—They are putting up a biggish alkaline works in Kathiwar. Do you know anything of the project?

*Dr. Fermor.*—I have heard of it; I must look it up.

*Dr. Matthai.*—They get nothing except salt in the areas they get limestone from Bengal, they get their coal from Bengal and their ammonia they get from Ammonium Sulphate either from Bengal or imported.

#### *Potassium nitrate.*

*President.*—The next thing is potassium nitrate. The production of that has been steadily going down.

*Sir Edwin.*—As a matter of fact owing to the withdrawal of restrictions on the manufacture of saline substances in India, production figures are no longer available. We have got them up to the year 1924, but nothing since.

*President.*—Have you kept yourself in touch with this mineral? At one time potassium nitrate was a mineral that was exported on a very large scale.

*Sir Edwin.*—It is an industry which owes its establishment largely to the American Civil War. The Americans wanted it for gunpowder and that is how the industry spread in India. It became a comparatively big industry during the war between the north and the south of America. I think much more could be made out of it if it were properly organised. It is not properly organised at present.

*President.*—How is it found?

*Sir Edwin.*—The process is described in the Agricultural Society's Journals, I have a short account of it here, which I will hand over.

*Dr. Fermor.*—It occurs as an efflorescence. The soil has to be taken up and mixed with water to extract the nitre.

*President.*—Are there sufficient supplies available to make it a bigger industry?

*Dr. Fermor.*—No, it will always have to remain a village industry, I think.

*Sir Edwin.*—I think the industry could be further developed if properly organised, and with an increased use of drainage traps.

*Dr. Matthai.*—The main demand for Indian potassium nitrate is for explosives, is it not?

*Sir Edwin.*—Yes.

*Dr. Matthai.*—So that I suppose it would be uneconomical to use it, say, for the manufacture of nitric acid in place of sodium nitrate.

*Dr. Fermor.*—You can use it, and you would get a potassium salt as a by-product which has a value as a fertiliser. You can use the nitrate as a fertiliser, but it is worth more as an explosive.

*Mr. Mathias.*—I suppose it is largely used in this country for fireworks.

*Dr. Fermor.*—Yes.

*Dr. Matthai.*—A certain amount is used on the Tea Estates?

*Sir Edwin.*—Some is used.

*President.*—How much nitrogen does it contain?

*Dr. Fermor.*—Approximately 89 per cent. potash and 14 per cent. nitrogen.

*President.*—It is so very difficult to get any figures as regards prices and so on when the thing is exported.

*Dr. Fermor.*—Prices are quoted in the Calcutta markets regularly.

*President.*—It being practically a village industry, prices would fluctuate. They would find out how much nitrogen it contains and how much potash.

*Dr. Fermor.*—Yes. The market price varies according to the purity of the product.

*Sir Edwin.*—The chances are that it would pay people to use it on the spot as manure, because the freight down to Calcutta must be fairly heavy.

*President.*—First of all we don't know how much is produced.

*Dr. Fermor.*—You can take the past figures as a rough guide to the amount of production.

*Sir Edwin.*—I put up a note for the Agricultural Commission on this and other fertilisers (hands in).

*President.*—What percentage of nitrogen would the Chilian nitrate contain.

*Dr. Fermor.*—About 16½ per cent.

#### Bauxite.

*President.*—Then there is this bauxite. That does seem to exist in the vicinity of coal, because it is found in the Central Provinces and in the Ranchi District.

*Dr. Matthai.*—How do you account for this big fall in the output of bauxite compared with 1924? There was a suggestion made to us that the Indian bauxite contained a little more iron than other kinds of bauxite.

*Dr. Fermor.*—India contains as good bauxite as any country in the world, but it varies in quality from place to place.

*Dr. Matthai.*—Supposing you took the Katni area?

*Dr. Fermor.*—That is very good.

*Mr. Mathias.*—Central Provinces bauxite is of very high quality.

*Dr. Fermor.*—Yes.

*President.*—So far as India is concerned the bauxite is used principally in making alum?

*Dr. Fermor.*—For making alum and also for oil refining.

*President.*—Does anybody make aluminium here?

*Dr. Fermor.*—Not yet.

*Mr. Mathias.*—Aluminium manufacture requires a very costly electric plant, does it not?

*Sir Edwin.*—Its manufacture is generally combined with hydro-electric power. Tatas had a scheme by which they were going to produce aluminium somewhere on the Bombay side.

*President.*—I take it that very large quantities of bauxite exist in the country.

*Sir Edwin.*—Yes, but it is difficult to make an estimate of the quantities. It varies so much. It may be pure in one place; if you go further on you find it contains more iron.

*President.*—What is the principal constituent of bauxite?

*Dr. Fermor.*—Aluminium oxide.

*President.*—What is the percentage?

*Dr. Fermor.*—60 per cent. alumina oxide.

*President.*—That is what they use for making alum.

*Dr. Fermor.*—Yes, and for aluminium. The Bengal Chemical and Pharmaceutical Works have made alum from Indian bauxite.

*President.*—They make it on the Bombay side too. In course of time they may require more and more alum for water works and there is a possibility of the demand being considerably increased.

*Dr. Fermor.*—You can take it that there is enough bauxite for that purpose available in India.

*Dr. Matthai.*—As far as water purification is concerned, Indian bauxite is good enough, but for industrial purposes such as the manufacture of paper the presence of iron makes some difference. It won't make any difference for water purification.

*Dr. Fermor.*—Bauxite in every country does contain iron, but it can be purified.

*Dr. Matthai.*—But Indian bauxite contains more.

*Dr. Fermor.*—No, not in the best deposits.

*Dr. Matthai.*—Where are the best to be obtained?

*Dr. Fermor.*—Katni.

*President.*—Is it also used in the manufacture of cement?

*Sir Edwin.*—Yes, in small quantities in the manufacture of Portland cement.

#### *Gypsum.*

*President.*—Now let us take gypsum. We want to consider how far—if necessary, not in the immediate present but in the future—supposing we were shut out of sulphur, gypsum would be available in the country as a substitute for sulphur. Gypsum really does not become an economic proposition until sulphur has become so expensive that you have got to use gypsum. If owing to war or to some other causes sulphur cannot be had, then only the question of the use of gypsum is of practical importance. For theoretical purposes should we be justified in saying that there are sufficient quantities of gypsum available in the country from which if and when necessary sulphuric acid could be manufactured?

*Sir Edwin.*—Yes.

*President.*—What percentage of sulphur would this contain.

*Sir Edwin.*—18½ per cent. roughly.

*Mr. Mathias.*—Are there any deposits of gypsum in the Central Provinces?

*Sir Edwin.*—No. The more important deposits are in Kashmir, the Punjab and the Rajputana. As a matter of fact Burma is full of it too; You can pick it up on the surface over large areas there.

*President.*—From 100 tons of gypsum, how much sulphuric could you make?

*Dr. Fermor.*—57 tons of sulphuric acid.

*President.*—That is the theoretical possibility.

*Dr. Fermor.*—Yes.

*Sir Edwin.*—They used this process in Germany during the war.

*President.*—The whole point is this: can you tell us whether this gypsum on an average would be as pure as this German gypsum?

*Sir Edwin.*—It is as pure as any other gypsum. Gypsum does not vary very much. The transparent gypsum that you can pick up in Burma on the surface is the purest to be found; that could be collected by hand by coolies.

*Mr. Mathias.*—Are there no deposits beneath?

*Sir Edwin.*—No, known deposits.

*President.*—There are considerable quantities available in the country.

*Sir Edwin.*—Yes, large quantities.

*President.*—Some of it is used in cement for setting, is it not?

*Sir Edwin.*—Yes.

*Dr. Fermor.*—It is used as a fertiliser.

*President.*—It is going to be used for the manufacture of artificial fertilisers also.

*Dr. Matthai.*—Is there any gypsum in Southern India?

*Sir Edwin.*—No, it is nearly all in the north.

*Dr. Matthai.*—We were told when we examined Messrs. Parry and Company that there was a possibility of some gypsum being discovered round Trichinopoly.

*Sir Edwin.*—I don't think it occurs in the south at all. We have no information about it.

*Dr. Fermor.*—There might be some in connection with the Mesozoic and Tertiary deposits along the coast.

*Sir Edwin.*—That is true.

*President.*—Could we say that, speaking generally, at present so long as the imported sulphur is available, we can use it because it is cheaper, but that when the price of sulphur rises or sulphur is no longer available, we can fall back on gypsum?

*Sir Edwin.*—That is correct, but it would be an expensive process.

*President.*—The question doesn't arise at all until sulphur has ceased to be economic.

*Dr. Matthai.*—If costs were no consideration at all, there are sufficient quantities of gypsum available for the manufacture of sulphuric acid?

*Sir Edwin.*—It would be quite safe to say that. The deposits in the Salt Range would be enough.

*President.*—It is not necessary for us to use gypsum at all if we can get imported sulphur and it is cheaper for us to use that. But this question arises in connection with the compound artificial fertilisers in which they want to combine nitrogen and phosphoric acid. So far as the process is dependent more or less on gypsum, we have got it.

*Sir Edwin.*—Yes.

*President.*—Nitrogen we can always get.

*Sir Edwin.*—Yes.

*Dr. Fermor.*—We should have no fear about gypsum, but nobody has estimated the quantities of gypsum available in the country.

*President.*—It is not necessary to make a precise estimate so long as we can say that for our requirements in the next few years we have got sufficient gypsum available in the country.

*Sir Edwin.*—Yes.

*President.*—The whole point is this: we were told that it would be cheaper for India always to import these fertilisers, because either we have not got the materials or because we cannot manufacture on a sufficiently large scale.

*Dr. Fermor.*—We have got all the materials for the manufacture of nitrogen fertilisers.

*President.*—We can say that of course as regards the quantities to be produced. But as regards the units, that is a matter of time. When the time came for India to manufacture it on a large scale, the materials would always be available, is that right?

*Dr. Fermor.*—Yes. We can make aluminium sulphate or calcium nitrate.

*President.*—We had one of the representatives of the Imperial Chemicals before us and he said that instead of having these phosphatic fertilisers and the nitrogenous fertilisers separately, they want to make a combined fertiliser ammonium phosphate and he thought we had not sufficient gypsum in the country for its manufacture. That would have been the difficulty so far as phosphatic rock is concerned. But they have got to import it as much as we have. So far as bones are concerned, we have sufficient quantities



of bones available here—I don't know whether they are or they are not, whether they are all being exported at present. But if it became a question of manufacturing this compound fertiliser in this country, then the question of materials should not stand in our way, should it?

*Dr. Fermor.*—No.

*Sir Edwin.*—Some of the soil in India does not want phosphates. That is what I was told by the Agricultural people, so that a compound fertiliser might not be of universal use.

*President.*—Assuming there was a demand for compound fertiliser in this country, I take it that we can say that so far as the raw materials are concerned, India should not be at a very great disadvantage.

*Sir Edwin.*—Quite right. We have no superabundance of mineral phosphate but bones could be used instead of being exported.

*President.*—So far as phosphates are concerned, all the countries in the world except two or three, have got to depend on imported rock, bones and things like that.

*Sir Edwin.*—Yes.

*President.*—So far as the whole world is concerned, it has to depend chiefly on Algiers and other places in Africa.

*Dr. Matthai.*—What is the opinion of the Geological Survey: is it absolutely out of the question to make use of the phosphatic nodules in Southern India for the manufacture of superphosphate?

*Sir Edwin.*—It has been tried but the project was not found to be economical.

*Dr. Matthai.*—I notice in one of your notes you say that the presence of carbonates makes it less suitable.

*Dr. Fermor.*—The Bengal Iron and Steel Company have some rock phosphates in their concession which they were putting as a mixture into the furnace to make high phosphoric pig iron suitable for casting.

*Dr. Matthai.*—Are the minerals found in Singbhum better than those found in Trichinopoly?

*Sir Edwin.*—The quality is probably much the same, but I think it is paying in Singbhum because it is close to the ironfields and most of it goes to the iron and steel companies.

*Dr. Matthai.*—My impression about the Trichinopoly phosphatic nodules is that although a number of companies have tried it, and failed, they are still experimenting. It was just about six months ago that Messrs. Parry and Company made a fresh application for a license over that area.

*Sir Edwin.*—The analysis of these nodules shows that they contain from 56 to 59 per cent. of phosphate of lime with about 16 per cent. of carbonate. The sparse distribution of the nodules and their high calcium carbonate content are unfavourable to the commercial success of any attempt to manufacture superphosphate.

*Mr. Mathias.*—What is the disadvantage of carbonate?

*Sir Edwin.*—I presume the fact that its presence means a waste of sulphuric acid in the preparation of superphosphate. Carbonate is not poisonous for the soil.

*Mr. Mathias.*—Can you get phosphoric acid from the phosphatic rocks in Madras?

*Dr. Fermor.*—I think it could be obtained.

#### *Sulphides.*

*President.*—As regards these metallic sulphides, the position is this that very large quantities are found in the Bawdwin mines in Burma. These would contain very large quantities of materials for the manufacture of sulphuric acid, but are not available to us at present, because these are all exported.

*Dr. Fermor.*—A portion of the sulphur goes up the chimney when smelting the lead ores.

*President.*—Quite true. That is because at present they find it more economical to export the zinc.

*Dr. Fermor.*—If they were smelting the zinc ore, the sulphur would go up the chimney.

*Dr. Matthai.*—It is a more hopeful proposition in regard to copper sulphides supposing you could do the smelting there.

*Dr. Fermor.*—Yes.

*President.*—How much sulphur would this copper sulphide contain?

*Dr. Fermor.*—3·8 tons of copper to a hundred tons of ore.

*President.*—Has this United Copper Corporation materialised?

*Sir Edwin.*—Yes. I think after a few years when they get going, they might possibly consider the question of sulphuric acid manufacture, that is if their ore continues at the present grade.

*Dr. Matthai.*—The ore they have struck now is much more satisfactory than has been struck for a long time.

*Sir Edwin.*—Yes. They now get a 3 per cent. instead of a 1 per cent. ore.

*Dr. Fermor.*—There is very much more sulphur to be obtained from the Bawdwin ore than from the Singbhum ore.

*President.*—As regards this statement that you make about zinc chloride, *vis.*, that zinc ores would be available, they are available, in this sense that they exist in the country, but the question is whether they are available in the sense that they are cheaper than the zinc scrap that they get. At present all these zinc ores are exported, are they not?

*Sir Edwin.*—They are going I believe to Belgium and Germany. None of it is being used in the country.

*President.*—Would it be cheaper to use zinc ore than to use zinc scrap for making zinc chloride

*Dr. Fermor.*—It is better to use what you have got.

*President.*—Zinc dross is available to a certain extent from the Tata Iron and Steel Company's works.

*Sir Edwin.*—It depends on the purity of the zinc chloride that you desire to get, and on by-products. Zinc scrap is generally impure, I should think.

*Dr. Matthai.*—We were told that if they were able to produce all the zinc chloride used in India, they would require 500 tons of zinc scrap in a year. That doesn't seem impossible to collect.

*Dr. Fermor.*—That does not appear to sound like a large industry.

*Mr. Mathias.*—The market for zinc chloride is very small, is it not?

*Dr. Fermor.*—Yes, I suppose so.

*President.*—This opinion that you have expressed is very much to the point:—

“Treating the problem generally we may say at once that all the minerals of which I have noted that supplies are adequate are found in quality sufficiently pure for them to be utilisable in the chemical industry.”

That really is the gist of this letter, that so far as these minerals do exist in the country in sufficiently large quantities, their quality is suitable for commercial purposes.

*Sir Edwin.*—Quite so.

*Dr. Matthai.*—Have you any information about iron pyrites found in India, whether they contain the same proportion of sulphur as the Spanish pyrites? We were told that you need somewhere about 40 per cent. of sulphur in the pyrites to make it economically suitable for sulphuric acid.

*Sir Edwin.*—There is a deposit which we have just discovered in Polur in the Madras Presidency.

*Dr. Matthai.*—Is that a promising thing?

*Sir Edwin.*—It seems good, but we know little about it yet. I offered to dig it out, but the Madras Government would not spend money on it. It is about  $3\frac{1}{2}$  feet thick.

*Dr. Matthai.*—The Madras Government has sent us a note about it.

*Sir Edwin.*—They prefer that private parties should test and work it.

*President.*—What about the chemical quality of it?

*Sir Edwin.*—So far as I know it ought to be satisfactory.

*Dr. Matthai.*—The Madras Government have told us that it has an average thickness of  $3\frac{1}{2}$  feet " and an Assistant Superintendent of the Geological Department estimated that it would be possible to get in a pit  $20' \times 3' 25' \times 50'$  about 300 tons of ore with 76 tons of sulphur, assuming it was only 20 per cent. of the total weight. When analysed the sulphur content was found to be low, i.e., from 17.8 to 19.35 and much of the sulphur appeared to have been carried away owing to decomposition at the surface. Below a certain depth say 50', the unaltered ore body could perhaps be found which would probably yield double the amount of this sulphur "

*Sir Edwin.*—I wanted to go down and test that, because I thought it might be an attractive proposition.

*President.*—Then as regards pyrites the position is this that it would not be true to say that no pyrites exist. The position is that pyrites does exist in the country in fairly large quantities, but that we can't say definitely what quantities are available or how much sulphur they will contain. Is that right?

*Dr. Fermor.*—We should not frame any policy on that until we investigate further.

*President.*—We can say this much, can we not, that pyrites has been discovered in the country and that is the largest quantity found in one single locality? Formerly we heard that they were found in the Punjab, in Baluchistan and other places in very small quantities, but Madras is the only place where it is more or less concentrated in one place.

*Dr. Fermor.*—Yes. Baluchistan is too far away.

*President.*—The position is that raw materials do exist in the country, but for financial or some special reasons, they are not able to make use of these.

*Dr. Fermor.*—I think we might anticipate that if the present copper scheme is successful in Singhbhum, they will continue the work of exploring the copper belts and find other suitable belts for treatment.

*Sir Edwin.*—It depends on whether this 3 per cent. copper ore is maintained.

*President.*—Have any ores been found in other parts of India?

*Sir Edwin.*—Nothing worth mentioning. The only copper of any importance that has been found is in Singhbhum. In Burma it accompanies the lead, zinc and silver.

*President.*—Have they found no zinc in Singhbhum?

*Dr. Fermor.*—Little, but no deposit of any size.

*Sir Edwin.*—There is no doubt that the most promising source of sulphur in the Indian Empire is the zinc concentrates from Bawdwin in Upper Burma.

*Dr. Fermor.*—I agree.

*Sir Edwin.*—Sulphuric acid cannot be made at Bawdwin owing to the difficulty of transport, Bawdwin being about 600 miles from Rangoon.

*President.*—The position is this. They manufacture these different chemicals in the country. At present it is merely a question of the unit of production. The whole case essentially depends on that. If they are able to show that having a reasonably large unit eventually they can do without

protection, they will have it, but not otherwise. This Board doesn't recommend protection without first satisfying itself that protection is required for a temporary period and that eventually the industry would be able to do without it.

*Dr. Fermor.*—I think, I should draw a distinction between sulphuric acid in fertilisers and things that are made out of sulphuric acid.

*President.*—What kind of distinction you would make?

*Dr. Fermor.*—Fertilisers should be as cheap as possible. Nothing should be done which would put up the cost of fertilisers.

