

PAPERS RELATING TO PUBLIC WORKS, MADRAS

19 - II

A P P E N D I X.

Appendix (A.)

Public Works Department.

Appendix (A.)

No. 57.

EXTRACT from the MINUTES of CONSULTATION, under date the 17th February 1851.

Read the following Papers.

From the Officiating Secretary to the Government of India.

(Here enter 21st December 1850, No. 583.)

Para. 1. UNDER the instructions of the Government of India, communicated in Major Wylie's letter, dated 21st December 1850, the Right honourable the Governor in Council is pleased to appoint the following gentlemen Members of a Commission for inquiring into and reporting upon the system of Public Works at this Presidency.

J. D. Bourdillon, Esq., Collector of the Northern Division of Arcot.
Major F. C. Cotton, Civil Engineer of the Seventh Division.
Major G. Balfour, Member of the Military Board.

2. These officers will, in communication with each other, fix on an early day for commencing the business of the Commission, at such place at the Presidency as may be convenient to all parties; and while so employed, will be permitted to receive the full allowances of their respective appointments.

3. Application will be made to the Government of Bengal for a copy of the Instructions issued to the Commission at that Presidency, which, when received, will be duly communicated to the Commission now appointed. Meanwhile, however, a copy of the Honourable Court's Despatch received with Major Wylie's letter, together with all the correspondence relating to the Department of Public Works of the Madras Presidency, which is therein referred to, as well as any other papers on the records of Government, will be held at the disposal of the Commission whenever they may call for them, and the Commission will further be empowered to call on all departments and individual officers for whatever information they may require connected with the subject of their investigations; and orders will be issued to all such departments for immediate compliance with such applications, in supersession to all other calls for the time being which do not indispensably require their attention.

Military Board.
Chief Engineer.
Superintending Engineers.
Board of Revenue
D. P. W.
All Collectors.
Civil Engineers.
Superintendent of Roads.
Accountant-general
Military Auditor-general, and
Civil Auditor.

(A true extract.)

H. C. Montgomery,
Chief Secretary.

MEMORANDUM from the Chief Secretary to the Government of Fort St. George to the Public Works Commissioners.

Para. 1. The points to which it seems the especial attention of the Commission should be directed, are,—

1st. The consideration of the Department of Public Works as a whole, whether for Civil purposes, such as—

Tank repairs - - - - -	} Under the Board of Revenue.
Revenue, judicial, and public buildings - - - - -	
District roads - - - - -	
Trunk roads - - - - -	- Under Captain Best, Superintendent.

For Military purposes, such as—

Fortifications - - - - -	} Under the Military Board.
Military roads - - - - -	
Buildings in military cantonments and at the Presidency - - - - -	

2d. The working of the Executive Branch, that is,—

By the Collectors and Engineers in the provinces.
By the Superintendent of Roads.
By the officers employed by the Military Board.

Appendix (A.)

3d. The establishment which constitutes the Executive in the three divisions of the department, such as,—

- Surveyors.
- Overseers from the Sappers and Miners.
- Collector's Maistry and District Establishments.
- Civil Engineer's Working Establishments.

4th. The sums laid out annually in the repair and construction of public works, and the proportion which the expense of superintendence bears towards them, taken under separate heads for a series of years, say 15, with the view of ascertaining whether the cost of superintendence has not greatly increased in particular branches of the Maratum, while the disbursements for repairs have continued stationary.

5th. The system of control and check on the public expenditure in the provinces, including the system of accounts.

6th. The system of control and check as exercised by the Revenue and Military Boards and by the Superintendent of Roads; the means at their command for the purpose.

2. For the investigation of these points, it seems necessary that the Committee should refer to the—

1st. Correspondence which took place on the constitution of the office of Inspector-general of Civil Estimates. The number of Civil Engineers, and the limits of their range, prior to 1837. Abolition of the office of Superintending Engineer in certain divisions; increase in the number and new allotment of the Civil Engineers' divisions; constitution of a Board in the Department of Public Works, with a seat to the Chief Engineer in it; alteration of the designation of the Inspector-general to Secretary to the Board in the department of Public Works. The new territorial distribution of the Civil Engineer's divisions, and the formation of Vizagapatam and Ganjam into a subdivision.