*Dr. Matthai.*—The point about fertilisers is that if it is going to be used very largely, it has got to be made cheaper. Supposing we found that there was a case for developing the fertiliser industry in India—we quite recognise that putting a duty and making the fertiliser expensive would check its use—but we gave it protection in the form of a bounty, the people who manufacture it will be able to sell it cheaper?

*Dr. Fermor.*—It would not be an economical proposition.

*Dr. Matthai.*—Supposing by means of a bounty you enable them to make a larger quantity of fertilisers and in that way the costs go down, as a result of enlarged output, and a bigger market, they may be able to hold their own ultimately without protection. Supposing that was the position, your objection would not hold. Your objection is primarily to a duty making fertilisers more expensive.

*Dr. Fermor.*—I agree.

**BOMBAY, BARODA AND CENTRAL INDIA RAILWAY  
COMPANY, LIMITED.**

**Oral Evidence of Mr. O. GOMES, Deputy Traffic Superintendent,  
Rates, recorded at Bombay on Monday, the 17th  
December, 1928.**

*Introductory.*

*President.*—Mr. Gomes, what position do you hold in this Railway?

*Mr. Gomes.*—D. T. S. Rates.

*President.*—Mr. Henman, what position do you hold?

*Mr. Henman.*—Acting Deputy Controller of Stores.

*President.*—Are you in charge of the policy of the Bombay, Baroda and Central India Railway Company or are you merely familiar with the amount of rates?

*Mr. Gomes.*—That is all.

*President.*—You have simply come here to tell us what the freights are.

*Mr. Gomes.*—Yes.

*President.*—Have you discussed this question with the Agent?

*Mr. Gomes.*—No.

*President.*—Did you get the subsequent letter that we wrote to the Agent enclosing him a copy of the letter which we addressed to the Great Indian Peninsula Railway?

*Mr. Gomes.*—Yes, copies of proceedings; the questionnaire and the answers put in by the firms.

*President.*—My Secretary sent you another letter enclosing a copy of the letter dated the 30th November, 1928, which he wrote to the Agent, Great Indian Peninsula Railway, have you got that?

*Mr. Gomes.*—Yes.

*President.*—Did the Agent see that letter?

*Mr. Gomes.*—I am not sure whether he personally saw it.

*President.*—Is it not his business to see letters which he receives from responsible authorities?

*Mr. Gomes.*—I don't know what the practice is in the Agent's office. He has a Secretary.

*President.*—Who is the Agent?

*Mr. Gomes.*—Sir Ernest Jackson.

*President.*—Who is his Secretary?

*Mr. Gomes.*—Mr. Medley.

*President.*—Did you get this letter from the Agent's office with any office note?

*Mr. Gomes.*—A copy of the letter has been sent down to the Traffic Manager for information.

*President.*—What action was taken on this letter?

*Mr. Gomes.*—I couldn't tell you.

*President.*—Do you understand the import of that letter especially the last paragraph of that in which we make it perfectly clear what we wish to discuss?

*Mr. Gomes.*—Yes.

*President.*—This is not a point which we can discuss with you.

*Mr. Gomes.*—I can give you any information you want.

*President.*—It is not a question of information: it is a question of policy.

*Mr. Gomes.*—I will go and speak about it to the Agent's office and see what they have to say.

*President.*—The Agent knows or ought to know from our letter that this Board was concerned in this matter with larger questions of policy. We could get information of the kind you can supply from any subordinate officer of the railway. Here we expressly say in our letter what we are going to discuss:—

“The subject which the Board wishes to discuss with you generally is the possibility of assisting the Indian industry by reducing the freight on raw materials and on finished products and also in case it is decided to recommend such assistance how far and in what form it would be possible to safeguard the interests of the railways.”

You have been sent here by the Agent and I have no doubt that you will give us the information that is in your possession. But this is not merely a question of information and I do not see what practical purpose would be served by my going on with your evidence this morning. Of course I cannot compel the Agent to appear before the Tariff Board if he does not wish to, but this Board can always make its observations in its report.

*Mr. Gomes.*—I think the impression in the Agent's office when they first received your letter. . . . .

*President.*—Did not the Agent see the correspondence?

*Mr. Gomes.*—He did see the first letter which you wrote.

*President.*—Did he not see the second letter?

*Mr. Gomes.*—I am not sure about it, but I know he has seen the first letter, because his remarks are there. In sending the letter down to the Traffic Manager, this is what he says:—“It will be necessary to give oral evidence before the Tariff Board. Will the General Traffic Manager kindly let the undersigned know whom he proposes to nominate”.

*President.*—Does not the Agent know that when questions of policy relating to his administration are under discussion, it would be more appropriate if he himself appeared?

*Mr. Gomes.*—I could not answer that.

*President.*—I have no doubt you will convey to him what I have said just now. We shall have to make our observations about this when we come to write our report for we have not received assistance of the kind we expected from this Railway Administration. This is a very important point. It is not merely a question of knowing how much freight is payable from one place to another. We have received no communication either to say what views the railway had on the points raised in the correspondence in order that we may know what they are going to say.

*Mr. Gomes.*—We are only asked to give oral evidence.

*President.*—Yes, but through some person who is responsible for the policy of the Company. As I told you, I don't think it will serve any practical purpose at all merely to discuss the amount of rates with you if you don't direct the policy of the Company. In these circumstances I don't propose to take your evidence. Of course your evidence would have been useful if it had been put to the Board through more responsible officers of the Company. You might have advised them as an expert on any particular point and then the more responsible officers of the Company could have made a statement. But as it is I don't see what purpose it would serve if I am to examine you on these points. You can tell the Agent so.

(Mr. Gomes then withdrew.)

## GREAT INDIAN PENINSULA RAILWAY.

Oral Evidence of Mr. D. S. BURN, Agent, and Mr. H. J. RAPER,  
Deputy Traffic Manager, Great Indian Peninsula Railway,  
recorded at Bombay on Monday, the 7th January, 1929.

### *Introductory.*

*President.*—We are very much obliged to you for coming here this morning to assist us. There are some very important questions to be discussed and I am sure that your evidence will be of very great help to us in coming to our decision. As I have already told you the question of freight is a very difficult matter. We do not propose to go into any details but mainly into questions of principle.

*Mr. Burn.*—Yes. I shall be very glad to be of any help I can.

*President.*—The Great Indian Peninsula Railway is now a Government Railway, is it not?

*Mr. Burn.*—Yes.

*President.*—Since when?

*Mr. Burn.*—Since 1925.

*President.*—This taking over the railway by Government, has it made any difference in the principles of management, that is to say, are you still treated as if you are a separate railway?

*Mr. Burn.*—We are a separate financial entity.

*President.*—That is to say, you work independently of other State Railways.

*Mr. Burn.*—Yes.

*President.*—Practically as you did before?

*Mr. Burn.*—Much, as we did before.

### *Rates.*

*President.*—For instance, within the powers that you possess you will be able to fix your rates and freights without any control by Government.

*Mr. Burn.*—I would not say that. Whenever any matter of great importance in rating is under consideration the Railway Board is consulted.

*Dr. Matthai.*—Take a small question like this—the general classification of goods for freight purposes. Supposing you were trying to transfer an article from one class to another, could that be done by you on your own initiative?

*Mr. Burn.*—That has to be done by Government.

*President.*—What I mean is this. Take the case of the East Indian Railway now, which has also become a Government Railway. Formerly you were both company managed railways and whenever there was any competition between you and the other railway at some points—we will put it that way—you had, within the terms of your contract, the right to fix your rates. So had the East Indian Railway. But now supposing any conflict arose between you and the East Indian Railway, would you have the same freedom as you had before?

*Mr. Burn.*—There is very little difference. As a matter of fact, we are competing now against the East Indian Railway as we used to do before, when we were company managed railways.

*President.*—That is what I want to know. You do compete.

*Mr. Burn.*—Yes.

*President.*—Therefore for practical purposes, the management remains the same.

*Mr. Burn.*—For all practical purposes, the fact that Government have taken over the railway makes very little difference in the details of raising rating.

*President.*—What is the control that Government have now? Formerly, the control would be considerably modified by the contract. Now, that contract has gone, has it not?

*Mr. Burn.*—Yes.

*President.*—Now the control exercised by the Railway Board would be by the general orders that it gives.

*Mr. Burn.*—Yes, so far as rating is concerned.

*President.*—I am only dealing with rates just now,—and also by the Railway Act.

*Mr. Burn.*—There is a difference in the standing of the railway under the Government and under the Company régime. The Government of India have power to give instructions to levy a certain rate. They have full power, if they choose to exercise it, over the whole of the Great Indian Peninsula Railway. Whatever orders the Railway Board gives me, I have to follow.

*President.*—Subject to the Railway Act.

*Mr. Burn.*—Yes.

*President.*—So, within the Railway Act, the Railway Board can give you whatever orders it thinks fit.

*Mr. Burn.*—Yes.

*President.*—What I do not understand is this. Supposing your traffic passes over your own line and some other foreign railway—it must often happen like that—supposing the Railway Board say 'quote so much on your own system', the company managed railway which is receiving the traffic can still fix its own rates.

*Mr. Burn.*—That is so.

*President.*—And that does happen.

*Mr. Burn.*—Each railway fixes its own rate over its own line.

*President.*—So far as Government railways are concerned, Government can give definite orders and make the rates uniform on their own systems.

*Mr. Burn.*—Yes.

*President.*—When one of the receiving railways is a private railway, what can Government do?

*Mr. Burn.*—Government fix the maximum and the minimum to be charged. I don't think that it is within the power of the Government to order a company managed railway to charge a particular rate for a particular commodity between two stations.

*President.*—They cannot do that.

*Mr. Burn.*—I don't think they can.

*President.*—We are looking at the question from the point of view of the industry now. Supposing we found that on a particular commodity with which we are now concerned either as regards its raw materials or as regards its finished products the freight was excessive and we recommended that it should be reduced—for instance we find that the freight from one point to another is Rs. 25 which is excessive but we are of opinion that it should be reduced to Rs. 10: that commodity passes partly on your own system and partly over a company worked railway—and supposing Government agreed with us that the total freight ought to be reduced from Rs. 25 to Rs. 10 in what way could Government enforce it?

*Mr. Burn.*—Government could make a recommendation to the company managed railway.

*President.*—But the railway administration would not be bound by it.

*Mr. Burn.*—I am talking without the book.

*President.*—I just want to understand the position.



*Mr. Burn.*—So far as I understand it, Government would not be in a position to say to the company managed railway 'charge such and such a rate from a particular junction to the point at which traffic arrives'.

*President.*—Therefore it must eventually rest in the last instance with the company managed railway.

*Mr. Burn.*—Yes, within the maximum and minimum it must rest in the last resort with the company managed railway.

*President.*—Can you give any instance where this question has arisen, where for instance you have reduced the freight and the company managed railway has not? You come into contact with the Southern Mahratta Railway and the Bombay, Baroda and Central India Railway.

*Mr. Burn.*—Those are two of the company worked systems with which we come in contact. There are many instances in which it is to the interests of one railway to reduce rates, for instance to bring traffic on its own line, and in which it is not to the interests of another railway to reduce rates. In such a case, the latter railway will refuse to reduce the freight. Let me give you an illustration. Supposing you have a station on the East Indian Railway within a short distance from a junction with the G. I. P. Ry. The E. I. Ry. wish to draw the traffic towards Calcutta for export whereas we wish to draw it towards Bombay. They would charge the full rate up to the junction and we would charge a reduced rate from the junction to Bombay with the intention of drawing that traffic towards Bombay.

*President.*—I think that you had the same difficulty with the Bengal Nagpur Railway between two junctions. What happened eventually?

*Mr. Burn.*—We charge certain low rates from *viâ* Nagpur. I can find out the details for you if you like.

*President.*—Nagpur is the terminus for the Bengal Nagpur Railway on this side.

*Mr. Burn.*—Yes.

*President.*—Supposing any goods come from a station further east of Nagpur, then on that section between that place and Nagpur they will charge at a higher rate.

*Mr. Burn.*—Yes, providing the traffic concerned is competitive. It is however more correct to state that the rate to *viâ* Nagpur would be the normal or class rate and the rate to the east a reduced rate because the rate to *viâ* Nagpur has not been increased; it is the rate to the east that is reduced.

*President.*—I can understand that competition between a Government railway and a company managed railway. But why should it happen between two railways belonging to Government?

*Mr. Burn.*—The rating has been built up over a long term of years. If you suddenly say to the East Indian Railway and the Great Indian Peninsula Railway 'you will no longer try to draw traffic either to Calcutta or to Bombay', the freight adjustments would have a very considerable effect on trade.

*President.*—It would be better for the trade.

*Mr. Burn.*—I don't think that it would necessarily be better for the trade: for instance if after low charges have become established you suddenly say that you are going to stop them.

*President.*—I agree that as regards some of those commodities in which there has been some competition if there is no longer competition the rates may be raised. But taking the system as a whole it must mean this that where you have got to charge exceptionally low rates, you have to make good your loss thereby keeping up your rates higher elsewhere.

*Mr. Burn.*—I disagree. The profit that we get from these very low rates enables us to charge lower rates for other goods, than we should otherwise be able to do. Generally speaking, the greater the traffic the lower the rates.

*President.*—The whole point is this. In the case of goods travelling over two systems, what happens now is this: up to Nagpur you will have one rate

and as another system begins at Nagpur, the commodity will be charged from Nagpur onwards at a higher rate than otherwise if the whole distance is taken together. That appears to me to be an anomaly for which we see no justification.

*Mr. Burn.*—It seems to me that the trend of your argument is that the goods should be charged at the same rate per mile per maund in whatever direction they go.

*President.*—Provided they travel over the Government systems.

*Mr. Burn.*—I don't think that such a system would be workable. I think that it would be quite impracticable to introduce such a system of rating in India. I would like to instance the case of Cawnpore which is a station in the United Provinces—somewhat nearer to Calcutta than it is to Bombay. The East Indian Railway tries to draw the Cawnpore traffic to Calcutta whereas the Bombay railways try to draw it towards Bombay. If you insist that the rates should be strictly according to the distance, all the Cawnpore traffic would go to Calcutta and Bombay would be cut out of competition with it. Cawnpore instead of having two ports for exports would have only one.

*Dr. Matthai.*—What you said just now would not apply to the telescopic system. Supposing we are taking the question of some raw material from Madras and the thing has to be conveyed for about 1,000 miles partly on the M. & S. M. Railway and partly on your own line: under the present system, it is impossible to give a telescopic rate.

*Mr. Burn.*—If it travels at schedule rates, the first schedule applies to the junction and then a second schedule operates.

*Dr. Matthai.*—You cannot have a continuous telescopic system.

*Mr. Burn.*—Under the present system, we do not have it as a rule, it usually applies for coal. Telescopic rates at present have been continued for each Railway, they are not suitable for universal application.

*President.*—I am coming to those rates presently. At present what I wish to understand is, if this Board came to the view that the freight on a certain commodity was excessive and that it should be reduced to a particular figure, how would the railway administrations, assuming that Government accepted our recommendation, be able to give effect to that?

*Mr. Burn.*—The Railway Board could give an order to the Great Indian to charge a particular rate, and they could recommend to the company managed railway that a particular rate should be charged.

*President.*—Supposing the total freight was reduced from Rs. 25 to Rs. 10, they would have to work out in what way the freight should be regulated on the different systems.

*Mr. Burn.*—That might in itself be a complicated matter. One might do it in proportion to the mileage or in proportion to the charges at the time existing. There are different ways of adjusting the reduction.

*President.*—I do not suggest that any company managed railway would ignore the views of the Railway Board. But supposing it did what would happen would be this. Supposing there was equal mileage between you and the company managed railway, each one would be entitled to Rs. 5 but if the company managed railway were entitled to charge Rs. 7, you would have to take Rs. 3 leaving to them Rs. 7.

*Mr. Burn.*—It would be a matter for the railways as to how the proportion should be taken out.

*President.*—In that case you would settle the difference or would the Railway Board do it?

*Mr. Burn.*—The railways themselves would do it.

*President.*—Supposing the Railway Board found the freight excessive and said it ought to be Rs. 10. Can they enforce that?

*Mr. Burn.*—Supposing the rate had to be reduced from Rs. 25 to Rs. 10, then the Railway Board would say "this reduction has to be made; make it

between yourselves. You come to an agreement". If the railways could not come to an agreement then they would go to the Railway Board for a decision.

*Alternative form of protection.*

*President.*—There is this Railway Rates Advisory Committee. We are not going into the same sort of questions which they are going into. We are not really concerned with the policy as regards rates and preferential treatment and thousand other things. What I wish to know is this: There is an agreement between the Government railways and the Government, and there are also the company managed railways who have got their own contracts. Supposing we said "we have come to the conclusion that the freight should be reduced to Rs. 10" and at the same time we said if there was any objection on the part of either the Government because of the financial arrangements or on the part of the company managed railways, they should go to the Railway Rates Advisory Committee and show that this rate that we recommend is too low and that they would lose, and the Railway Rates Advisory Committee found that it would lose, then in that case the difference must be made good by Government as Government, would not that sufficiently safeguard the railway administration? If the railway administration was not able to establish its case then the recommendation for freight reduction would stand. It would stand in any case. In the case in which you are able to establish that the railways would lose, Government says it is in the public interest that this freight reduction should take place but that the railways should not suffer to the extent to which they would lose and that this should be made good out of general revenues. The whole point is this, that we as a body have got to consider which would be the best form of protection to an industry, whether it is by way of a direct bounty or whether by way of raising the duties or by means of a reduction in freight if we came to the conclusion that on the whole it would be cheaper for the country to get this reduction in freight; taking the country as a whole, and the consumer and the Government revenues, there is nothing to prevent us from saying so whether Government accepts this recommendation or not. We must first of all satisfy ourselves that the industry has made out a case for protection and then if we came to the conclusion that the industry has made out a case, we have to consider how that industry ought to be protected, whether by increase in the duty, or by bounty or by reduction in freight. Having considered all these facts we say on the whole we think that it is by a reduction in freight that it ought to get assistance.

*Mr. Burn.*—That would be subsidising the industry out of railway rates.

*President.*—In that case there would be no objection on the ground that it would be subsidising the industry, because a direct bounty also subsidises an industry.

*Mr. Burn.*—It might have a very awkward effect on the rates. One of the points that arises with low rates is that people would book to the station from which the low rates operate and then re-book in order to get cheaper rates than if they booked from their own stations direct to the station of destination.

*President.*—That would happen. Supposing it was possible to do it in such a way that the advantage was given only to a really *bonâ fide* industry.

*Mr. Burn.*—You mean it will be for the Railway Board to say that what the railways suffered financially should be made good by Government?

*President.*—It would be fair for the railways to say that 'we are ready to reduce this but you must pay for it', that is to say that the railways must establish their case before the Railway Rates Advisory Committee or any corresponding body which goes into the question. Then what objection could there be from the point of view of the railways?

*Mr. Burn.*—You mean if they established before the Railway Rates Advisory Committee that the particular rate was the proper rate to be charged, that Committee would advise Government accordingly and if Government agreed to it that rate would be brought into effect?

*President.*—Supposing our recommendation is accepted that the rates should be lowered, then the difference between the old rate and the rate fixed by the Committee must be made good by Government from the general finances.

*Mr. Burn.*—Then there would be no financial loss to the railways?

*President.*—Supposing the railways were able to establish financial loss, then if our recommendation is coupled with this proposal that in such an event Government should make good the loss, would it not be all right for the railways?