2d. The representations of the Military Board on the constitution of the Department of Public Works.

3d. The correspondence between the Government and the Honourable Court of Directors, and with the Government of India, embracing various propositions for improving the efficiency of the Department of Public Works.

4th. Correspondence relating to the Survey School, and the employment of Overseers from the corps of Sappers.

5th. Returns obtained from the Board of Revenue of expenditure and charges of superintendence.

6th. System of keeping accounts.

7th. Correspondence with Board of Revenue regarding defects in the existing system.

3. As the correspondence on the subjects adverted to above has for the most part taken place with the Board of Revenue, their records will afford ready means of supplying the Commission with information; all others, such as the correspondence with the Court of Directors, will be furnished from the Government Office, and, on application, the Military Board will supply all papers appertaining to their department.

Fort St. George,
22 March 1851.

H. C. Montgomery,
Chief Secretary.

To the Commission for inquiring into and Reporting
upon the System of Public Works.

Public Works Department.

No. 109.

EXTRACT from the MINUTES of CONSULTATION, under date the 21st March 1851.

Read the following letter from the Officiating Secretary to the Government of India.

(Here enter 28th February 1851, No. 638.)

REFERRING to para. 8 of the Extract from the Minutes of Consultation, dated 17th February 1851, No. 57, and to the despatch of the Honourable the Court of Directors therein referred to, a copy of which was furnished to the Commission appointed to inquire into the system of public works at this Presidency, the Right honourable the Governor in Council deems it necessary, in addition to the duty of the Commission, which is so clearly indicated in that despatch, to instruct the Commission generally to inquire into every* branch of the existing system

* The establishment of the Office of the Inspector-general of Civil Estimates in 1819, the alteration of system in 1836, by which the Chief Engineer had a seat in the Board in the Maratum Department, and the office of Inspector-general merged into that of Secretary to the Board of Revenue Department of Public Works.

The changes since 1836 in the territorial allotment of the Civil Engineers' ranges, the abolition of the Office of Superintending Engineers, the representations of the Military Board on the subject.

system of public works, both in respect of superintendence and execution; commencing from the period the office of Inspector-general of Civil Estimates was established.

Appendix (A.)

The Commission will report the result of their inquiries, and submit for the consideration of Government any suggestions which they may think it expedient to make, either for the modification and amendment of the present system, or for the establishment of some other plan, whereby the execution of public works may be placed under such a system as shall insure their being planned and executed with the utmost practicable amount of promptitude, skill, and true economy.

The Commission are authorized to require the presence of any persons in the service of Government whom they may be desirous of examining on any point connected with the subject under inquiry.

(A true Extract.)

H. C. Montgomery,
Chief Secretary.

To the Commission for Inquiring into and Reporting
upon the system of Public Works.

Appendix (B.)

REPORT to the BOARD OF REVENUE on the SUBJECT of the IRRIGATION DEPARTMENT,
by Captain A. Cotton.

To the Secretary to the Board of Revenue, in the Department of Public Works.

Sir,

13 December 1837.

Appendix (B.)

1. In reply to your letter on the subject of the Tank Department, I have the honour now to offer the following as the results of what experience I have had in the matter. I propose confining myself chiefly to the consideration of the amount of expenditure necessary to keep up the irrigation works, and not to enter upon the details of the application of that sum minutely; first, because I concur with the Civil Engineer of the Third Division in the views he holds on that subject, and which he has laid before the Board; and, secondly, because the amount of expenditure required, has, so far as I am aware, never yet been thoroughly examined and determined upon sound grounds. This is a very remarkable circumstance, for it is the fundamental question; and till it is really answered with some correctness, all attempts to make the department efficient by a careful arrangement of the details, must inevitably fail; there will be either a wasteful expenditure, or an inadequate one.

2. This question has been under my consideration for many years, and I have long been anxious to see it most thoroughly examined, being fully satisfied that in the management of the Carnatic, its irrigation, if not the very first point to be attended to, is at least one of the first-rate importance; and I must say that after being about nine years employed in this line, I can come to no other conclusion than that the importance of the subject has been throughout altogether misapprehended. Since some time before my arrival in the country, it has indeed been pretty regularly advancing in the degree of attention which it has received; but after all, I have no hesitation in saying, that I feel assured that it is a subject which requires a much more systematic arrangement than it has ever yet been deemed worthy of. I am sorry that I have not had more experience in the department, and that I am not able to treat the subject as it ought to be treated, but perhaps what I can say, being the result of some years' experience, and of my having taken a real interest in the country, may be considered worthy of some attention.