*Mr. Burn.*—There are practical difficulties, particularly the one I mentioned just now, this matter of re-booking. I don't see at the moment how it can be got over. It is a question I would like to have time for consideration.

*President.*—This Board is not recommending any general reduction of freights but it is only concerned with industries the protection of which it recommends and therefore it is of importance to know how, if the railways are prejudiced, they should be safeguarded.

*Mr. Burn.*—I should like to have time to consider that.

*President.*—You can take your own time about this and let us know.

*Mr. Burn.*—Yes, I will.

*President.*—In the case of raw materials it would apply for instance to the raw materials booked direct to the factory; in the case of the finished article it would apply to goods *ex* factory to destination. Obviously we cannot say if any goods of the kind protected are exported from any place without your being able to identify its place of origin. That we quite understand, but supposing it was confined to bookings to and from factory, the chances of re-booking are not very great.

*Mr. Burn.*—We have had instances where goods had been brought to the factory to be consigned at siding rates.

*President.*—In this particular case the number of factories would be very limited and we know pretty nearly what their consumption of raw materials is likely to be and how much their finished products are likely to be, so that very great difficulty is not likely to arise.

*Mr. Burn.*—It would mean that we should have to have some sort of certificate at the station. The factory as a rule stands away from the station and the goods are brought by bullock cart or some such conveyance.

*President.*—The factory has got to satisfy the railway that they are their goods.

*Mr. Burn.*—Yes.

#### *Classification.*

*President.*—I want to understand a bit about this classification of freight. I see there are 10 general classes.

*Mr. Burn.*—Yes.

*President.*—I think the last classification came into force in 1922.

*Mr. Burn.*—Yes.

*President.*—That classification provides for maximum and minimum rates?

*Mr. Burn.*—That is so.

*President.*—There are only two minimum rates—1 and .166?

*Mr. Burn.*—Yes.

*President.*—That is to say 1/10th of a pie and 1/6th of a pie.

*Mr. Burn.*—Yes.

*President.*—But the maximum rates are in each case different?

*Mr. Burn.*—Yes.

*President.*—By what authority was this classification made?

*Mr. Burn.*—It was made by a Committee of the Railway Conference and approved of by the Government.

*President.*—It is very difficult to find out the general basis on which this classification is made. May I take it that the minimum rate would represent the amount which would just be enough to cover its operating cost and a little more?

*Mr. Burn.*—I should like to say at this stage that I should be obliged if the answers I am giving to your questions are taken as provisional, that is to say before my statement is finally completed I should have a chance of revising it and altering it if necessary.

*President.*—That is always our practice. After this evidence is taken down, it will be typed and then sent to you and you are at liberty to correct it. But if you make any substantial additions you should draw the Board's attention to them.

*Mr. Burn.*—I am much obliged. My answer to your question is that if all articles had been carried at the minimum rate of .1 pie per maund per mile railways could not have possibly made any profit.

*President.*—The whole point is this. There is no point in keeping the minimum unless it serves some purpose.

*Mr. Burn.*—The reason why this minimum was fixed, many years previous to 1922, was because of certain lines which were guaranteed by Government and not earning their guarantee. If no minimum had been fixed they could have charged an extremely low rate which meant that they would carry goods at a loss, so Government in order to prevent these railways from charging ridiculously low rates and thus not paying the guarantee put in a minimum below which they could not go.

*President.*—And also prevent reckless competition?

*Mr. Burn.*—Yes.

*Dr. Matthai.*—May I take it that at the time the minimum of .10 was fixed the implication was that .10 meant not merely that railways at that rate would cover their operating expenses but might be able to make about 3½ per cent.?

*Mr. Burn.*—I am sure that was not the idea.

*Dr. Matthai.*—It left a little margin above operating expenses, did it not?

*Mr. Burn.*—I of a pie per maund per mile was the lowest charge that they could make, but the actual rates they charged were far above the minimum in the vast majority of rates. If they had charged everything at .10 they would never have been able to pay 3½ per cent. or any other interest. The minimum of .10 only applies, of course, to the first and second classes.

*President.*—Would it be possible for anybody really to find out whether a particular rate paid or did not pay?

*Mr. Burn.*—You can find that out only by a system of averages.

*President.*—The averages are all right as applied to a particular commodity. What I wish to know is, would you be able to establish that this rate of .10 must necessarily mean a loss to you?

*Mr. Burn.*—We know what the average cost of carrying a ton a mile is; we know what we call the additional traffic. Additional traffic is carried at about 1/3rd the cost of ordinary traffic. I would like to refer you to a statement I have here on that point: It is that which can be carried at the dependent cost without loss. In the notes on the G. I. P. Railway Statistics, January 1926, dependent cost is defined to be that part of the expenditure that is dependent on the moderate variation in the number of trains and train mile. The moderate is introduced to prevent dependent cost being stretched to cover cases where variation is large enough to enforce a change in railway policy . . . . .

*President.*—What it comes to is this. You would take the traffic which would just enable you even to cover your operating costs and a little more rather than let it go.

*Mr. Burn.*—Precisely. Supposing we are asked to run a train for carrying magnesia from point A to point B, we can judge within very narrow lines as to what the actual cost of that train is.

*President.*—That is the minimum at which you would be prepared to carry.

*Mr. Burn.*—With a small profit added.

*Dr. Matthai.*—What you call additional traffic is really the traffic which you can carry in addition to the existing traffic without an increase in your equipment.

*Mr. Burn.*—Yes, and that traffic only costs, roughly, a third of what ordinary traffic costs.

*President.*—Take the 1st class as '38. We assume that it pays you and covers everything. Then '12 would be the rate at which you can just afford to carry.

*Mr. Burn.*—No.

*President.*—I take it you would take your average cost per ton, that is to say of all traffic and a third of that you consider would be the cost of the additional traffic.

*Mr. Burn.*—That is so.

*President.*—Take some of these commodities, copperas and Glauber's salt just by way of illustration. Copperas, I think, is first class and Glauber's salt is third class. They are more or less the same stuff to carry. How can you say that it pays you to carry copperas at the minimum, but it doesn't pay you to carry Glauber's salt at the same rate? How can you establish that?

*Mr. Burn.*—Supposing I say that I am not taking the line that it does not pay us, but it doesn't pay us as much as it should pay.

*President.*—Let us suppose that 100 tons of copperas are to be taken to Poona and I am giving you 100 tons of Glauber's salt. I am the consignor of both the commodities. You tell me that you would charge me for copperas at the 1st class rate and for the Glauber's salt at the third class rate. I say to you that they are the same stuff.

*Mr. Burn.*—I shall let you hear as to this later.

*President.*—Really speaking has every article that is put under a particular classification been considered absolutely from that point of view or is it more or less a rough-and-ready method?

*Mr. Burn.*—The classification is not drawn up really in a scientific manner.

*President.*—Can you prove to me that the Glauber's salt despatched from Bombay must pay you a higher freight than copperas sent from Bombay to Poona?

*Mr. Burn.*—I should say that one is really more expensive than the other and therefore other things being equal, it should be in a position to pay a higher freight.

*President.*—Supposing the commodities are within the same category . . .

*Mr. Burn.*—Then they come under the same classification. I don't say that the classification is perfect.

*President.*—Have the authorities responsible for the classification gone into all these questions when they classified?

*Mr. Burn.*—It is a growth of many years and built up gradually.

*President.*—Are there any principles on which this classification is based?

*Mr. Burn.*—One is the value of the article.

*President.*—I take it Class I represents the cheaper articles.

*Mr. Burn.*—Yes. Other things being equal, articles of the highest value will be in the highest class. There are other factors. There is the danger of carrying the commodity and the space it occupies.

*Dr. Matthai.*—The amount of traffic which offers in each commodity.

*Mr. Burn.*—That is also important. I have noted down a few things which have to be taken into account. The following are some of the factors certain of which must be and others may have to be taken into account in fixing rates:—Maximum and minimum charges sanctioned by Government; whether the traffic is additional or not; whether in train loads or wagon loads or in small quantities; relation of bulk of goods to weight, which is very important; whether goods are travelling in the direction of the flow of traffic or not. (We have to return empties. Normally the trend of traffic is towards Bombay so that we have to return a lot of empty wagons up-country and it is obviously very much cheaper to put goods in wagons which have to travel empty against the flow of traffic, than it is to carry goods with the flow of traffic.) Risk attendant on transportation; increase in value which transportation gives, that is to say the value of service to trader; what the traffic can bear. I should like to bring to your notice an extract from Ackworth's Elements of Railway Economics on the principle of what the traffic will bear.

*President.*—That is an important point from our point of view as I just now explained to you. The whole point is this that in the case of a new industry where you have no traffic at all, if it was shown to you that the reduction of freight will bring that industry into being and give you that traffic which you had not, and the freight was fixed in such a way that that traffic was created for you . . . . .

*Mr. Burn.*—Provided that traffic gave a reasonable profit.

*President.*—Yes. Then to start with would it be unfair from the Company's point of view if the lowest rate was fixed? It would just cover your expenses and a little profit.

*Mr. Burn.*—I should say it would be reasonable.

*President.*—We have got no criterion for judging what that rate would be. It is quite possible on the same facts to come to very different conclusions by attaching different degrees of importance to the different points.

*Mr. Burn.*—That is so.

*President.*—Therefore for that reason don't you think that it would be sufficient if we said that the lowest minimum rate might just pay the railway to start with subject of course to what the railways have to say afterwards. You can show afterwards that the lowest rate would make you lose.

*Mr. Burn.*—I think the better way of dealing with that would be to give the railways specific questions as to what rate could be charged on such and such a commodity and then it is for the railways to answer after full consideration what is the rate they would recommend.

*President.*—This Board is not an expert body on freights. This Board can only say that this article can only bear a freight of say Rs. 10 and it can say also that a freight of Rs. 10 will give the Railway Company 15 per maund per mile which is a little higher than the minimum rate and this Board thinks that it is a reasonable rate for the Company to take. We would leave it at that. If the railway companies are not satisfied, then they can go to the Railway Rates Advisory Committee and say that this rate is too low. We can't go into all these questions. Would you call that an unfair proposal? This proposal would safeguard your interests in this way that if giving effect to this proposal meant a loss to the railways, then there is a procedure provided by which you can represent your case.

*Mr. Burn.*—Your point is that if you fixed a certain rate, say 15 per maund per mile and the railways considered that 20 per maund per mile would be reasonable, then this question could go before the Rates Advisory Committee. If that Committee decided that 20 was a fair rate, then the difference between the two should be made up by the Government of India. The Railway Rates Tribunal is only an advisory body. It has no power of fixing the rates itself. It can only advise the Government of India that such a rate should be applied.

*President.*—That is all that is required. The Government of India can either accept its advice or overrule it.

*Mr. Burn.*—I would like to have further opportunities of finding out what are the practical difficulties.

*Dr. Matthai.*—At present the lowest rate which you are in a position to charge is '1 which is the minimum for class I. Supposing there was a suggestion that something lower than that should be charged—say '05, would you be able to do that on your own initiative?

*Mr. Burn.*—No, not without Government's sanction. The maximum is fixed by Government and the minimum is fixed by Government. The railways have only power to fix rates between the two.

*Dr. Matthai.*—Are there charges lower than '1?

*Mr. Burn.*—Coal is charged at a lower rate with the sanction of Government.

*President.*—Speaking generally the tendency for the railways is rather to approximate to the higher than the lower limit as regards freights.

*Mr. Burn.*—I should say that we regard the maximum for those 10 classes as the normal rate, that is to say that every commodity for which a special rate is not charged is charged at the class rate.

*President.*—But the special rate would more often than not approximate to the maximum.

*Mr. Burn.*—No.

*Dr. Matthai.*—If you charge a schedule rate or station to station rate, that rate must not in any case be lower than the minimum.

*Mr. Burn.*—It cannot be lower than the minimum.

*President.*—May I take it that all articles have been classified?

*Mr. Burn.*—Practically all the articles carried by railways appear in the classification.

*President.*—You have not the power to transfer any article from one classification to another, is that right?

*Mr. Burn.*—Yes, but it must be remembered that for any commodity in the third or any higher class we can charge a special rate as long as we do not go below '166.

*Dr. Matthai.*—What you mean is this: In substance you may alter the classification to this extent that you are not bound to follow the maximum rate, but may alter it to a rate not below the minimum.

*Mr. Burn.*—We cannot exceed the maximum. Take the 5th class rate, the maximum of that class being '77. We may have an article in the 5th class for which we may charge '39. It does not mean that thereby we have changed the classification. The article still remains in the 5th class.

*President.*—It has the effect of changing the classification.

*Mr. Burn.*—In one sense it has the effect of changing the classification and in another sense it has not.

*Dr. Matthai.*—As a matter of fact a good deal of latitude is given to the railway as regards classes from 3 to 10 because the minimum is the same for all these classes. By lowering the rates to that limit you can so to speak abolish the distinction between one class and another.

*Mr. Burn.*—In a sense, that is so.

*President.*—That is just the point which is puzzling me. What is the point of having the classification?

*Mr. Burn.*—Supposing an article is not charged a special rate, it automatically falls under the classification.

*President.*—The classification really comes in when there is no special rate fixed.

*Mr. Burn.*—That is not so. The class rate applies to any article that is not charged a station to station rate or schedule rate.



*Dr. Matthai.*—Those two rates are entirely left to you.

*Mr. Burn.*—Yes, as long as we keep within the maximum and minimum of the particular class concerned.

*President.*—So far as classes 1 and 2 are concerned, there is no margin for changing the classification.

*Mr. Burn.*—We have no power to change the classification.

*President.*—In effect it comes to the same thing.

*Mr. Burn.*—That is so.

*President.*—As a matter of fact if you so desire practically you can ignore the classification—3 to 10—by not going below the limit of '166.

*Mr. Burn.*—Yes.

*Dr. Matthai.*—Supposing for example you are in a position to charge a special or station to station rate for a large number of articles in the first two classes at '1 and for a large number of articles from class 3 to class 10 at '166, it is open to you to do it.

*Mr. Burn.*—Yes.

*Dr. Matthai.*—Practically it would mean that you would work on a two-fold classification.

*Mr. Raper.*—We have not considered it in that light at all.

#### *Effect of freights on any scheme of protection.*

*President.*—It has got a very great bearing on the points we are considering. The position is this. We fix a measure of protection on certain principles and we take freights into account generally. We must assume that the rates which are in force at the time we make our recommendation would continue to remain in force but the railway administrations have got the power to alter the rates within these two limits.

*Mr. Burn.*—That is so.

*President.*—That alteration can take place without any reference to us and therefore our whole scheme may be considerably modified merely by the action of the railway from its own point of view. I am not blaming the railway. Take the case of steel. The scheme of protection is in force. The industry is doing well and you say that the industry ought to pay more freight. You raise the freight and the effect of that might be that our scheme is entirely modified. You work from your own point of view. You are not concerned with protection. You say "The rate should be raised" and you increase it. The effect of that is that the domestic industry finds that it is not able to get the price that we thought it ought to get and the whole scheme of protection fails.

*Mr. Burn.*—May I state what the policy of the railway is? I have taken some pains in considering the matter that you have raised. The policy of this railway is to take no action by the manipulation of railway rates or in any other way to favour imported manufactured articles or commodities at the expense of those which are indigenous or *vice versa*.

*President.*—This is where the conflict comes in. The policy of protection implies that indigenous articles should have preference over foreign.

*Mr. Burn.*—If I may continue, our view is that if any indigenous manufactures require protection, they should be given protection in some other way than by the quotation in their favour of specially low rates. Manufactured articles and commodities whether imported or indigenous are charged at the same rates.

*President.*—We entirely agree that it is not for the railways to manipulate freights in such a way that they may increase or decrease protection. But the point is this. We assume that this Board has recommended that protection is to be given to an industry and Government have accepted that proposal. This Board has also recommended that the best way of protecting an industry is by giving it special freights. Now, unless the railway

administration is more or less precluded from making any alteration in freights which would have the effect of interfering with the scheme of protection, the scheme of protection will fail.

*Mr. Burn.*—I follow that.

*President.*—That is the point.

*Mr. Burn.*—The particular point that I want to bring before the Tariff Board is this. I have already read out some of the factors that are necessary to be taken into account before one settles a rate. They are very complicated indeed. Sir Wm. Ackworth says that rate making is not a science but an art. You cannot have any formulæ which can be applied in order to arrive at a rate. It is impossible to have formulæ on which we can work.

*President.*—It is for that reason very important that the railway should follow the policy of not fixing its rates with a view to protecting industries. There I agree. But here is a different body altogether whose function is to advise Government on questions of protection.

*Mr. Burn.*—If you introduce another factor in deciding the question of rating that in some particular instance it is necessary to charge low rates as a measure of protection, then the whole rating is thrown out of gear, because rates are all linked up. The rate on one commodity is linked up with the rate on another.

*President.*—If Government indiscriminately meddle with freights, that would happen, but when Government feel that the best way of protecting a particular industry is by means of reduction in freights either on its raw materials or on the finished product, that objection should not be really decisive.

*Mr. Burn.*—There is a further question to be considered. If the competing country were to take some counter measures which had the effect of bringing down the cost for its constituents, it would necessitate a further alteration in the rate in this country.

*President.*—Take the case of the Steel Industry. We fixed a certain scale of protection and then we said that the foreign steel must come at a certain price into the country. It is on that assumption that we recommend a particular rate of duty. But then we have provided that if for whatever cause or reason the price of foreign steel comes down below that figure, then Government have got to increase the duty. The same thing would follow in this case. We do not go into the causes which have brought down the price of the foreign article. We simply say "it has come down below the figure we have fixed; it is prejudicial to the indigenous industry and therefore the duty has to go up". That will be provided.

*Mr. Burn.*—I follow. But one of the points that might arise is undue preference.

*President.*—There is no undue preference when the legislature itself prescribes it.

*Mr. Burn.*—Yes.

*Dr. Matthai.*—How is undue preference defined in the Railway Act?

*Mr. Burn.*—It is nowhere defined.

*President.*—The railways nearly always can justify the reduction when it is in their interests to do so.

*Mr. Burn.*—I have got a long chapter on that which may interest you. There is no definition of undue preference in the Railway Act. It is not so much a question of law as a question of fact which depends on the circumstances of each particular case.

*Dr. Matthai.*—The argument against that might be this. Supposing as a result of protection there is going to be an increase in the amount of the particular commodity which is offering for traffic then the reduction of the rate, although in the first instance it is done for the purpose of preferring the industry, ultimately, as a result of the increase in traffic, may be consistent with the interests of the railway itself.

*Mr. Burn.*—That would lead to a very difficult problem. In certain instances in fixing the amount Government might come in between the rate suggested by the Tariff Board and the rate that the Rates Advisory Committee considers reasonable.

*President.*—You must fight that out.

*Dr. Matthai.*—When you give a preferential rate to the indigenous product then to that extent the indigenous product is replacing the imported product so that in the total amount of traffic offering there is no decrease.

*Mr. Burn.*—On the other hand you might get more traffic by means of the indigenous article taking the place of the imported article.

*Dr. Matthai.*—If you take a case like Epsoms, there is more traffic offering on magnesite.

*President.*—I take it that so far as the fixing of rates is concerned, the railways adopt a more or less neutral attitude, that is to say they don't necessarily fix rates with a view to encouraging indigenous industries?

*Mr. Burn.*—We don't fix rates with the idea of helping indigenous against imported commodity nor do we fix the rates to enable imported articles to compete against indigenous commodities.