3. The fundamental questions in this inquiry I consider to be these:—

- 1st. What is the value of the works that belong to the Tank Department, that is, not only the first cost, but also their annual value to the country, if in good order?
- 2d. What amount is absolutely necessary to keep them in an efficient state?
- 3d. What amount may be advantageously expended in new works, or improving old ones?

Out of the first of these questions arises the following: Has the actual expenditure hitherto been in excess, or less than the sum really required?

And out of the third:—

What have been the results of the attempts at improvements already made?

4. In

The efficiency of the Board of Revenue in the Department of Public Works under the present system as controlling authority and the means of improving it. The suggestions made by the Board towards this object from time to time.

The efficiency of the Executive Branch of the Department of Public Works, including Surveyors, Overseers of the Corps of Sappers and Miners, Collectors and District Establishments.

The working of the Road Department in all its branches.

The expenditure in all branches of Maramut, separately and collectively, with the proportion the charges of superintendence bear to the expenditure.

The employment of convicts as a means of saving expenditure to the State.

Abridgment of correspondence and other minor matters which may occur on a general consideration of the subject in its different branches.

Appendix (B.)

4. In answer to the first question, it will be seen by the accompanying statement of the Nunjay revenue of the districts of the Carnatic up to Fusly 1244, that the average Nunjay Jamabundy of the five years preceding that Fusly, omitting Tanjore, and adding three lacs for Chingleput, which has been omitted in the statement, was about 85 lacs; the total land revenue nearly 190 lacs; and the total of collections, including extra sources, 242 lacs. That is, the Nunjay revenue was more than two-fifths of the total land revenue, and about one-third of the total collections.

5. The statements do not contain a separate account of the Nunjay revenue of Tanjore, but the revenue of the dry lands of that district is very small, and the total Nunjay revenue of the Carnatic, including Tanjore, for the average of the years above mentioned, was about 118 lacs; that of the total land revenue, 226 lacs; and the grand total collections 288 lacs; or the Nunjay revenue was more than half of the total land revenue, and about two-fifths of the total collections. But I must here observe, that the irrigation works in general are so far from being in good order, that the revenue actually derived from them at present, is by no means the full measure of their value. In proof of this, I give the following comparison of the Nunjay revenue of five districts for four Fuslies, beginning from 1232; and that of four Fuslies, beginning from 1241, omitting Fusly 1242, because it was a year of extraordinary failure of crops from want of rain:—

Fuslies.	North Arcot.		South Arcot.		Madura.		Tinnevely.		Trichinopoly.		REMARKS.
	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	
1232 - -	16,44,000	- -	12,41,000	- -	4,20,000	- -	12,26,000	- -	8,00,001	- -	
1233 - -	15,12,000	- -	12,16,000	- -	3,65,000	- -	11,84,000	- -	8,10,000	- -	
1234 - -	15,64,000	- -	12,43,000	- -	4,17,000	- -	11,25,000	- -	8,45,000	- -	
1235 - -	14,45,000	- -	12,51,000	- -	4,41,000	- -	11,65,000	- -	8,37,000	- -	
TOTAL - -	61,66,000	- -	49,51,000	- -	16,43,000	- -	47,00,000	- -	33,00,002	- -	
Average - -	15,41,000	- -	12,38,000	- -	4,11,000	- -	11,70,000	- -	8,25,000	- -	
1241 - -	13,32,000	- -	10,44,000	- -	4,00,000	- -	*6,26,000	- -	7,91,000	- -	* Not taken into the average as being an extraordinary season.
1243 - -	11,84,000	- -	10,12,000	- -	4,37,000	- -	11,23,000	- -	8,00,004	- -	
1244 - -	12,37,000	- -	11,10,000	- -	4,62,000	- -	11,52,000	- -	8,00,003	- -	
1245 - -	11,27,000	- -	10,20,000	- -	5,00,000	- -	10,55,000	- -	8,00,002	- -	
TOTAL - -	48,80,000	- -	41,76,000	- -	17,99,000	- -	33,10,000	- -	32,00,000	- -	
Average - -	12,20,000	- -	10,44,000	- -	4,60,000	- -	11,00,000	- -	8,00,000	- -	