*President.*—Supposing we came to the conclusion that we should recommend protection we must see that the indigenous industry should have preference. If protection takes the form of reduction of railway freight as regards the raw materials, the question would not arise in that form, but as regards the finished article, especially as regards articles manufactured at the ports, the question may arise. We may say that the indigenous article should be carried at a lower freight than the imported article. I can see the practical difficulties as regards that if the factory were situated at the port because then it would be very difficult for you to identify the goods, but where means of identification do exist, e.g., in the case of a factory situated at Ambernath, would it not be possible for the railways to fix the rates for the indigenous article booked from the factory to any destination at a lower rate than the imported article?

*Mr. Burn.*—If we got an order to do so, there would be no difficulty in carrying it out.

*President.*—Would that infringe the provision as regards undue preference or could railways always justify that on general grounds?

*Mr. Burn.*—I should say that would be undue preference. Let us take the case not of Ambernath but of Bombay where you have a factory and you arrange a system of certificates whereby the indigenous article is booked at a lower freight than the imported article. I think that would constitute undue preference.

*President.*—Take the reverse case which is not uncommon. On the whole freights from the ports are lower for the same distances than the freights from the interior, aren't they?

*Mr. Burn.*—In certain instances they are.

*President.*—That constitutes undue preference in favour of the imported article.

*Mr. Burn.*—No, because both the indigenous and the imported articles share in the reduced freight from the port.

*President.*—We will now take the case of Ambernath. I don't know whether it is your section.

*Mr. Burn.*—Yes. I know what you are referring to. They said that there were certain rates which were cheaper from Bombay than the rates from Ambernath.

*President.*—Messrs. Dharamsi Morarji Chemical Company said that in nearly every case the freight from Ambernath was higher to places situated up-country than the freight from Bombay.

*Mr. Burn.*—The Great Indian Peninsula Railway are prepared to quote the Bombay rates in every one of those cases. We should have been pre-

pared to do so at any time if the Ambarnath people had come to us and asked us to do so.

*President.*—It is perfectly true that you would do it, but I am now putting to you the case from the general point of view. You may take a very reasonable view of the case and say "I will do it because it is just and fair", but there is no guarantee that the other Agents would do it.

*Mr. Burn.*—We have a rate for grain and seeds of 9 annas from Cawnpore to Bombay whereas from Jhansi to Bombay the rate is 12 annas and Jhansi is 130 miles nearer to Bombay than is Cawnpore. The justification for this is competition with another railway. We are entitled to quote a lower rate to combat competition with the East Indian Railway and thus get a share of the traffic. We are justified from the point of view of undue preference in quoting this lower rate on account of competition with the East Indian Railway.

*President.*—But I think you may be able to apply the same argument to other places

*Mr. Burn.*—Coming to this particular point, when we have an indigenous article which is produced in the Great Indian Peninsula Railway territory, if we quoted a lower rate for it than for the other, we should give undue preference to the local article and the merchants dealing in the other commodities would have ground for approaching the Railway Rates Advisory Committee and complaining that we were not giving them a fair deal.

*President.*—Quite true. In the case of the Bombay, Baroda and Central India Railway the same thing applies. The whole point arises as to whether in this case your rates and that of the B., B. & C. I. Railway to Cawnpore are the same or whether they charge a higher rate. Take a case like Glauber's salt. The freight to Wadi Bunder is Rs. 1-8-6 and to Ambarnath Rs. 1-13-5.

*Mr. Burn.*—We are prepared to quote that rate.

*President.*—Quite true, but there is the point. We are now discussing the general principle, I am not dealing with the G. I. P. Railway system only. If the Government really wants to protect an industry they should make it a rule of general application that an industry which is established at a place nearer to the place of destination should have at least the same rate of freight as an industry established at the ports. Take a case like this where there is a difference of 5 annas a maund or about Rs. 9 a ton. That means that the indigenous industry is at a disadvantage in the Cawnpore market against the importer to the extent of Rs. 9 a ton which on Glauber's salt means 15 to 20 per cent. difference of duty.

*Mr. Burn.*—This factor of competition is an extremely important factor in rating and I don't think that it would be practicable to create a system of rating in India which would put it out of account. In order to get any share of the traffic from Cawnpore to Bombay we have to quote very low rates. From Jhansi and other intermediate stations we find that we can charge higher rates because the element of competition is lacking.

*President.*—We are dealing with this question from a different point of view. We have got to fix our measure of protection on certain principles and we say that an industry ought to get such and such price at the works and therefore we say "this industry has got a market of so much in Bombay alone but it has also got a market up-country which represents a certain percentage, but there the competition with the foreign competitor is keen and it has got to pay higher freight than the importer and therefore if we have to equalize the prices we have to fix our scale of protection at a higher level than it is necessary for us to do if they were paying the same freight". That is the issue now, and that does not merely arise in connection with G. I. P. Railway, but as I was trying to explain, it arises in connection with all Railway administrations where this happens.

*Mr. Burn.*—It is a complication in the making of the freights.

*President.*—How are you going to safeguard the indigenous industries against this happening?

*Mr. Burn.*—My own personal view is that to try to do it by manipulating railway rates would be an extremely complicated method. Some simpler way will have to be devised to overcome the difficulty.

*President.*—Obviously where the foreign importer gets preference it is for us to see that the indigenous industry is safeguarded. In the case of an article which is produced in Bombay the cost would be very much higher than the cost of an article produced at Ambernath because the other charges are high and therefore the advantages are not real.

*Mr. Burn.*—I understand that.

*President.*—The railway policy has been such that the industries had to concentrate at the ports naturally in their own interests. Now as we are making enquiries we find that the ports are not necessarily the best location for industries and that the industries should be nearer their markets as well as the raw materials and the fuel. Industries cannot do that until there is a change in the railway policy by which at least they are not put on a less favourable basis than the importer. That is the point we are now investigating. Take Bengal. Calcutta itself has got certain factories but there are other industries which might spring round the coalfields. If the freight from the ports is lower than the freight from the coalfields, the rate of protection goes up unnecessarily if the industry has to be protected.

*Mr. Burn.*—We have given rates from Bengal to Bombay for Tata's products which enable them to compete in the ports.

*President.*—It is very doubtful if the Steel industry could have been established except at a heavy cost if the railways had not given special rates to Tatas. That is the point we are considering that instead of the railway administration having to give special rates after an industry has been established would it not be better to have some system devised by which industries knew that they would not be anyhow placed in a less favourable position than the foreign importer.

*Mr. Burn.*—Intending manufacturers can always make enquiries before establishing their factories.

*President.*—That is the point. We are not suggesting a reversal of the railway policy as applied to all commodities. We are only suggesting a modification of that policy with reference to industries which the country decides should be protected. It is only limited to that.

*Mr. Burn.*—The action necessary to bring this into force will need very careful consideration.

*President.*—Take Poona for instance where there are no industries. Supposing some industries are established there, they should not be at a disadvantage if Poona was favourably situated otherwise, merely by the fact that it was not a port.

*Mr. Burn.*—We have had these questions raised by the Sholapur Cotton Mills. They said that they were very badly treated and Bombay had got preferential rates owing to competition. Sholapur is right in the middle of a cotton producing district; they have cheap labour; they have large markets near them. These are compensations which must be weighed against those disadvantages of which they complain.

*President.*—That is not a protected industry. If these rates remain as they are and supposing we are recommending a scheme of protection, it would mean—supposing it had been given by means of increased duties—that the duty would have to be very much higher than it need be and the loss to the country as a whole in that case would be greater than the loss of revenue to the railways and on the whole this would be a cheaper way of assisting the industry than putting up duties which would raise the prices of the articles throughout the country.

*Mr. Raper.*—Can these works compete in Bombay?

*President.*—They sell a certain percentage in Bombay.

*Mr. Burn.*—Yes.

*Dr. Matthai.*—As far as the Bombay market is concerned, they are under no disadvantage. That is really a small percentage of the total demand.

*Mr. Burn.*—Their stuff sells in Bombay favourably with the imported stuff.

*Dr. Matthai.*—Not as far as these Ambernath people are concerned.

*Mr. Burn.*—Ambernath can get exactly the same rates as Bombay.

*Dr. Matthai.*—Where goods are shipped from Ambernath then they have got to bear a freight which is relatively higher than the freight that would be borne by the imports.

*Mr. Raper.*—Slightly higher.

*Mr. Burn.*—If the Ambernath people had come to us as soon as they established the factory and told us that the Bombay rate is lower than the Ambernath rate and if they had asked us to assist, we would have told them that we would charge them the Bombay rate as Ambernath comes under the Bombay Industrial area.

*President.*—Even so they are not put in the same position because there is still undue preference in favour of the imported article, because their distance is less. Whatever the justification is, the fact remains that there is in effect preference in favour of the imported article to the extent to which his freight is the same though his distance is greater. As a Board we look at the industry from the industries' point of view and can we get away from that? In fact whatever your reasons may be, there is this preference in favour of the imported article to that extent. It may be very small, but it is there.

*Mr. Burn.*—We regard it as a considerable concession giving Ambernath the Bombay rate.

*President.*—As I say you may take a very reasonable view of the matter, but other agents might not do so. Therefore the industries must depend upon the Agents' doing so or not. That is one objection in principle.

*Mr. Burn.*—Yes.

*President.*—The next is that even after you have made this concession, there is still that difference. What do you suggest as regards that? Ambernath is situated nearer to Bombay and is entitled to claim reduction to the extent of 40 miles.

*Mr. Burn.*—We don't agree that it is entitled to claim.

*President.*—I don't say it is right, but there is a case for it which requires consideration.

*Mr. Raper.*—We have had cases of this kind before the Rates Advisory Committee.

*President.*—The Rates Advisory Committee deals with the question from a very different point of view. We are concerned here with considering what are the possibilities of the Indian industries which are going to be protected and then we say "Here is one which is really not of the making of the industry, but of the railway system". Is the industry to be blamed for it?

*Mr. Raper.*—It is a very usual position in every country I understand.

*Dr. Matthai.*—Ambernath comes under the Bombay industrial area. Ambernath people are charged higher rates in spite of lower mileage and even if you did make the concession now, they would not get the advantage of being 30 or 40 miles nearer to Cawnpore than the Bombay people are.

*Mr. Burn.*—My reply to that is that mileage is only one of the factors that comes into play.

*President.*—That is from your point of view. I am not disputing your right to fix those rates but on the other hand I cannot get over this from my point of view.

*Mr. Burn.*—I think you will agree that where there is a question of competition—take the rate from Cawnpore to Bombay—that is a perfectly logical method of rating.

*President.*—That is true from the railway point of view. As a matter of fact we are not competent to enquire into that question. We are concerned with the mere fact that this preference does exist in favour of the imported article as between the manufacture at Ambernath and Bombay. We want to take up these concrete cases with which we are concerned. It may be necessary for us to point out that if this is not done and if we recommend protection, the protection has got to go up merely because of this fact.

*Mr. Burn.*—I would like specially to bring to your notice the fact that the policy of the Great Indian Peninsula Railway in charging these lower rates from Cawnpore instead of having the effect of raising the rates on other articles carried by the railways has the effect of reducing them.

*President.*—I am not disputing the methods of railways from their point of view, but I have got to give my decisions on certain points. This is one of the difficulties in my way and it is a real difficulty from my point of view. Why should it not be confined merely to protected industries?

*Mr. Burn.*—It would create tremendous difficulties. It would cause anomalies all over the country. It would have to be applied to every protected industry.

*President.*—Yes. I am only speaking of protected industries.

*Mr. Burn.*—Could you have one principle for protected industries and another for non-protected industries?

*President.*—Supposing the country is satisfied that an unnecessary burden would be thrown on the consumer by the scale of duties being higher than would be necessary and if the freights were reduced, the country may say “all right, reduce the freight”. What you would lose would be very much less probably than the burden which would be thrown on the consumer by his having to pay a higher price for it.

*Mr. Burn.*—You want us to consider what the practical difficulties are and to advise you.

*President.*—I will put it to you this way. When an industry is located in a place where by its location it would be entitled to a smaller freight, that industry ought to get the benefit of that smaller freight. If it doesn't, the scale of protection has got to go up which means that you raise the price of the commodity to all the consumers and that is what we wish to avoid if possible and we would like to have your advice on that point. It would apply not merely to the Great Indian Peninsula Railway, but to all other railways. I shall be very glad if you will think it over and let us have your views.

#### *Magnesite.*

*President.*—Now we would like to go into the question of freight. First, let us take the raw materials. Magnesite is one of the raw materials and comes from Salem or Mysore. There are I think about three railways on which it has to come.

*Mr. Burn.*—Yes, S. I. R., M. & S. M. and G. I. P.

*President.*—What is the rate?

*Mr. Burn.*—The rate is based on sea competition. We quote a rate to compete with sea freights from Madras to Bombay.

*President.*—What is the total freight?

*Mr. Burn.*—The special rate is 14 annas 8 pies per maund.

*President.*—That is equal to how many rupees per ton?

*Mr. Burn.*—Rs. 24-15-0 per ton.

*President.*—How much does it work out per mile?

*Mr. Burn.*—19 of a pie per mile per maund.

*President.*—That is just about half the first class maximum rate.

*Mr. Burn.*—Exactly. This is including the terminal which we charge at each end.

*President.*—What is the distance?

*Mr. Burn.*—916 miles.

*President.*—How does this compare with the freight on manganese from the Central Provinces?

*Mr. Burn.*—For manganese we charge Rs. 9-6-0 per ton.

*President.*—What is the distance.

*Mr. Burn.*—520 miles.

*President.*—That is a much lower rate.

*Mr. Burn.*—It is a lower rate. If you will excuse my saying so, from the railway point of view there is no relevancy between the two rates on the two commodities.

*President.*—Is that lower rate due to competition?

*Mr. Burn.*—Yes, it is due to our trying to get manganese to Bombay when the Bengal Nagpur Railway is trying to take it to Calcutta.

*President.*—What is the distance from that place to Calcutta?

*Mr. Burn.*—Nagpur is 520 miles from Bombay, and 703 from Calcutta.

*President.*—Have you managed to get it?

*Mr. Burn.*—We get a certain proportion of it, but most of it goes to Calcutta.

*President.*—Was there any particular reason why this '19 was fixed for magnesite?

*Mr. Burn.*—It is based on the railway rate from Salem to Madras and the shipping rate from Madras to Bombay. We underquote that rate. All railways have joined in this reduced rate. Each system charges '19 of a pie on its length.

*President.*—Now this freight of Rs. 24-15-0 is found to be very high in this particular article.

*Mr. Burn.*—It is a very considerable reduction on the class rate. It is a reduction of about 50 per cent.

*President.*—On what?

*Mr. Burn.*—On the class rate.

*Dr. Matthai.*—What class is it?

*Mr. Burn.*—1st class.

*President.*—I would like you to give me a table showing what would be the freight if you charged at the ordinary rate and what would be the freight at the special rate.

*Mr. Burn.*—Here is a statement which we have prepared for magnesite (handed in). This is the only raw material in which the Eastern Chemicals are interested.

*President.*—We want similar figures for bauxite.

*Mr. Burn.*—We have a statement ready for that too (handed in).

*President.*—There is some question about bones.

*Mr. Burn.*—We have for that also (handed in a statement).

*President.*—That is to say, you charge the maximum rate for bones from these three places.

*Mr. Burn.*—Nearly so.

*President.*—That applies to both bauxite and bones.

*Mr. Burn.*—No, only to bones.

*President.*—And not to magnesite?

*Mr. Burn.*—No, that would be the 1st class.

*President.*—You charge only half.

*Mr. Burn.*—We charge a very much reduced rate, roughly about half.



*Bauxite.*

*President.*—What about bauxite?

*Mr. Burn.*—For bauxite we charge Rs. 10 per ton from Katni which is equivalent to 11 pie per maund per mile—that is less than a third.

*Dr. Matthai.*—In bones the G. I. P. rate is higher than 1st class ordinary as it is '46.

*Mr. Burn.*—We have shown the G. I. P. proportion including the terminal.

*Dr. Matthai.*—That covers the ordinary class rate plus the terminal.

*Mr. Burn.*—Yes.

*President.*—What is this terminal?

*Mr. Burn.*—We charge a conveyance rate—a rate from one point to another—and, in addition to that, a terminal charge for loading, unloading, etc.

*President.*—That is entirely fixed by the railway. The Railway Board has no control over it.

*Mr. Burn.*—We have a letter from the Railway Board on the question of terminals stating the maximum terminal we can charge. But we do not actually charge the maximum rate.

*Bones.*

*President.*—Now taking the case of bones, they are looked upon as manure.

*Mr. Burn.*—They are used as manure in some places.

*President.*—The rate for bones is very much higher than the manure rate.

*Mr. Burn.*—If an article is classified under II we take the lower classification: Supposing it is shown under two different headings—sometimes it does occur—the classification applies to the lower one, that is 1st class.

*President.*—As regards manure, the rate is '1.

*Mr. Burn.*—We have recently brought in last year at the instance of the Railway Board a rate for manure which is '1. But bones are not used as manure on the G. I. P. Railway.

*President.*—This is rather an important point. Of the heavy chemicals which we are enquiring into, sulphuric acid is one and it is used in the manufacture of bone fertilisers. So, it is important for us to find out whether if bones were cheapened, that is to say if the freight was lower, there would be more demand for sulphuric acid and more demand for fertilisers. One would think that bones whether used as bones or as bone meal would be treated as manure. There is as you know a lot of criticism about the export of bones.

*Mr. Burn.*—Yes, they say that it is taken away from the soil of the country.

*President.*—We are considering the question whether the price of bone fertilisers can be so brought down that more fertilisers are used in the country and fewer bones are exported. One item that we have to consider is the question of freight on bones. I was wondering whether it would be possible for the railways to treat bones used by the local manufacturers for fertilisers as manure and charge them the special rate.

*Mr. Burn.*—If we were to treat bones, as manure, we would be simply assisting the export trade without in any way assisting the country.

*President.*—Would it be possible for the railways to treat them as manure if bones are used in the country?

*Mr. Raper.*—That is a point which we have not ourselves considered.

*Mr. Burn.*—This question has not been brought up.

*President.*—It is rather important. Of course, in this country people do not understand the use of fertilisers. Let us hope that they will begin to appreciate the use of fertilisers. In order to encourage the use of fertilisers, it is important that they should be made cheaper.

*Mr. Burn.*—Bone meal is used for tea and coffee plantations in Ceylon. Crushed bones go to Antwerp and other places on the Continent.

*Dr. Matthai.*—The point would arise in this way. Supposing there was a consignment from a place like Raichur which was coming to Bombay for the purpose of being used in the manufacture of bone superphosphate, then of course it would be consistent with your own principles to give that consignment the rates applicable to manure.

*Mr. Burn.*—No.

*President.*—Are these rates for wagon loads or for small consignments?

*Mr. Burn.*—The minimum weight is 160 maunds.

*Dr. Matthai.*—Did you say there were special rates from Raichur?

*Mr. Raper.*—The ordinary schedule rate.

*Dr. Matthai.*—What is the ordinary schedule rate? Is Bombay about 500 miles from Raichur?

*Mr. Raper.*—443 miles.

*President.*—That is entirely on your system?

*Mr. Burn.*—Yes.

*President.*—It will work out pretty nearly to the maximum rate. It is just under it.

*Mr. Raper.*—218 per maund per mile.

*President.*—There are two propositions, first as regards magnesite being charged the minimum rate, that is '1, and secondly as regards bones, treating them on the same footing as manure.