6. From this it appears that the Nunjay revenue has very greatly fallen off in some of the districts even within the last 10 years; in Arcot one-fifth, in South Arcot one-sixth, though in two of its Talooks, by attention to irrigation, it had greatly increased; and in Tinnevely, 1-15th. In Trichinopoly it has not fallen off of late years, in my opinion, because it has been so vigilantly attended to by the present Collector, but I have no doubt that it has fallen off since it has been under the Company's management. In Madura it has rather increased of late years, chiefly, I believe, from the same cause; and in Tanjore it has increased also from the same cause, leading to its obtaining a much more liberal expenditure, and much more of the attention of the Tank Department Officers. Excepting the last, I think that in every tank district the revenue is now much below what it would be if the works were in good order, so far as I can judge from what I have seen of the multitude of tanks and channels that now only produce two-thirds, one-half, or even one-fourth of the Ayacut revenue. I should judge that (omitting Tanjore, the works of which are, in the main, in good order) the remaining districts, which now yield about 85 lacs, would yield at least 120 lacs, making, with Tanjore, 153 lacs as the annual revenue of works of irrigation under the charge of Government in this Presidency; and taking the revenue at 40 per cent. upon the crop, the annual value of the gross produce of these works is about 382 lacs. To this must be added rent free lands, probably about 8 per cent., and it makes a total of 413 lacs of property per annum, entirely dependent upon the state of the works of irrigation.

7. As to the original cost of the works, I can only judge, very rudely, that the returns in revenue to Government are, on an average 20 per cent. upon the outlay, which would make their first cost 825 lacs of rupees, allowing for the rent free lands. This is not, however, a point of much consequence.

8. The answer to the first question, then, is as follows:—

- 1st. The original cost of the irrigation works may be about 825 lacs of rupees.
- 2d. The annual value of the crop dependent upon them, if in good order, about 413 lacs.
- 3d. The annual revenue to Government in that case would be about 165 lacs.
- 4th. The present actual revenue is 118 lacs.
- 5th. The present total value of the annual crop dependent upon them, about 320 lacs, including the rent free lands and taking the revenue at 40 per cent. of the produce.

I will

9. I will now consider the second question; viz., What annual sum is absolutely necessary to keep them in an efficient state? So little has this point been considered, that I know of no data whatever having been prepared at any time which would enable us directly to answer this question. I believe that if a question was asked respecting the grounds on which the present annual expenditure has been fixed, there is no person whatever who could assign any reason for it, whether drawn from the annual account of property dependent upon the works, or from the experience of past years, showing how far the sums expended had been sufficient or insufficient to prevent the revenue from falling off. No annual statement, showing the increase or diminution of Nunjay revenue, with reports showing how far that increase or diminution was owing to the state of the irrigation works, how far to the failure of rains, how far to the state of the assessment, &c., are ever prepared, so that this most important subject is never brought into a clear point of view; I can only, therefore, give my own judgment upon it, formed from a consideration of the other question mentioned as dependent upon this; viz., Has the sum actually expended been in excess of or less than the sum annually required? I have not the least doubt myself that the expenditure has been totally inadequate.

I judge, first, from the innumerable instances of works in a defective state which have come under my own observation. So generally, indeed, have I found the works in a defective state, that I believe I may say that nearly all the tanks in the country, and nearly all the channels also, excepting those of Tanjore, and the very large ones of other districts, water less lands than they once did; many only a quarter, and very great numbers from half to three-quarters, and the actual revenue derived from several districts some years ago, compared with the present, fully supports me in this opinion. By the statement above given, it appears that the Nunjay revenue of North Arcot is three lacs below what it was 10 years ago out of 15 lacs, in South Arcot 2 lacs out of 12; and in Tinnevely, three-quarters of a lac out of 11½. But the falling off in the Nunjay revenue has, I believe, been going on for a long series of years. I cannot obtain accounts of the Nunjay revenue for more than a few years, because there are no returns of it distinct from the other items of revenue; however, that it has been falling off of late years is the principal point that it is necessary to ascertain at present, and that this is the case in several districts is shown by the above statement. This question indeed arises—Is this deficiency owing to the defective state of the public works, or to other causes? To this I can only reply, that from what I have seen I have no doubt it is owing to that cause, and I believe that it will be generally allowed to be so by the Revenue Officers and Engineers who have been employed in the irrigated districts.