*Mr. Burn.*—I would like to let you have our views later on.

*President.*—This question of bones is rather important, not of immediate importance but of future. It would be one way of stopping exports about which so much is said. In the next place it might be of advantage to the raiyat.

*Mr. Burn.*—In what way would it tend to stop exports?

*President.*—More bones would be absorbed in the country.

*Mr. Burn.*—Reduction of the rate would not have that effect necessarily. Of course it would render manufacture possible.

*President.*—Yes, and that would enable them to compete on better terms with rock superphosphate. We have not got any rock phosphates here and therefore the only substitute we have is bone superphosphate. Even rock superphosphate is not used on a large scale yet, but supposing the country wanted to have its own superphosphate, it will have to fall back upon bone superphosphate for the time being.

*Mr. Raper.*—The rate for bone to Bombay would be 8 annas 1 pie per maund which is equal to 218 per maund per mile.

*President.*—You have got a considerable amount of traffic in bones from Raichur, haven't you? Is that the principal market?

*Mr. Raper.*—I think our principal market is in the United Provinces, round about Agra and Jhansi. Bones from there are more suitable for export than other bones.

*President.*—Part of the bones go also *vid* Calcutta I suppose?

*Mr. Burn.*—Yes.

*President.*—Have you got the bulk of the traffic in bones?

*Mr. Raper.*—Not now. A lot of it goes by the North Western Railway or the Bombay, Baroda and Central India Railway to Karachi.

*President.*—I find that as regards bauxite your rate is pretty nearly the lowest rate.

*Mr. Burn.*—It would be interesting for the Board to know what that difference is founded on. It is founded on the rate from Calcutta. We quote in competition with the rate from Katni to Calcutta and charge the minimum rate from Katni to Bombay as against that from Katni to

Calcutta. We quote our rate in competition with the Bengal Nagpur Railway.

*President.*—They have got a shorter lead, have they not?

*Mr. Burn.*—Katni is nearer to Calcutta than to Bombay.

*President.*—The other raw material is coal. What about the Central Provinces coal? Is it entirely on your line as regards Bombay?

*Mr. Burn.*—It is situated on the G. I. P. Railway. The Pench Valley coalfields are in the neighbourhood of Parasia. The other collieries are near Nagpur. This coal is inferior to Bengal coal and at the end of the War when the boom in the coal trade finished and the coal mines had to look about for sources of demand, Bengal coal came over into the parts of the G. I. P. and B., B. & C. I. Railways for which the demand was being met by the Central Provinces coalfields situated on the G. I. P. Railway.

*President.*—Where does the B., B. & C. I. Railway meet the coal mines?

*Mr. Burn.*—The B., B. & C. I. Railway was served at certain stations on the G. I. P. Railway for these coal mines. As a result of this competition by the Bengal coalfields the G. I. P. Railway reduced the scale for coal from collieries situated on their Railway and thus enabled the inferior coal to compete with the coal of Bengal. Some years ago—about four years—the coal rate was again reduced for Bengal coal and in sympathy the G. I. P. Railway again reduced the rates from the Pench Valley and brought them down to the minimum. As a result these coalfields remain in being.

*President.*—What is the average rate from the Bengal coalfields?

*Mr. Burn.*—It is a telescopic rate which varies according to distance.

*President.*—How does it work out?

*Mr. Raper.*—The amount charged to stations to the west from our fields averages about half that from Bengal.

*President.*—I understand the coal rates are lower than the rates for any other commodity. What does that mean?

*Mr. Raper.*—The ordinary minimum is 1/10th of a pie per mile all round, whereas for coal the G. I. P. starts with 1/10th of a pie for the first 300 miles and then for the next 200 miles .065 and then for the next 500 miles .045 of a pie.

*Mr. Burn.*—We have had no reduction since 1925. I have a note\* with me here. It shows exactly what the position is as regards railway rates relatively with the rates on the G. I. P. Railway. The actual minimum chargeable we brought down so low that we cannot go down any lower. I think it will be necessary for me to give evidence before you again and if you took the opportunity of reading this, it might clarify the position.

*President.*—I would like to have a look at it. As regards Bombay the question of coal is of very great importance in connection with most industries. They are much worse off here than other parts of India for coal and for that reason it is important to consider what the coal rates are and whether there is any possibility of reduction.

*Mr. Burn.*—They are very low indeed now.

*President.*—Take a small industry like the chemical industry. Their power and fuel would amount to about 15,000 tons a year.

#### *Sulphuric acid.*

*President.*—Sulphuric acid is classed under 6th class on small consignments. That is at owner's risk.

*Mr. Burn.*—8th class at railway risk and 6th class at owner's risk.

*President.*—But you are charging 4th class for wagon load of 300 maunds.

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\* Report on the Routing and Rating of Traffic on the G. I. P. Railway.

*Mr. Burn.*—Yes.

*President.*—Sulphuric acid is a very important chemical. It affects all the industries practically.

*Mr. Burn.*—That is so.

*President.*—One would expect that the rate for sulphuric acid would be lower than that.

*Mr. Burn.*—If you see the statement showing general classification, Great Indian Peninsula Railway exception and special rates per maund for certain chemicals and acids you will find a special rate from Bombay to Poona for example.

*President.*—It works out to 64 pie per maund per mile and Delhi is 55 pie per maund per mile. I think Messrs. The Tata Iron and Steel Company told us that yourself and the Bengal Nagpur Railway gave very special rates for taking sulphuric acid to Tatanagar from Ambernath.

*Mr. Burn.*—Yes. I think now Tatas are manufacturing their own sulphuric acid.

*President.*—The whole point is that sulphuric acid is used practically in all the industries to some extent; in fact so far as the chemical industry exists in the country, it is practically built on sulphuric acid and therefore one would expect that the rates for sulphuric acid would be very much lower than what it is.

*Mr. Burn.*—One of the factors that keeps the rate up is that sulphuric acid is dangerous and is destructive if it gets loose.

*President.*—These are wagon loads.

*Mr. Burn.*—Yes.

*President.*—Sulphuric acid is no more risky than any other article if it is properly sealed and kept.

*Mr. Burn.*—It is not a question of the railways having been approached by these Chemical Companies for special rates of sulphuric acid and the railways refusing to give them. I think the Tariff Board will agree that, generally speaking, if a railway gets no request for a special rate it can take it that the rate in existence is either correct or too low. The merchants are not, as a rule, backward in putting forward their claims for a reduction in rates.

*President.*—They appear to be unusually backward in this part of the world.

*Dr. Matthai.*—The Indian manufacturer is not particularly interested in asking for a reduction in the rate on sulphuric acid. The reduction would apply equally to the imported acid. If he asks for a reduction in the railway freight on sulphuric acid, it does not benefit him at the expense of the importer.

*Mr. Burn.*—Not at the expense of the importer, but in the conduct of his own business. It gives also a bigger margin of profit.

*Dr. Matthai.*—Not necessarily. He is more interested in the reduction of freight on raw materials, because that would apply to him and not to the other party.

*Mr. Burn.*—Here is an instance in point. If you will kindly look at the statement showing the general classification, Great Indian Peninsula Railway exception and special rates per maund for certain chemicals and acids, you will find Ambernath has been given special rates because of its geographical position. The rate from Bombay *via* Raichur is Rs. 1-7-7 as against from Ambernath *via* Raichur Rs. 1-5-8. Bombay to Nagpur is Rs. 1-11-10 as against Ambernath to Nagpur Rs. 1-10-4. There is also another instance; *via* Wadi from Bombay the rate is Rs. 1-4-1 and from Ambernath the rate is Rs. 1-2-4 and it applies also to Sholapur.

*President.*—Was it at their special request or how did it happen?

*Mr. Burn.*—This is the 4th class rate which is shown here in the G. I. P. exception, but with a different weight. Instead of being W/300, the weight for charge if you will see at the top of that statement is per maund O. RW/120 L.

*President.*—What do you mean by O. RW/120.

*Mr. Burn.*—W/120 means minimum weight for charge is 120 maunds per wagon. O. R. means "at owner's risk". This rate although it is quoted in the form of a station to station rate is really the 4th class rate with a different minimum weight for charge. That was put in at the request of the firm. They said that they could not load 300 maunds in a wagon and they asked for a reduction to be made from 300 maunds to 120 maunds.

*President.*—I take it that you have got no tank wagons for sulphuric acid.

*Mr. Burn.*—No.

*President.*—Because there is no demand for them.

*Mr. Burn.*—There is no demand for tank wagons.

*President.*—Would you be able to supply them if there was a demand?

*Mr. Burn.*—I shall let you know later on.

*Dr. Matthai.*—How long have these special rates been in force?

*Mr. Burn.*—Reduced rates at present in force were quoted on the 15th February, 1925.

*President.*—In this case of bauxite Messrs. Dharamsi Morarji Chemical Company give Rs. 16 as freight and you give Rs. 10.

*Mr. Burn.*—It is shown in the tariff as Rs. 10 from Katni to Ambernath.

*Dr. Matthai.*—Is that for wagon loads?

*Mr. Raper.*—Yes, carrying capacity.

*Dr. Matthai.*—Probably this Rs. 16 is for smaller consignments.

*President.*—That might make the difference. It may be that bauxite does not lend itself to get the full advantage of it.

*Mr. Raper.*—They have not told us so.

*President.*—They give Rs. 16.

*Mr. Burn.*—It will have to travel at 38 pie per maund per mile. It is much more than Rs. 16 a ton from Katni to Bombay.

*President.*—I don't know how they give Rs. 16. It may be that the carrying capacity might make the difference.

*Mr. Burn.*—If they carry at the special rates quoted, it will be over Rs. 33 a ton, so that it is not a question of Rs. 10 or Rs. 16. I think there must have been a misunderstanding.

*President.*—They ask that the freight should be reduced from Rs. 16 to Rs. 6.

*Dr. Matthai.*—Do they get the bauxite right at the railway station?

*Mr. Burn.*—No. It may cost them Rs. 6 to take the stuff to the railway station.

*President.*—Are these rates based on the actual weights or according to the carrying capacity of the wagons?

*Mr. Burn.*—There is a note to that effect at the bottom of the statement showing rates for ores common (bauxite): "Rates in column 4 are charged on the carrying capacity of the wagon used".

#### *Acid containers.*

*President.*—It may be due to that. As regards sulphuric acid they make a complaint that they have got to pay the same rate on the containers.

*Mr. Burn.*—That was a point that was raised. The method of charging containers separately, so far as I am aware, is unknown in India. In the interests of economical transport containers should be as light as possible.

The effect of quoting a separate rate for containers and for contents would take away the inducement to make containers as light as possible so as to get greater benefit from the rate, and that in itself is undesirable from the point of view of economical transport. It is not in the interest of the manufacturers or of the railways or of industry generally that railways should carry heavy containers up and down the country. It is uneconomical to carry heavy containers with light contents.

*Dr. Matthai.*—As a general principle it is perfectly sound, but the difficulty with regard to sulphuric acid is that if you don't allow them to use the present containers, that is to say jars and carboys, the only alternative which will be suitable for sulphuric acid is steel drums. Now steel drums can't be made here and they have got to be imported and when you import drums in the finished stage, they carry a tremendous amount of freight. If there is some alternative between these jars and carboys on the one hand and steel drums on the other what you say would be perfectly correct, but apparently there is no alternative. Sulphuric acid requires a special kind of container and if they cannot get a steel drum, there is really nothing lighter to which they can go back.

*Mr. Burn.*—Cannot the local manufacturers of steel put their heads together and devise a light form of container?

*President.*—Sulphuric acid container is a very special thing. Steel you can get here, but it is a question of making the drum. The joints have to be specially made.

*Mr. Burn.*—A lot of acid is conveyed in Doulton jars which have to be imported from England.

*President.*—As you say you cannot encourage the use of heavy containers, but a way might be found by which you can make a certain minimum allowance for the containers.

*Mr. Burn.*—That is simply another way of asking for a reduction in the rate and to make a reduction in the rate in this particular fashion by having one charge for the container and another for the contents, I think, is wrong in principle.

*President.*—You need not make the two charges separate, but you can bear that in mind and lower the freight.

*Mr. Burn.*—As I say, it is an application for a reduction in the freight rate on sulphuric acid.

*President.*—It is not free from difficulty I confess. The whole point is that if this was done, they would have some advantage over the imported sulphuric acid which comes in steel drums which are very much lighter.

*Mr. Burn.*—That is so. From that point of view according to our present policy, it would be objectionable to giving definite action in rating to help the indigenous industry against the imported industry instead of treating each entirely independently so far as it is possible to do so.

*President.*—Then as regards empties I understand the Great Indian Peninsula Railway charges at the same rate, more or less as 4th class.

*Mr. Burn.*—We are looking into that matter. We will go into the details with the Bombay, Baroda and Central India Railway and certain other railways. The application is now before me.

*President.*—What is the general rule as regards empties in the case of other commodities?

*Mr. Burn.*—We have a special rate for empties which are returned.

*President.*—What do you do as regards petrol tins, etc.?

*Mr. Burn.*—The empties returned (barrels, cans, etc.) are charged at 1st class rate. There is a special concession as regards Ambernath. Empties when booked to Ambernath are charged at the rate of 5 annas per 16 ton wagon per mile and if a higher tonnage is used, a higher charge will be levied. In none of these things (barrels, cans, etc.) glass containers are included under the term empties.

*President.*—Is there any special reason why glass containers should be treated separately?

*Mr. Burn.*—Glass containers are more valuable products and they are more liable to breakage.

*President.*—They go at owner's risk.

*Mr. Burn.*—Yes. Glass carboys are charged at the sixth class rate.

*President.*—It makes a lot of difference in freight.

*Dr. Matthai.*—If you take sulphuric acid, according to your present system of charging freight on the local manufacture, your freight would mean 35 per cent. packing whereas in regard to imported acid, it would only mean 12 per cent.

*Mr. Burn.*—That is so.

*Dr. Matthai.*—So that these people are at a disadvantage to the extent of the difference between 35 and 12 per cent.

*Mr. Burn.*—There is another point. Some of the acid which is imported before it is sent on to the destination is put into other containers. Further the effect of putting the acid into steel containers is that it restricts its use. It cannot be used for all the purposes for which sulphuric acid packed in earthenware or glass containers is used.

*President.*—It makes a difference on an average of 35 per cent. The empties weigh about 35 per cent. of the gross.

*Mr. Burn.*—From the point of view of rating I would strongly oppose charging the contents and the containers separately. From the point of view that I have put forward, what is wanted for economic transport is as light a container as possible.

*President.*—If it went as an empty, it would be charged a lower rate.

*Mr. Burn.*—Than what?

*President.*—If a carboy went as an empty, would it not come under class 6?

*Mr. Burn.*—It would. I agree that the packing if it went separately would be charged less than if it went with the contents. You cannot send anything without packing it, and packing is invariably charged at the rate at which the commodity is charged.

*President.*—I quite agree that you should not encourage this uneconomic packing. When it goes by itself, you say that it should go at a lower rate.

*Mr. Burn.*—The same thing would apply to the piece-goods packing. If you send the packing material separately, it would cost you much less than if you send it along with piece-goods. There of course the percentage of packing is very small.

*President.*—You may treat the packing as packing. I do not suggest that you should encourage this uneconomic packing. But seeing that the percentage in the chemical industry is very large, can't you charge for the packing at the same rate as you would for the empties?

*Mr. Burn.*—Where is the principle going to stop? If that is conceded in the case of chemicals, are you going to apply it to other commodities?

*Dr. Matthai.*—I still do not follow the principle that you suggest. Supposing your principle were accepted by the Chemical Company, then as I say the only thing they can do is to give up packing in jars and carboys and pack in steel drums. But now for steel drums they have got to pay very much more. Therefore what you will be compelling them to do is to pack in a lighter material which is really more expensive and consequently is not economical. This is a very special case. I accept your principle which is perfectly sound, but it does not apply in this case.

*Mr. Burn.*—Is it finally settled that it is impossible to get a cheaper packing in this country?

*Dr. Matthai.*—At any rate we will examine the question further, but the impression that we have formed so far is that, even on carboys, the freight would be smaller than on steel drums.

*Mr. Burn.*—When the acid arrives packed in steel drums, it does not always go forward in the same packing to the up-country markets. This fact cuts a good deal of ground from under the feet of those who put forward the contention that the indigenous industry suffers. The use of sulphuric acid packed in steel drums is restricted. It cannot be used for all the purposes for which the acid packed in glass carboys can be used.

*President.*—There is the same complaint in the case of nitric acid which is classed as No. 9. Both nitric acid and hydrochloric acid are classed as No. 9. There the percentage of tare is very much higher.

*Mr. Burn.*—These acids come under class 10 at the railway's risk and class 9 at the owner's risk.

*President.*—Do you consider that hydrochloric acid and nitric acid are more dangerous than sulphuric acid from the railway point of view?

*Mr. Burn.*—What the reason for putting them in a separate classification is I do not know. I shall have to look it up. But I would like to draw the Tariff Board's attention to the very small use of nitric acid in the country (shown a statement).

*President.*—These figures are correct. These are import figures I think.

*Mr. Burn.*—Yes.

*President.*—As a matter of fact, very little of these acids—nitric, hydrochloric and sulphuric acids—is being imported. There is a considerable difference in freight owing to the classification.

*Mr. Burn.*—That is so. I shall look into the question and let you know.

*President.*—As regards freights on salts, copperas and alum come under class 1; Glauber's salt under class 2 at owner's risk; copper sulphate under class 4; Epsom salt, zinc chloride and sodium sulphide under class 4. I do not understand the reason for this classification at all. More or less they seem to be the same sort of articles except that copper sulphate is more expensive, but as regards Epsom salt, copperas and Glauber's salt, there is not very much difference in price.

*Mr. Burn.*—You would like some explanation as to how each came under the particular class.

*President.*—Yes. Epsom, zinc chloride and sodium sulphide are three salts in which the Indian industry has got to meet more competition than in the case of Glauber's salt and copperas. Copperas and alum come under class 1 and Glauber's salt comes under class 2 and the rest come under class 4. According to your rules you can bring them all down to .166.

*Mr. Burn.*—We can quote special rates which would bring the freight down to .166.

*President.*—As regards copperas and alum, you can bring the freight down to .1.

*Mr. Burn.*—Yes.

*President.*—I suppose that the other railways have got the same classification.

*Mr. Burn.*—Their maximum and minimum are the same. But we will have to look up their classifications and see whether there is any difference.

*President.*—I suppose in your rates and in that of the B., B. & C. I. Railway the classification would be about the same in both?

*Mr. Burn.*—We have certain exceptional classifications which they have not got. For example we have special classification for cotton. There are certain other exceptions, e.g., calico, cambric and so on. Then again for kerosine and certain iron and steel we have special classifications. Generally speaking our classifications are much the same as those of the B., B. & C. I. Railway.



*President.*—One point arises in connection with this. Wagon load rates as applied to chemicals in this country are really not of much use. Take any of these salts: it is only a question of two to three thousand tons distributed in small quantities so that unless the freights on smaller consignments are also reduced it is not of any help to them. In the case of steel it is a very different proposition; so is it in the case of coal, but in the case of chemicals wagon load rates do not help materially.

*Mr. Raper.*—We have no wagon load rates for these salts, they are per maund.

*President.*—The Dharamsi Morarji Chemical Company states—“In few cases special wagon rates have recently been granted by the G. I. P. Railway administration but these can scarcely be taken advantage of yet because our orders are generally not for wagon loads at a time except in the case of Bombay”. I suppose Dharamsi's mean these are package rates and that the wagon load rates should be reduced by one half?

*Mr. Burn.*—Apparently.

*President.*—As regards freights on fertilisers, they come to .12 per maund per mile for wagon loads. I suppose that would be including the terminals?

*Mr. Burn.*—That is so.

*President.*—And .45 per maund per mile for small loads?

*Mr. Burn.*—No. They asked for a special rate, 1/10th of a pie, and that is the new rate which was introduced at the instance of the Government of India last year.

*President.*—Does this rate of 1/10th of a pie apply to wagon loads only?

*Mr. Burn.*—No.

*President.*—I want to know whether it is the minimum rate for long distance, or short distance or what is it?

*Mr. Burn.*—There is no weight condition attached. The minimum distance charged is 10 miles.

*President.*—The only way we can look at this is this. Take the case of magnesite or bauxite. Supposing in our calculations we came to the conclusion that the industry should get such and such price for Epsom salt or aluminium sulphate, if the weight suggest that it could only get it if the freight was reduced to so much irrespective of weight or distance. But if we were to take the weight or the distance into account we should be so mixed up that we wouldn't be able to do anything.

*Mr. Burn.*—So far as manure is concerned there is no weight or other condition attached to the rate.

*President.*—As regards other products we have got to mention a lump sum freight rate from certain stations.

*Mr. Burn.*—There would be no difficulty from the point of view of the machinery of rating to quote a rate which had no weight condition attached to it.

*President.*—From our point of view would it not be simple for us to say that we would apply the lowest rates?

*Mr. Burn.*—I don't think as a practical measure I could advocate that.

*President.*—But there is no other way in which we can arrive at the effect of the freight.

*Mr. Burn.*—I would like to consider the question further.

*President.*—You will bear in mind that we don't want to complicate our recommendations by distance and weight. I hope you will be able to devise a simple formula which we can use for our calculations which will give us an idea as to what reduction can be made by adopting that particular formula.

*Mr. Burn.*—Yes.

*President.*—Then there is this other complication about the different railway systems over which goods are carried. Take the case of magnesite. Of course by arrangement amongst yourselves you have abolished the distinc-

tion between your railway and the other railways. Now the question arises, can nothing be done as regards these protected commodities?

*Mr. Burn.*—So far as the State Railways are concerned the Government can give an order and so far as the company managed railways are concerned I understand it can recommend them to follow certain lines.

*President.*—You go as far as Delhi and Cawnpore?

*Mr. Burn.*—Yes.

*President.*—And there you are in direct competition against the Bombay, Baroda and Central India Railway?

*Mr. Burn.*—We are in competition at Delhi with the East Indian Railway for Calcutta, with the North Western Railway for Karachi and with the B., B. & C. I. Railway for Bombay. We have an agreement dealing with that traffic which is laid down in this volume.

*President.*—I saw in one case that the Delhi freight rate for the same distance was higher than Cawnpore.

*Mr. Burn.*—Delhi is at a greater distance from Bombay than Cawnpore.

## EAST INDIAN RAILWAY.

Oral Evidence of Dr. W. R. HORN and Messrs. B. F. HIGMAN and J. C. ROSE recorded at Calcutta on Monday, the 4th March, 1929.

*Introductory.*

*President.*—Mr. Higman, you are the Chief Commercial Manager of the East Indian Railway?

*Mr. Higman.*—Yes. Mr. Rose is Rates and Development Manager. He has specialised in rate questions. Dr. Horn is the Controller of Stores.

*President.*—I should like to explain to you what are the points we are considering, because I think that will help the discussion. The main idea is that if the chemical industry is to be established in the country, manufacture must be carried on on a large scale, that is to say there should be as few units as possible with reference to the market, because small scale production, as you would agree, always raises the cost of production, whereas large scale production will have the contrary effect. You will find that India is a very large country and that except perhaps the Steel industry there is really no industry which has got all its raw materials in one place. As regards chemicals, of course, some place may have one raw material, some place may have coal, another place may have another raw material and therefore raw materials must be brought to one place where a large unit is in operation. That means that the radius of distribution also is lengthened. Take the case of the Chemical industry. Perhaps having regard to the market there is room for one or two units at present. Perhaps if there is to be one large unit, that will suffice for the whole of India. We don't say where the industry is to be established; it is for the industry itself to find out. We find that there are several small units working in different parts of India and the result is that the costs are high. If we are to protect the industry as it is at present, the scale of protection will have to be higher and protection will have to be continued for a much longer time until the industry is able to produce economically; whereas if there is one large single unit, it may so happen that the average price including the cost of distribution would be so low for the whole of the country that there will be a smaller scale of protection needed and in a much shorter time the industry may be able to stand on its own legs. We are considering that point, and it is for that reason that we suggested that officers responsible for the policy of the railway company should come and assist us. It is no longer merely a question of calculating the freights, but of considering how this idea can be worked without throwing an undue burden on the railways on the one hand and on the consumers generally on the other.

*Mr. Rose.*—I see your point.

*Freight rates.*

*President.*—As regards these freights, so far as the minimum rates are concerned, there are two minimum rates, one is  $\cdot 10$  of a pie and the other is  $\cdot 166$ ?

*Mr. Rose.*—Yes,  $1/10$ th of a pie and  $1/6$ th of a pie.

*President.*—So that it comes to this that you can apply the minimum rate of  $1/6$ th of a pie practically to all the goods if you like?

*Mr. Rose.*—Quite so.

*President.*—Whereas  $1/10$ th of a pie may be applied to two classes only.

*Mr. Rose.*—Yes, the first two classes.

*President.*—So far as the first two classes are concerned, you can go down to  $1/10$ th of a pie.

*Mr. Rose.*—Yes.

*President.*—These classifications, I suppose, were effected some years ago?

*Mr. Rose.*—The last revision was made in 1922.

*Dr. Matthai.*—Do you mean by revision both the question of classification of the goods and the fixation of rates?

*Mr. Rose.*—Yes. We had five classes previous to 1922 and we have gone up to 10, because we found it necessary to have more latitude.

*President.*—I find that they had a surcharge of 15 per cent.

*Mr. Rose.*—Yes, and they took that into account and in some cases went up by 25 per cent. That was to meet the general increase in the working cost of railways.

*Mr. Mathias.*—You are conversant with the principle of the classifications, aren't you?

*Mr. Rose.*—Yes. It depends on the nature and general characteristics of commodities to a large extent. Considerations vary very largely, such as the question of value, regularity of traffic, the volume, the uses to which the various commodities are put, packing conditions, damageability and so on. It varies as you will realise in respect of particular commodities.

*President.*—Is this minimum rate so fixed that it just enables the railway company to work at a small profit?

*Mr. Rose.*—The idea was of course to cover out of pocket costs by the minima.

*President.*—That is to say the variable part of the expenditure?

*Mr. Rose.*—Yes, the fluctuating costs.

*President.*—That would be about  $\frac{1}{3}$ rd.

*Mr. Rose.*—Roughly it is computed at that. We can't get the exact figure, but for general purposes I should say that would meet the position.

*Mr. Mathias.*—Is it the actual running cost?

*Mr. Rose.*—It is the fluctuating cost, that is to say not taking into account administration and other fixed charges.

*President.*—Can you prove whether in any particular case the minimum rate is charged doesn't pay?

*Mr. Rose.*—No. I don't think that we can precisely get at it.

*President.*—Supposing we said that the 10 of a pie rate should apply to all these commodities?

*Mr. Rose.*—Then you have got to deal with the particular merits of the commodities.

*President.*—Quite true. But can you prove that you will be out of pocket by so much?

*Mr. Rose.*—No.

*President.*—We say that this industry is of very great importance—this is merely for purposes of discussion—and that it cannot bear a bigger freight than the minimum freight at which railways carry goods.

*Mr. Rose.*—We will consider that with very great sympathy.

*President.*—The point is this: in making our calculations as regards the future, we must have some starting point and if we don't have that starting point, we cannot fix the measure of protection that the industry requires.

*Mr. Rose.*—That is so.

*President.*—It is for that reason that it is of importance to find out whether you can really establish that. Supposing I say as regards these salts for example, that the rate which the industry can bear is 1 of a pie, would it be possible for you to say that you are going to lose on it?

*Mr. Rose.*—That depends on how you are looking at it. If you are looking at it with reference to the indigenous industry alone, we say we would be very seriously prejudiced, because our considerations are primarily those of a business concern and we have to avoid undue preference.

*President.*—We will deal with that later on. Purely as a business proposition we say that so far as this industry is concerned, it cannot bear a higher freight than the minimum freight, what would you say to that?

*Mr. Rose.*—We would give it every consideration.

*President.*—But the point is whether it would be possible for the railways to establish that they are actually losing.

*Mr. Rose.*—I think off-hand I can say that the question would not arise. If the necessity was there and we had to come down to 1/10th of a pie, we would do it. That is speaking generally and not specifically.

*President.*—I am speaking generally.

*Mr. Rose.*—We have gone right down to 1/10th of a pie practically in the case of bauxite. I remember seeing the other day a complaint on that score that our rates were too high. It struck me as rather unfair at the time, because the freight rates referred to are practically the minima rates. This is a case in point where bauxite being one of the raw materials, we have put the freight practically at the minimum.

*President.*—Take the case of salts first. There are the salts and the acids. Let us take the raw materials in their manufacture. The principal raw materials in this enquiry are bauxite, magnesite, salt and coal.

*Mr. Rose.*—I have got a statement drawn up here which shows the industries located on our line, the raw materials used, their sources of origin, despatches of the finished products and where they are going to. In each case the basis of charge is given. We have also got a note here explaining the general rates structure (hands in).

*President.*—I must tell you that in the first place we contemplate a haulage of 1,000 miles.

*Mr. Rose.*—That is on more than one railway.

*President.*—We will assume that even if there are different railways, there is a uniform rate which should apply.

*Mr. Rose.*—That is an important factor in the case of the railways, because we are looking at the subject of rates purely as independent financial units.

*President.*—I don't think we can go into that question, but take the case of the Great Indian Peninsula Railway which is a State Railway.

*Each railway an independent financial unit.*

*Mr. Rose.*—But we are entirely independent financial units. We have got to answer charges of undue preference. After all in this particular industry its finished products are the raw materials of other industries, and they want to be unhampered in the source of their supply of raw material. The glass works, the paper works, and so on, require their chemicals from the ports and if a chemical industry situated at, say, Ambernath wanted special rates over the East Indian Railway, we wouldn't get any benefit out of that concern directly as we would in the case of an industry located on our own line.

*President.*—That question will arise hereafter. At present we don't want to introduce too many complications in our discussion. As laymen, we don't understand why on two railways belonging to the same person there should be two different charges.

*Mr. Rose.*—It is very simple when you take into account the other limiting factors. We have prepared a note about it indicating our policy and attempting to explain some of the difficulties of the other industries, particularly in regard to the chemical industry and its finished products.

*President.*—As far as we can see at present, if the country desires that there should be a chemical industry in the country at the cheapest cost in the long run, then it must be prepared to make some sacrifice either in its railway revenues or in some other way.

*Mr. Rose.*—May I suggest that this aspect of the case was foreseen by the Fiscal Commission and they clearly pointed out the danger of an indirect subsidy.

*President.*—This is direct subsidy. We are not suggesting that by any hidden preference.

*Mr. Rose.*—It would amount to that unless you are prepared to consider the other constituents of the railways. That is our difficulty.

*President.*—We will consider every point that the Railway Administration wishes to raise, but the issue before us now is this: supposing we are satisfied that this industry has to be protected, we have got to find out which is the cheapest way of doing it, whether by an increase in the duties, or by bounties or by the reduction of freights or by the combination of the two. Whichever appears to be the cheapest method, that we must recommend.

*Mr. Rose.*—We are up against the suggestion of protection through the means of railway freights.

*President.*—This is a question of cheapening the chemicals for all the industries and for agriculture.

*Mr. Rose.*—That we have already taken into account.

*President.*—If you have done so, we will say so and recommend them in our proposals.

*Mr. Rose.*—We have prepared a note in which you will find that we have made a lot of concessions in the case of indigenous industrial centres. Our special rates are only for indigenous commodities. You will find that right through our system, at Konnagar, Cawnpore, Ghaziabad and so on; and you will find that in every case where we have been approached, we have satisfied the industries.

*President.*—The whole point is that if we are going to make any recommendations, we must take a long view of the industry. One thing that the industry most definitely needs, if it is to be started at all, is that the chemical industry should know what the freights are going to be. There must be some uniformity in rates both as regards the raw materials as well as the finished products.

*Mr. Rose.*—You can't have uniformity of charge.

*President.*—If an exception is to be made, that will have to be made, because as I explained to you the industry must be located in one centre and from our point of view in order to carry out that idea, every alteration that is required in the railway policy must be undertaken by the Government if it wants an industry to be started. Of course that would be left to the Legislature and to the Government. But we have got to find out how the railway freights could be so adjusted that large unit production becomes possible in the country.

*Mr. Mathias.*—Really it is a question of the expansion of demand so as to enable a big industry to be started. At present the local market is very small.

*Mr. Rose.*—But we are up against the limiting factors of the law.

*Mr. Mathias.*—If Government thinks that the industry has to be protected, it will have to change the law.

*Mr. Rose.*—You must consider the practical side. How are you going to safeguard the interests of manufacturers located at the ports who will be adversely affected by a policy of undue discrimination in rates against traffic moving from the ports for the benefit of industries located at industrial centres?

*President.*—We are not dealing with the whole industrial system at all. We are considering the Chemical industry.

*Mr. Rose.*—In the event of their expanding, they will be seriously affected.

*President.*—An industry has got to make up its mind where it is going to be established.

*Mr. Rose.*—The moment you encourage a policy like that, you automatically ask the other industries to do the same thing.

*Mr. Mathias.*—The other industries will have to come up to the Tariff Board and state their case.

*Mr. Rose.*—We find that there is a clash of interests in so many directions that we have to treat the subject purely as a business proposition. We do our best, we are very sympathetic and I think in the majority of cases we have given satisfaction.

*President.*—If on calculating the costs, it appears to us that by a reduction in the freight, the costs can be reduced so much and the consumers would benefit a great deal more than the railways are likely to lose, then so far as we are concerned, there is nothing to prevent us from making that recommendation.

*Mr. Rose.*—How are you going to effect a reduction in the cost?

*President.*—Merely for purposes of illustration, let us take a case like this: At present there are two units, we will say, each one of them producing 4,000 tons altogether, and the average cost comes to Rs. 100. The foreign article we will say comes in at Rs. 70 and therefore the Indian product requires a protection of Rs. 30, as a result of the chemicals being manufactured in two places, but we find that if there is only one unit working, the costs may come down to Rs. 80, then the protection is only Rs. 10. Therefore the average price to the consumer is reduced in proportion and on the whole we are able to say that if the chemicals are manufactured in one place the consumer will benefit to this extent. Then we will consider how the railways would suffer and if we find that the advantage to the consumer is greater than the loss to the railways, we make that recommendation.

*Mr. Rose.*—To arrive at those costs you will have to take into account the various freight charges from points situated at different distances from the consumer.

*President.*—As it happens, so far as these particular chemicals are concerned, the raw materials fairly well exist only in certain places and they have to be carried from those places to the works. As regards the finished products, they go all over the place and it may happen, supposing the works was established in Bengal, a considerable proportion of the production may have to be transported to Bombay.

*Mr. Rose.*—That is another trouble. They enter each other's territory. It is quite a simple matter with industries that have their territories apportioned out, but where these concerns want to compete in each other's territory, it is a difficult matter.

*President.*—That is what we want to make possible, but the railways at present don't make it possible. What happens is that owing to the policy of the railways, smaller units have been encouraged where they have the freight advantage from the port.

*Mr. Rose.*—There is no freight advantage from the ports.

*President.*—There is in this way that there is a local market which a small unit can get.

*Mr. Rose.*—If you shut out foreign imports entirely, don't you prejudice the other consuming industries? That is the peculiar situation with regard to the chemical industry.

*President.*—That is a general question which we are not considering now. The whole point is how far the freights can be reduced so that production on a large scale becomes possible, and how far the railways are willing to co-operate with the Government and the Legislature in carrying out that idea.

*Mr. Rose.*—As matters stand at present, we are prepared to co-operate in giving every assistance to industries, but there are certain limiting factors both from the legal standpoint and from the practical point of view.

*Goods classification.*

*President.*—Let me first examine you on this general classification. You have classified Epsom Salts as 4th class.

*Mr. Rose.*—It has since been decided that it will be classified 3 R. R. & 2 O. R.

*President.*—Copperas comes under class I; alumina ferric also comes under class I; Glauber's salt and sodium sulphate come under 3 R. R., & 2 O. R., but we can see no reason whatsoever for these different classifications.

*Mr. Rose.*—This question has not been brought up yet. These classifications were made very many years ago.

*Mr. Higman.*—These freights come under review whenever anybody represents the matter.

*President.*—If we protect the industry, it must know what is going to happen. We want the industry to know exactly how it is going to stand. It must not depend on negotiations with individual Railway Administrations. Take sulphuric acid for instance. You have put it in class IV, and B. N. R. has put it under class VI.

*Mr. Rose.*—Class IV is wagon load and class VI is an actual weight rate. Would you like us to write a note on this point? I understand the Great Indian Peninsula Railway put up several points to the Conference which dealt with the subject of classification and the conference have recently decided to accept the remedies suggested. If you desire that we should examine any of these items, we will gladly put up the matter to the Indian Railway Conference Association.

*President.*—Let us take concrete figures. Let us assume that the distances are 1,000 miles and over, and that though they may go over different Railway Administrations, the rate would be the same. We must start with that. First of all give me, as regards these salts and the acids, what the total charge per ton would be per mile.

*Mr. Rose.*—It varies.

*President.*—Take 1,000 miles and over. What is the distance between Bombay and Calcutta?

*Mr. Rose.*—Over 1,300 miles. It doesn't help us in replying to your point. We have to separate the railways.

*President.*—I am suggesting to you to take your own rate.

*Mr. Rose.*—Our rate is quite distinct from the rate on the Great Indian Peninsula Railway.

*President.*—You can take your own rate and prepare a statement and let me have it later on. At present we are considering what would happen if the unit was either at this end or the other end. What I want to know is what is the present freight and supposing there was no alterations in the tariff, what would be the freights?

*Mr. Rose.*—That won't be indicative of what actually happens in practice, because, in practice, we have got numerous special rates.

*President.*—When they exist, you can mention them. I am suggesting to you that sulphuric acid is manufactured in Bombay and is brought to Bengal. Now it will come partly over your system, partly over the Great Indian Peninsula and partly over the Bengal Nagpur Railway systems.

*Mr. Rose.*—Here is a summary of the general basis of charge. (Hands in.)

*President.*—What is the actual position just now; supposing no alteration in the tariff was made, how much tariff will these products have to bear if they are transported from one place to another? What I want you to do is to explain to me this: supposing I wanted to start my works in Bombay and I wanted to bring the products to Calcutta, I want to see what it means at present and I should then see what alteration is required.

*Mr. Rose.*—I can give you that.



*President.*—Supposing there was no alteration, what would the railways earn on this traffic and what are the railways likely to earn on the rates we may propose the railways ought to charge. That is what we want to know.

*Mr. Rose.*—We can't give you the actual rates, because we don't keep such statistics for these commodities. We can give you in the lump what we earn for all the traffic.