10. The two southern Talooks of South Arcot are an instance of diminished revenue, which, as it has come under my own observation, I can say with certainty is solely owing to the neglected state of the irrigation works; and as very nearly the whole of the lands of these Talooks were once actually watered, the total collection of land revenue shows very distinctly the degree of order in which the irrigation works have been kept up from the time of the Company's taking charge; but it must be observed that these Talooks are said once to have yielded four or five lacs, and I believe they would now yield that if properly taken care of.

11. The Province of Tanjore requires distinct notice, as being a remarkable exception to the general state of the Carnatic, in respect of its Nunjay revenue. In this there has been no less an increase than nearly 40 per cent. of gross produce in 30 years, as shown by the statement (C.) of the Appendix. In this it will be observed,—

1st. That there has upon the whole been a constant increase of produce.

2d. That the regularity of the produce has been increased in an extraordinary degree, insomuch that while the variations in the produce of different individual years, in the first period of five, were as great as from 100 to 57, these variations had so much decreased of late years, that in the last five the greatest variation was only from 100 to 95½. This is perhaps the best test of all of the state and effect of the irrigation works, both because the very object of them is to obviate the effects of the irregularity of the seasons, so that the crops may not be drowned in very wet ones, or withered in very dry ones, and also because it is an effect which is most clearly to be attributed to that cause.

12. The general improvement in the state of this district has been doubtless owing to its having had a succession of very able men as Collectors, on account of its great importance; but I am sure that it is in consequence of their being really able men, that they have considered the irrigation of the district worthy of their utmost care, and they have consequently not allowed the works to get out of order, either for want of necessary expenditure, or of the attention of the officers of the Tank Department. To return to the question under consideration, in general the expenditure is allowed to be quite inadequate; some of the revenue officers indeed say that the amount of the bills is quite sufficient, if it was really and judiciously expended; but even those who are of this opinion, I believe, consider that an increase of the Inspecting Department is absolutely necessary to see that the money is not wasted.

13. I will now consider what inference can be drawn by comparing the expenditure with the value of the property to be secured, upon the general principles applicable to such works. The average expenditure of the last six years in the Tank Department, including civil buildings,

Appendix (B.)

buildings, is about Rs. 5,50,000, and deducting half a lac for the latter works, there will be	
expended upon works of irrigation annually	Rs. 5,30,000
Allowances of Officers, Surveyors, &c.	1,00,000
TOTAL	Rs. 6,30,000

	<i>Rupees.</i>
Total amount of revenue dependent upon these works at present	118,00,000
Upon which the expenses of the Tank Department are more than 5 per cent., but allowing the revenue of these works, if in good order, to be	165,00,000
It makes the expenses of the Tank Department to be upon that sum less than 4 per cent., and taking the total value of gross produce under these works to be at present	320,00,000
The expenses of the Tank Department are upon the total annual amount of property about 2 per cent., and if the original cost of the works was	825,00,000
The annual expenditure is upon it less than two-thirds per cent.	

14. Upon this statement it appears to me impossible to come to any other conclusion upon general principles, than that the expenditure must be inadequate; it cannot, I think, amount to more than two-thirds per cent. upon the first cost of the works. In England, canals and such works in which water is retained, require an annual outlay of 3 or 4 per cent., or from four to six times as much as is allowed in this country. There is thus an agreement between the conclusions to be drawn from this calculation, from the diminished revenue, and the observations I have myself made, and I think I may say from the general opinion of the Revenue and Engineer Officers.