*President.*—It would be all right if you could give us a flat rate. Supposing you are able to say per ton mile, or maund per mile up to and over these distances, probably 1,300 miles, how much per unit you are earning now and how much you are likely to earn if there was a flat rate, that will serve our purpose. You are giving me these telescopic rates varying at different points. They don't help us much.

*Mr. Rose.*—I can put it into that form where I can show you precisely how much our special station to station rates represent per maund per mile and I think it will help you in gauging what is our average basis of charge. It is very difficult for us to do more than that.

*Dr. Matthai.*—Supposing in Bombay they produced all the sulphuric acid required in the country—say, about 2,500 tons and out of that Bombay consumed 1,500 tons, the other 1,000 tons would be sent continuously from Bombay to Calcutta, that is to say there was going to be a regular traffic of 1,000 tons of sulphuric acid to Calcutta, on the sort of rates that you have allowed so far, what is the rate you would be likely to charge on your part of the section between Bombay and Calcutta?

*Mr. Rose.*—I think it will be best, if I may suggest it, to take an average or mean of the basis of our special rates. I think when I show it to you in statement form you will be able to see how it varies over different leads.

*President.*—What I don't understand is what is the incidence of charge per ton mile over the same distance?

*Mr. Rose.*—It varies unfortunately. For practical purposes, however, it may be feasible to take the mean or an average in those cases where from experience we know the traffic is likely to go. If I work up a statement like that initially and bring it along, will that help you?

*President.*—I think that will help us. The point I want to consider is what would happen to the railways from the railway point of view if instead of charging these present rates you are charging or are likely to charge over these distances, we recommended a flat rate. As I say we must have some starting point for calculating the future price, the cost of distribution and of manufacture.

*Mr. Rose.*—Is a flat rate going to help the industry which is going to send chemicals all over the country?

*President.*—When you take the telescopic rate into account, you can convert it into a flat rate. We can only say that this unit is started here in Calcutta; Calcutta has a demand for 5,000 tons, but it will manufacture 15,000 tons and therefore it will have to sell 10,000 tons at different points. Bombay may require so much and Cawnpore may require so much and so on.

*Mr. Rose.*—I think you will be able to use the statement I visualise, the one that I propose preparing.

*President.*—At present we don't really know what the position is.

*Mr. Mathias.*—Actually you say there are various limiting considerations which would prevent any uniform rate. That is on the supposition that each railway will have its own special rates?

*Mr. Rose.*—Yes, I have tried to explain that in my note on the policy of the railway.

*Mr. Mathias.*—These railways will be regarded as independent financial units.

*Mr. Rose.*—Yes, but there are other considerations also which demand attention.

*Mr. Mathias.*—You have fully discussed that in the note?

*Mr. Rose.*—I have tried to make it as concise as possible.

*President.*—Practically the position is this: the Government system connects Bombay, Calcutta and Karachi, that is to say the goods won't have to travel over any private railway.

*Mr. Rose.*—No, but automatically the Company managed lines are concerned on account of the competition that exists between the railways.

*President.*—You have got no control over the Company managed railways as you have over the State railways. The position therefore is that except as regards Madras which is almost entirely on private systems, you can practically control the position.

*Mr. Rose.*—We cannot, because the Bombay, Baroda and Central India Railway for instance, which is a Company managed line, if it doesn't agree with the policy adopted as to giving preference to indigenous industries, might upset the whole of our arrangements by treating the imported products on the same footing, in which case we must compete in our own interests as well as in the interests of the industries situated on our own system.

*President.*—They cannot maintain any higher charge than you do.

*Mr. Rose.*—It is not likely that if we give the indigenous industry a preferential rate, the Bombay, Baroda and Central India Railway would still continue to give the importer the same treatment as we are giving to the indigenous industry. If we reduce the rates for the indigenous industry, the Bombay, Baroda and Central India Railway will find it necessary to protect their traffic in the shape of imports. Of course I am only quoting this as an example.

*President.*—I don't think any private enterprise would oppose Government policy.

*Mr. Rose.*—I merely point out what may happen. Even we State Railways are forced to follow the principle of avoiding any undue preference.

*President.*—Supposing Government decided that the State Railways should do this, that policy should be carried out by the State Railways, would it not? As regards preference to the importer, that is a point with which we shall deal later. At present we are merely concerned with the indigenous manufacturer.

*Mr. Rose.*—But you can't separate the two.

*President.*—As a matter of fact we have foreseen that difficulty if the Company managed railways adopt that policy.

*Mr. Rose.*—I was suggesting that as one of the limiting factors.

*President.*—What do you think they would do if Government said that such a policy should be adopted?

*Mr. Rose.*—I don't think that even in the case of State Railways Government can suggest a policy which is impossible.

*President.*—That is for the Government to consider. We are here simply to examine the position and report to Government. As I said the Chemical industry happens to be one where the railway policy has to be modified if the country really wants the industry to be established. There is no getting away from that.

*Mr. Rose.*—You don't think that our present policy meets the situation?

#### *Necessity of cheaper transport.*

*President.*—I don't think so. As I explained to you before, in the long run it is cheaper for the country to enable a bigger unit to be started, and there is no other way of doing it. In the case of the Steel industry it is a different thing. Even there you find that unless the railways had given them special rates, it would never have survived. In the case of the Chemical industry which is a key industry, the same thing applies.

*Mr. Rose.*—They have got practical difficulties to face.

*President.*—Take the alkali industry for instance. It has not been established at all in the country, but supposing it was necessary to establish that industry and we found that some of the raw materials exist here and others have to be transported from other parts of India, salt for instance—coal exists here, but there is no coal in Bombay—if the industry has to be started, raw materials will have to be brought at as low a rate as possible and the finished articles have to be carried at as low a rate as possible.

*Mr. Rose.*—I think you will find that generally, where raw products are concerned, the railways do carry them at as low rates as can be obtained. It is only in regard to the finished products that complications arise, particularly with an industry like the Chemical industry.

*President.*—But the finished products are going to be as important as regards the chemical industry as the raw materials.

*Mr. Rose.*—I don't mean to imply that we don't give concessions. We do, but when it comes to a question of discrimination against foreign products, we are up against it.

*Mr. Mathias.*—Take Bombay for instance. There imported chemicals at present compete with the chemicals manufactured there. Presuming that the industry in Bombay was protected, then if you reduce your railway rates, it would enable the Bombay manufacturer to transport his chemicals to a still greater distance up country and to compete against imported chemicals which come into Calcutta for instance. If we adequately protect the industry, it should be able to meet foreign competition in Bombay; by a reduction in the railway rates, we should enable the Bombay industry to meet in the up country market the competition of foreign goods imported by sea into Calcutta; for Indian chemicals would be extended thereby the market.

*Mr. Rose.*—You cannot discriminate as regards rates in favour of the protected indigenous industry.

*Mr. Mathias.*—My point is even if you don't discriminate, the reduction of freights would still be of great advantage to a protected indigenous industry.

*Mr. Rose.*—The reduction of freights would apply to both.

*President.*—What the railways might do is this: supposing there is a factory located at Ambernath; it is only 40 miles from Bombay. We say the railways will give special rates to a factory for their raw materials and for the finished products and then we take into account the existing freights as regards ports.

*Mr. Rose.*—We leave them as they are.

*President.*—But the Bombay, Baroda and Central India Railway will say we will reduce these freights from the ports.

*Mr. Rose.*—Unless they wanted to give up their traffic entirely they would have to do that.

*President.*—They do it and therefore our scheme of protection through the medium of the railway rates goes overboard and therefore it would be necessary for us to provide against that in any scheme that we put forward and say that the railways are not to meddle in the case of protected industries except under the orders of Government. Unless that is done every scheme of protection would fail.

*Mr. Rose.*—My submission is that it will probably be impracticable.

*President.*—The Government has got to decide whether it has power to do it or not.

*Mr. Rose.*—It is a question of practicability too.

*President.*—How do you mean practicability?

*Mr. Rose.*—I mean practicability in regard to imposing such powers.

*President.*—Will you give us the figures on the present footing?

*Mr. Rose.*—Yes, and you would like this also in regard to the raw materials?

*President.*—Yes. You would add coal and lime and dolomite. As regards lime the radius is about 400 to 500 miles at the most. Will you also give me the present coal rates from the coalfields to Calcutta?

*Mr. Rose.*—I would work it out up to 1,000 miles.

*President.*—First of all give the coal rate from Jharia to Bombay and then from the coalfields to Calcutta.

*Mr. Rose.*—Yes.

*President.*—Then there is this other question as regards wagon loads. These I take it will be wagon loads?

*Mr. Rose.*—Coal is.

*President.*—What about the other commodities? Are you treating them on a wagon load footing?

*Mr. Rose.*—Some of them, sulphuric acid for instance.

*President.*—All the acids and the raw materials you can treat on a wagon load basis, but the question arises as regards the finished products.

*Mr. Rose.*—I will discriminate with Copperas for instance, I presume you would like it on the actual weight basis.

*President.*—Practically it will apply to all the finished products.

*Mr. Rose.*—Yes. I will give you the alternative too.

*President.*—On this question of, undue preference, there is one point I would like to put to you. Would it necessarily be a question of undue preference if you gave a lower rate *ex-factory* than you give from the ports? I will put it this way, that the establishment of an industry by the fact that you give lower rates increases your traffic.

*Mr. Rose.*—Yes, it gives us subsidiary traffic.

*President.*—Whereas the import trade doesn't and therefore you may make that a ground for giving lower rates to the indigenous industry without any question of undue preference.

*Mr. Rose.*—That is a general principle, but what happens in the case of another industry which uses the finished products of that particular industry that you want to accord special treatment to? It is the raw material to that other industry.

*President.*—First of all the question of undue preference will arise between the importer and the indigenous industry. I am dealing with that just now. Could you answer "Yes, we are giving these people lower rates, because we also carry their raw materials"?

*Mr. Rose.*—We do that in many cases.

*President.*—Therefore there is no question of undue preference.

*Mr. Rose.*—There is in respect to the particular circumstances governing certain industries like the Chemical industry. We are faced not only with the issue as it rests between the indigenous product and the imported product, but also the issue as between that finished product for the Chemical industry and that finished product as a raw material for those other industries which consume the same. They wish to be unhampered in regard to the source from which they may draw their raw materials and they naturally wish that they should have every facility for securing the imported article through the ports. These other industries come to us and say, "these are our raw materials. You generally help industries by giving them lower rates on their raw materials and as we intend bringing these from the ports, can we have the benefit of this principle"?

*President.*—Your answer is "you can buy the indigenous material. It would be a shorter distance for you".

*Mr. Rose.*—They may get it cheaper at the ports. Then again there may be the question of quality. Take a commodity like China clay, where the Paper mills told us that the indigenous product was not suitable.

*President.*—That goes to the whole root of protection. You may assume that all these questions have been decided.

*Mr. Rose.*—It is an issue with the railways too.

*President.*—The same question arose in the case of iron and steel or cement. You may consider that imported product is better. If you think it is better and if you don't like the indigenous product, you have to pay more for it and take it. Steel is a raw product for many other industries.

*Mr. Rose.*—As the law on the subject stands and so far as our policy is concerned, I think undue preference would undoubtedly arise if discrimination was made in favour of the Chemical industry purely on the grounds of affording protection to it.

*President.*—If that is a ground for not adopting the policy of protection, it is for the legislature to decide it. So far as we are concerned, we simply put it to them that this is the position. If you want an industry to be established in the country, you must be prepared to put up with this hardship.

*Mr. Rose.*—So far as the indigenous industry is concerned, you will observe from the statement we have submitted and the summary of the rating position that in many instances we have given them on finished products special rates which do not apply from the ports at all. Where it is feasible to do so, we generally assist them by giving them special treatment.

*President.*—I quite realise that. Take the alkali industry for instance. It has not yet been established at all. Supposing it has to be established, those who want to promote the industry must know what is going to happen to them. They can't go to all the railways and ask them "what are you going to do for us".

*Mr. Rose.*—I don't think they will ever get it unless they do come to the railways and say what concessions they want.

*President.*—We don't make a recommendation which is to last for 100 years. We recommend the protection to last for four or five years and then they come under review. The railways can then say they are doing very well under our scheme of concession . . . .

*Mr. Higman.*—And then the whole law can be altered?

*President.*—Yes. Our recommendations are confined to a certain period. I have put to you our difficulties. We must have some starting point in order to calculate it and then we want to consider how your position is likely to be affected financially if our proposals went through.

*Mr. Rose.*—You have got the total involved and I will give you the details which will enable you to gauge the position.

*President.*—I take it that so far as your railway administration is concerned, supposing you were satisfied with our proposals and agreed with us that the industry ought to be established and so on, effect could be given to our proposals within these minima rates without reference to any higher authorities.

*Mr. Rose.*—Quite. We have a free hand unless we realise that it is a question of policy which we ought to place before the Railway Board.

*President.*—Will you give me a few illustrations in which you applied minima rates?

*Mr. Rose.*—Bauxite is one; Road material for the use of municipalities and district boards, and manures are others.

*President.*—To manure, do you apply the wagon load rate?

*Mr. Rose.*—No, we charge on actual weight.

*President.*—That I think is the most favourable rate. In that you give the lowest minima rate without reference to distance or weight?

*Mr. Rose.*—That is the most favourable rate. But in fact in the case of manures, such as oil cake for instance, we generally get full wagon loads.

From the point of view of the distance, it is a flat rate, 10 of a pie per mile. There is no variation. There are special considerations why manure has been given that rate.

*President.*—The establishment of a chemical industry in the country has a very great bearing on the question of fertilisers. In theory you cannot really distinguish between the two.

*Mr. Rose.*—On all fertilisers they will get the minimum rate.

*President.*—As regards coal I think there is a special rate which may go below the minima rate?

*Mr. Rose.*—Yes, that is a special case which goes below the minima on a telescopic basis. It is a special scale entirely built up on the fact that the coal industry is located at a particular centre while there are many parts of the country which are situated at very great distances from the source of supply, and being a cheap commodity and necessary for all purposes, so this specially below rate was applied right through to destination.

*President.*—Can you tell me the amount of reduction in freight on coal?

*Mr. Rose.*—Rs. 1-6-0 a ton from Jharia to Bombay.

*President.*—What is the freight to-day?

*Mr. Rose.*—It is Rs. 13-12-0 per ton.

*President.*—What is the freight on steel from Jamshedpur?

*Mr. Rose.*—The Bengal Nagpur Railway could give you that.

*President.*—I think the freight on steel would be about Rs. 15 from Tata-nagar to Bombay, so that it is only slightly higher than the freight on coal. There does not appear to be any reason why chemicals should pay more.

*Mr. Rose.*—I have not compared them on that footing.

*President.*—As regards the through rates, that question has been raised from time to time. I saw a reference made to-day in a speech by the Commerce Member.

*Mr. Rose.*—It is under the special consideration of the Government. It is a very difficult problem.

*President.*—That is because you have been building up different ports.

*Mr. Rose.*—It is not that so much, it is a question first of the method of treating railways as separate financial units and when that occurs you will have to take into account the higher working costs on one railway as compared with another. One railway, generally speaking, on account of higher working costs may have a higher average basis of charge, so you have variations throughout and therefore it is very difficult unless you get complete uniformity throughout the different systems.

*President.*—I suppose you have got figures to show the average haulage cost per mile.

*Mr. Rose.*—Yes. We can give you the average lead and the average rate per ton on commodities like grains, seeds and coal, etc., for which we maintain statistics.

*President.*—Supposing you had to quote a rate, you would naturally compare it with the average haulage costs.

*Mr. Rose.*—That is really one of our methods.

*President.*—Can you give us that?

*Mr. Rose.*—Yes, would you like it over a series of years? It is in the Administration Report of the Railways and we can take that out for you. I will summarise and send it to you for say a period of five years.

THE BENGAL NAGPUR RAILWAY COMPANY, LIMITED.

Oral Evidence of Messrs. A. DUNCAN and R. A. LEAKEY recorded at Calcutta on Tuesday, the 5th March, 1929.

*Explanatory.*

*President.*—Mr. Leakey, I think you were here yesterday when we heard the East Indian Railway and I might explain to you again that there is no question at present of differentiating between the importer and the indigenous manufacturer. You may leave that out of account for the moment. What we are concerned with is this: if a big chemical industry is to be started in the country—at present it is a very small industry—it must be on a large scale, that is to say, much larger units should be at work than at present. That implies that unless a location were found for the industry where all the raw materials were available within a short distance, and also a market, there will be difficulty. But as you understand, the chemical industry is not one where you can have all the raw materials in close proximity nor can you have a market close by. Chemicals are manufactured in small quantities and though the market may be large it is a scattered market. The idea of a larger unit is that the cost of production comes down and the consumer benefits. But even if you get the cost of production lowered, still the cost of distribution must not be unreasonably high and therefore the question of freights arise in two directions, *viz.*, namely the question of freights on raw materials from the various places where they are found to the factory and the freight on the finished products from the factory to the various markets. We have now got to consider three points; first, what are your present rates, how much you are earning on the present production and on the haulage of the raw materials at the present rates. You may take the lower rates in operation assuming that you apply them generally to the industries. Secondly, if we recommended a flat rate, for the purposes of exploration, 1 of a pie per maund per mile, how much you would earn on the increased production and on the increased quantities of the raw materials to be hauled, first on the finished products and then on the raw materials. Those are the three sets of figures which we would like you to work out so that we can see whether it is feasible to make a recommendation based on a large scale production. If we found that the cost to the railways would be more than the circumstances of the case justified then of course we should hesitate to make such a recommendation. But if we found that, on the whole, the burden on the railways would not be excessive or unreasonable, and on the other hand the consumer would benefit and the people would have an industry established in the country, we should then be prepared to make a recommendation. I hope I have made myself clear. It is for this reason that we are examining the railway officers who would be able to explain to us what the policy of the company is and whether it is likely to be modified on these lines. We shall be prepared to hear your objections after you have given the necessary information. The railway administration is not concerned in this enquiry with the question whether protection should be given or not. That we are appointed to consider and report to the Government. Government will then consider the proposals that we put forward and if it is satisfied that protection is to be granted, they will do so. Of course, you are entitled to say here how far, apart from the general question of the policy of protection, your own interests are likely to be affected as a railway. We cannot go into the general question obviously as to whether protection ought to be recommended or not. If as a consumer you are hit by protection, you are entitled to place your case before the Board. You know already how much you are earning at present from this industry and if production is carried on on a large scale, that is to say, by a single unit with reference to the present market conditions in

the country—let us not talk about the future at all—how far the traffic is likely to increase.

*Mr. Duncan.*—That would be rather a difficult figure to collect.

*President.*—You could only make an approximate calculation. We take a unit of 8,000 to 10,000 tons in terms of sulphuric acid. It will produce about 16,000 tons of different kinds of salt. Say, we put it this way: about  $\frac{1}{3}$  of that production would be consumed in the neighbourhood of the factory. Supposing it is situated in Calcutta, Calcutta itself may consume, say, roughly a third and the rest has to be distributed; a third of that may go to Bombay directly and the rest may be distributed all over the country. These are merely approximate figures. These are the figures we want you to give. Sulphuric acid, for instance, if manufactured in Calcutta, about 2,000 tons may have to be transported to Bombay; and *vice versa*. Then as regards raw materials supposing the factory was situated near Bombay, it would require perhaps 20,000 tons to 30,000 tons of coal; it would require about 2,000 to 3,000 tons of bauxite; 1,500 tons or so of magnesite; then of course there are the stores and the other smaller raw materials like iron scrap, zinc scrap and so on. So your distribution of the finished product would be somewhat different from what it is now, that is to say, instead of going from the port to the interior, a part of it may be diverted from port to port and from the port to the interior. It is for that purpose we are trying to calculate by taking a flat rate and for the sake of exploration we are taking Bombay and Calcutta as the two extremes. Will you be able to assist us?

*Mr. Duncan.*—We will try as far as possible. Our difficulty is that we have no factory manufacturing chemicals on the Bengal Nagpur Railway itself and I think I am correct in saying that any traffic that there is, is from the ports and we have not had occasion to explore the question of special rates, because we have never been approached.

*President.*—I quite understand that. The thing that we really wish to avoid is this: we regard this as an industry of very great national importance, because practically all industries and agriculture depend on it and therefore we want to make some proposals which will create in the minds of the investing public a sense of security that if they undertake the manufacture of chemicals, they would be able to know how they would stand. The question of freight is of the utmost importance. As I have pointed out, if the industry has to live by negotiation with the railways, we don't know where the industry will have its headquarters—it may be Bombay or the Bengal coalfields. I think these are the probable centres for manufacture on a large scale, but of course we can't tell. It is for the industry itself to make up its mind. What we are anxious about is that the industry should know that it can get certain rates upon which it could make its calculations as regards costs, profit, market and so on. Up to now the industry does not really know that. Take the case of the steel industry for instance. Had not the Bengal Nagpur Railway and the East Indian Railway given these favourable rates, it would not have been able to stand at all. If it is a matter of negotiation with the railway administration in the case of the Chemical industry, and that is what it really comes to, I don't think we can leave the industry in that position, and therefore we would like to know what precisely your freight policy is going to be.

#### *General policy.*

*Mr. Duncan.*—As a matter of general policy the Bengal Nagpur Railway is prepared to consider sympathetically any representations in the matter of rates from any concern putting forward a specific case for consideration.

*President.*—That we know. There is no question about that. But here we are not dealing with applications of particular manufacturers or persons. We are looking at the industry as a whole. Supposing we asked you what are you prepared to do?

*Mr. Duncan.*—We would say that our general policy would apply.



*Mr. Mathias.*—What we are considering is this: In the case of fertilisers the railways allow minima rates. Would the railway be prepared to apply the same policy to chemicals as they do to fertilisers?

*Mr. Duncan.*—That is a question that would apply to the railways as a whole. I may say on behalf of the Bengal Nagpur Railway that they would be prepared to come into line with any policy or specific agreement which the State railways take up.

*President.*—That is to say, so far as the Bengal Nagpur Railways are concerned, they will be prepared to adopt what the State railways adopt?

*Mr. Duncan.*—Quite right.

*President.*—As my colleague just now pointed out to you, the fertiliser industry now knows that the cost of haulage is going to be 1 of a pie per maund per mile. It knows what its probable raw materials are, how they are carried and so on. We want to find some formula which would enable us to say that this is the sort of freight that the industry ought to bear and if that is the amount of freight, then it either needs protection and the protection amounts to so much or it does not need any protection at all. We can't really decide what form protection should take or whether protection should be given or not until we know its cost of production so far as it depends on the freight and the cost of distribution.

*Mr. Duncan.*—In a matter like this which is an all-India concern, so far as the railways are concerned, it is very difficult to commit oneself to an actual minimum figure.

*President.*—I think you will be able to see clearly when you have got out those three sets of figures that I mentioned a little while ago.

*Mr. Leakey.*—But to work out any results as regards earnings, we should require a definite proposition to be put forward as any commercial concern would do, if they were approaching us for a reduction of rates. For instance the Tata Iron and Steel Company's freight rate was based on a minimum ton mileage guaranteed to the railway.

*President.*—That industry stands on a very different footing. That is a very fortunate industry in one respect, *viz.*, that it has got all its raw materials, practically all that counts, within a radius of 150 miles. It has got a substantial portion of the market within that radius and steel is an article which is used on a large scale. I mean one won't use 5 lbs. of steel. In the case of chemicals it is different and it must necessarily be on a small scale for distribution purposes. This industry cannot guarantee to you what tonnage you are likely to have. I can give you these figures with reference to the present market.

*Mr. Duncan.*—Those figures that you give are all-India figures.

*President.*—Supposing we say that the factory is located in Bombay for the time being, and its sulphuric acid production is 8,000 to 10,000 tons, salts, say, 16,000 tons. Of this 1/3rd would be consumed on the Bombay side and 1/3rd would probably be in this direction, the bulk of it in Calcutta. About 2,000 tons of acids would come to Calcutta and about 2,000 tons used in Bombay and some would go to the up-country markets. As regards materials, as I said, about 20,000 to 30,000 tons of coal will have to be hauled. I don't think you are interested in magnesite and bauxite, are you?

*Mr. Duncan.*—No.

*President.*—That is all so far as the present market goes, but the market may expand; we hope that the market will expand. When Calcutta has got a market big enough to have its own unit, the process will be reversed, but we can't say how the market would develop. It all depends on the demand that occurs in the country. Then take another industry which has not yet started and that is the alkali industry. If it is started, probably it will be in Bengal. It would be a much bigger industry than this one if fully developed. Probably 50,000 tons of alkalies are required in the country. There is no salt here and it will have to be transported from the other side of the country. Limestone is within a radius of 200 or 300 miles. Then

there is the distribution of the products all over India. We can't give you any more definite figures, but you must bear this in mind that it is an expanding market and a substantial portion of it will fall on Bengal so far as production is concerned.

*Mr. Leakey.*—Supposing the factory was situated in Bombay, the bulk of that traffic that you visualise would be from Bombay to Calcutta.

*Dr. Matthai.*—About a third.

*President.*—But you see the whole of the coal would go there.

*Mr. Leakey.*—But taking the traffic from the factory to Calcutta, there is sea competition. If the shipping companies undercut us, they may get the whole of the traffic by sea.

*President.*—Sea competition exists even now, does it not?

*Mr. Leakey.*—Yes.

*President.*—It is no new factor.

*Mr. Leakey.*—But it would be a factor if that was held out to the railways as a basis of traffic which they could reckon on. You are putting it to us—“here is a certain amount of traffic you are likely to get”—can you say we will get that traffic?

*President.*—No one can say that. How can I say what form your competition will take any more than you can? I doubt very much whether in the case of chemicals sea competition would count at all. Take sulphuric acid for instance. They will never be able to carry 2,000 tons of sulphuric acid from Bombay to Calcutta. We have been examining these figures and the position appears to be this that at present, if prices are really to be reduced and the industry is to do with as little protection as possible, it must concentrate in one particular place. It does not matter to us whether it is Bombay or Calcutta or Lahore. We don't wish to make any suggestion as regards that, but what we wish to point out is simply this, that at present the idea must be to develop one large single unit. Then as the market expands, other units may be started in other centres.

*Mr. Duncan.*—As far as coal is concerned, the existing rates would apply to every other consuming industry in India and would equally apply to the chemical industry.

*Mr. Leakey.*—Under the present policy of rating coal, I don't think any reduction would be given for any particular concern because such a concern required protection.

*President.*—For purposes of coal we may take the existing coal rates. Could you give me the average rate for coal per ton to Bombay?

*Mr. Leakey.*—In the neighbourhood of Rs. 13 a ton.

*President.*—That is about 1 of a pie per mile.

*Mr. Mathias.*—It would be something below that after the recent reduction in rates?

*Mr. Leakey.*—It would be below that at the revised rates.

*President.*—What do you reckon the distance to be?

*Mr. Duncan.*—It would be about 1,200 miles.

*President.*—If you take 1,200 miles, it is about 08. The question of coal stands on an entirely different footing. That would always be an all-India question?

*Mr. Leakey.*—Yes.

*President.*—Can you let me have a copy of your agreement with Tatas as regards haulage of their goods?

*Mr. Duncan.*—I will send you a copy. It is a flat rate.

*President.*—Would you mind giving me the flat rate?

*Mr. Leakey.*—One-tenth of a pie per maund per mile.

*President.*—Is that for raw materials as well as for finished products?

*Mr. Leakey.*—Generally speaking it is one-fifteenth of a pie for raw materials. There is a special stipulation that the distance hauled will have to be a certain number of miles; normally speaking it is one-fifteenth of a pie for the raw materials and one-tenth of a pie for the finished products, except in the case of products for shipment.

*Mr. Duncan.*—Here it is (hands in).

*President.*—30 million ton miles!

*Mr. Duncan.*—That is the minimum required.

*President.*—As I said, in this industry we don't really know how it will develop, so that any minimum limit is out of the question at present. But the whole question is whether a flat rate would be possible. You have got this one-tenth of a pie per maund per mile from Tatanagar to Calcutta for finished products and bye-products of coke ovens.

*Mr. Duncan.*—That is the raw materials rate. It is really one-fifteenth of a pie.

*President.*—And the lowest minimum rate may be  $\cdot 1$  of a pie or  $\cdot 166$ , i.e., one-sixth of a pie in that case for the other products.

*Mr. Leakey.*—Roughly speaking, it is at the one-tenth of a pie per mile. In certain cases where certain commodities were classified in a higher class than the second class rate in 1905 it is based on the 1905 classification.

*President.*—The minimum rates have not been changed?

*Mr. Leakey.*—No.

*President.*—So that it is roughly one-tenth of a pie for the finished products and one-fifteenth of a pie for the raw materials.

*Mr. Leakey.*—Yes.

*President.*—Therefore, the steel industry knows exactly where it stands and as a matter of fact in our enquiry we were able more or less to assess the advantage that the Steel Company got in the matter of freights. It is for a similar reason that we really want a starting point in order to consider what form the protection should take. I take it, Mr. Leakey, that this coal rate and one-fifteenth of a pie per maund are about the lowest rates that the railways give?

*Mr. Duncan.*—This is below the statutory minima.

*President.*—In practice coal is the only article that is put below the minimum rate and so is this one-fifteenth of a pie.

*Mr. Duncan.*—Yes.

*President.*—Are there many articles where you charge the minimum rate?

*Mr. Leakey.*—For bauxite we charge the minimum rate.

*President.*—And there are the fertilisers?

*Mr. Leakey.*—Yes, the fertiliser rates are flat rates over the G. I. P. in the two different cases, that is to say, there is no distinction as regards weight; but as far as we are concerned, there is a special scheduled rate for "actual weight," as you will see from item 15 of the statement that I put in. The "C/FF" is the manure schedule for "wagon loads".

*Mr. Mathias.*—What is C. C.?

*Mr. Leakey.*—"C. C." is carrying capacity; "O. R." is owners' risk.

*Dr. Matthai.*—What does carrying capacity really mean?

*Mr. Leakey.*—If you send 18 tons in a wagon of 20 tons carrying capacity, you are charged as a minimum on the carrying capacity of the wagon.

*Mr. Mathias.*—What is "L"?

*Mr. Leakey.*—Sender and consignee do the loading and unloading. The C/FF schedule is based on one-tenth of a pie per mile and it applies only to wagon loads. We have a higher schedule which applies to small lots.

*President.*—We find it very difficult to work out these flat rates and therefore we have asked for a statement to see what the position is. We

want to see how the present figures will show by a comparison with the flat rate of 1 of a pie per mile over the whole distance.

*Mr. Duncan.*—You want both for the raw materials and the finished products?

*Mr. Leakey.*—With regard to the route between Bombay and Calcutta, we are only responsible for the portion up to Nagpur. We can't give you any indication of what would be done beyond that.

*President.*—You know what the Great Indian Peninsula Railway is charging and you can give that. We wish you merely to quote that to show what it really comes to. Then we can take the quantities ourselves and work out.

*Mr. Leakey.*—Am I to understand that you wish me to give you a list showing the actual rates in force for the whole distance from Calcutta to Bombay, calculated at the existing tariff rates, compared with rates at one-tenth pie, to show what the lump sum rates would be?

*President.*—Yes, and then we will calculate on the existing traffic and calculate on our estimate of what the traffic is likely to be.

*Mr. Leakey.*—We have no idea of the existing traffic under each of these heads.

*President.*—As a matter of fact there is very little, but when we say existing traffic, we really mean when the industry is reorganised. That is the point where we start.

*Mr. Leakey.*—With regard to these raw materials, for instance, we have a rate for bauxite from Katni-Marwara to Calcutta at one-tenth of a pie per mile. If we show bauxite from Calcutta to Bombay, it will be shown at the tariff rate. Our rate in this case here is a special rate between two specific points. But I take it that what we should give you is the rate at which it is carried to Calcutta, applied from Calcutta to Bombay.

*President.*—You can put it that way.

*Dr. Matthai.*—As a matter of fact bauxite is carried over the Great Indian Peninsula Railway?

*President.*—So far as the raw materials are concerned, you can do it this way: bauxite comes from Central Provinces to Calcutta, give that rate; magnesite comes from Salem, give that rate; coal would come from Jharia to Bombay. In the case of salt it is from Bombay to Calcutta. Limestone is in Bihar.

*Mr. Leakey.*—That is from Singbhum.

*President.*—That I think is the nearest source to Calcutta?

*Mr. Duncan.*—Yes.

*Mr. Leakey.*—Limestone from Birmitrapur to Bombay would be at the actual tariff rate.

*President.*—You can give that rate. I think as regards the acids and the salts, we may take it that Bombay is the place of manufacture. As regards the alkalies, we may take Bengal as the place. Their raw materials that will be hauled this way is salt—very large quantities of salt and limestone—then there is coal from Jharia to those places. These are the principal raw materials to be hauled to Calcutta, the others go to Bombay.

*Mr. Leakey.*—There is a large production of salt on the east coast.

*President.*—That would be very much nearer to Calcutta.

*Mr. Duncan.*—Yes, it is in the Ganjam District.

*Mr. Mathias.*—Does that come to the Calcutta market now?

*Mr. Duncan.*—Yes, it is extraordinary; it is very popular right up to Sambalpur and Ranchi.

*President.*—The alkali industry, as you see from these figures, can be a fairly big one. I take it that if a manufacturer finds that his freights are too high, he approaches the railway administration and asks for special rates

and I assume that if the railways are satisfied that he ought to get a special rate, then he gets it, but if the industry has not actually started and then he comes and says: "I am starting an alkali industry," will the railways consider his case or ask him to wait?

*Mr. Duncan.*—If there are reasonable grounds that the industry will bring additional traffic to the railway, the railway would quote him a special rate.

*Mr. Leakey.*—As an example, in connection with this rate for bauxite, we had a case of a new prospecting concern in Lohardaga, beyond Ranchi. They approached us and said that if they could get a low rate, they could do good business in London. They gave us their probable tonnage, if they could get into the market. We met them and that rate was given in order to enable them to develop this industry equally for the benefit of the railway. We gave them the same rate as we did to Katni-Marwara. It was a business proposition from the point of view of the railway.

*President.*—What is the minimum amount of traffic on which you would give special rates?

*Mr. Leakey.*—It is very difficult to say that. It depends a great deal on the nature of the commodity.

*President.*—Take these ordinary chemicals where the raw materials and the finished products are not very expensive.

*Mr. Leakey.*—Considering that our existing traffic in chemicals is not very great at present, it should not be difficult to induce the railway to agree. If it was a business proposition and if we were going to get a tonnage such as you assume, we would consider a reduction in the rates.

*President.*—On a tonnage like that we have given, would the railways consider a reduction of rates.

*Mr. Leakey.*—That tonnage gives us very little idea of the amount of traffic that the Bengal Nagpur Railway will get.

*President.*—We don't know at present. We must take the railways as one single system. We can't really look upon each individual system. What we say is this: will the railway administration consider it worth while on this tonnage to consider it?

*Mr. Leakey.*—We should at once say that it is an attractive tonnage for us to cater for and it would induce us to meet the concern and grant them a reduced rate with an idea of developing it.

*Mr. Mathias.*—These special rates that you have mentioned in regard to acids on the first page of your memorandum regarding rates for chemicals, do they mean minimum tonnage?

*Mr. Leakey.*—No, that is on actual weight over the B. N. Railway. We have a purely competitive rate, we were not approached by any concern to quote the rate. It is purely the railway's internal adjustment of the rate. We don't know that traffic exists at all.

*Mr. Mathias.*—What factory does this sulphuric acid come from at Shalimar?

*Mr. Leakey.*—There is a similar rate quoted from Bombay to Nagpur and the Bengal Nagpur Railway quote a competitive rate to attract some of the traffic.

*President.*—I was told by Mr. Peterson that you gave them a special rate for sulphuric acid from Ambernath to Tatanagar. I take it that the minimum rate there would be 1/6th of a pie for sulphuric acid.

*Mr. Leakey.*—No, because that may not be considered as raw material.

*President.*—That is going to be a raw material, because it is being used for sulphate of ammonia.

*Mr. Leakey.*—I don't think it is under the category of raw material at present.

*Mr. Duncan.*—Raw material is anything taken out of the ground, not fabricated.

*President.*—Sulphuric acid is really a raw material. It has to be used for something else.

*Mr. Duncan.*—It has been manufactured before. It has gone through some process of manufacture.

*President.*—It is a raw material practically for all industries.

*Mr. Duncan.*—There is a distinct definition of raw materials for the purposes of this agreement.

*Dr. Matthai.*—Any kind of materials used for the manufacture of manure would be conveyed at the manure rates. Take, for example, sodium nitrate. You say this would be charged over the Bengal Nagpur Railway at the same scale as shown in item 15, that is one-tenth of a pie per mile.

*Mr. Duncan.*—Yes.

*Dr. Matthai.*—What is your procedure for determining that this is conveyed for that particular purpose?

*Mr. Duncan.*—On a certificate presented by the consignees.

*President.*—Take the case of fertilisers. Sulphuric acid is a very important raw material; in fact the two raw materials are rock phosphate and sulphuric acid. Rock phosphate you take at the manure rate without any question, but in the case of sulphuric acid, it is classified under item 8 as dangerous goods. When you take a wagon load, you take it by itself. Is it then really a dangerous goods?

*Mr. Leakey.*—We are not responsible for that. That is all laid down by the Inspector of Explosives.

*President.*—It doesn't seem to me that it would be dangerous to carry sulphuric acid in a tank wagon.

*Mr. Mathias.*—You are responsible for the rates. You should have power to reduce the rate.

*Mr. Duncan.*—We have power to quote special rates, but the actual classification of the goods is "dangerous"!

*Mr. Mathias.*—How are matches classified?

*Mr. Leakey.*—Matches are classified as dangerous goods, 8th class and 9th class.

*President.*—I take it that this 1 of a pie per mile rate is not a rate on which the company would lose.

*Mr. Duncan.*—I should not care to say that. It is not possible to say on a conglomeration of rates that exist.

*President.*—Yes, I know that, but can you prove?

*Mr. Leakey.*—It is absolutely impossible to prove. If you are carrying a train load of iron ore or a train load of limestone between specific points, one-tenth of a pie per mile per maund may in that case be said to be a paying rate. But if you take a small amount of cement, for example, anywhere over the system, then the shunting and that sort of thing may make that rate entirely unremunerative. For example, to the Tata Iron and Steel Company we allow a rate of one-tenth of a pie per mile for a wagon load of steel.

*President.*—Steel as I told you is much easier to buy than epsom salt or Glauber's salt and things like that. In the case of chemicals, as I said, some of them can be carried in wagon loads, but there are other things which you cannot expect to carry in wagon loads.

*Mr. Leakey.*—Yes.