15. I could give innumerable instances of particular works which have fallen into decay from the inadequacy of the Tank Department, but I will only mention the following:—

A tract of land in the very centre of Tanjore was deprived of its water by an alteration which took place in the bed of the river that supplied it; it was several years before the Engineers could find an opportunity of properly investigating the case, the work in the division being so entirely beyond the powers of the officers to get through. At last it was taken in hand: the average loss had been to Government about Rs. 26,000 per annum for six years, the total loss of property not less than Rs. 60,000 per annum; the lands were not saleable, the Meerassidars were entirely ruined, and most of the Ryots had gone to other villages. About Rs. 23,000 were expended in rectifying the evil, and the lands now are fully watered, and saleable at Rs. 150 a vaylie or Rs. 30 a cawnie. In this case, therefore, there was an annual loss of property nearly three times as great as the sum required to restore the works, and in six years property to the amount of about 3½ lacs of rupees had been lost for want of an expenditure of Rs. 23,000, and an officer to plan and conduct the work.

16. The second is that of the southern Talooks of South Arcot, above quoted, and upon which I have so often remarked in various reports. In 1827 I was called from the other end of the division, 250 miles distant, to look at the great channel called the Vuddavaur, by which they are irrigated.

This important work had been so utterly neglected, that I found it filled up with mud to a depth of about two yards; the Talooks were almost ruined, and many of the people had emigrated. An estimate was prepared and sanctioned, but from the impossibility of Engineer Officers attending to the work as it ought to be attended to, I found, on being re-appointed to that district eight years afterwards, that only a part of the work had been executed, and the revenue had continued to fall off till in 1831 it was only Rs. 1,18,000; whereas it had once been Rs. 2,20,000 while under the Company's government, and I believe as much as four or five lacs at an earlier period. In the course of six years, by an expenditure of about 1½ lac of rupees, the revenue has been increased to Rs. 2,58,000 in Fusly 1246 (exclusive of the Jaghere resumed in 1241, and yielding in 1246 nearly Rs. 49,000), and there is every reason to expect that it will continue to advance. I have just heard that there is an estimated increase of Rs. 20,000 in this season over the last in one of the Talooks alone.

17. A judgment may also be formed respecting the adequacy of the present arrangement, by simply considering the extent of country and value of the property in each division, and the number of persons forming the Inspecting Department. In the Third Division the annual revenue from the works is:—

	<i>Rs.</i>
In Tanjore	33,00,000
„ South Arcot	9,00,000
„ Trichinopoly	8,00,000
TOTAL	Rs. 50,00,000

The total value of annual produce about 135 lacs. The total value of the works themselves perhaps about 270 lacs. The extent of country is, from north to south, 200 miles, and east to west 140 miles. For the inspection of the works spread over this surface there are at present three officers (one of whom is quite inexperienced), one experienced Surveyor, and

and one apprentice. When it is considered that the officers must generally take their office-people with them, and consequently can get very little business done if moving at more than the rate of 10 miles per day, it must be evident that only a very small part of the expenditure can be checked by the Inspecting Department, which is indeed the fact.

18. Concluding, then, that both the present expenditure upon the repairs themselves, and also the number of persons in the Inspecting Department are quite inadequate, it remains to consider what amount would be adequate. I don't know how to judge of this with any certainty, but I think if the expenditure was at once increased from two-thirds to 1½ per cent. upon the supposed value of the works, there could be no possible room for fear that the sum would be needlessly great, even were the works now generally in a fair state of repair; but as the works are so very generally in want of extensive repairs, I am satisfied that a sum double the amount of the present expenditure would be most economically laid out for some years: indeed I feel sure, that if it is desirable to bring the same extent of land under effective irrigation, as has been so at times within the last 30 years, it cannot be done with less than an annual expenditure of that sum, viz., 12 lacs of rupees, at the very least, for some years to come.

19. In urging this point, I beg the attention of the Board to the abundant returns obtained from the expenditure in Tanjore, according to the statement above given, and also those in the two southern Talooks of South Arcot. It is more than probable, that to persons who are not intimately acquainted with the state of the irrigated lands of the Carnatic, it will appear quite impossible that such enormous sums in revenue may be lost or secured by so small a proportional expenditure; but I cannot but think that, if these statements are closely examined and considered, it will be impossible to avoid the conviction that the returns from money spent in securing the irrigation, are far greater than almost any other works could yield, or than almost any persons have supposed. Nor is it in the least surprising that it should be the case; that where the present means of raising food are so wretchedly bad, that four-fifths of the population must be employed upon it, any plan that will very greatly facilitate its production should produce such apparently vast results. I know that there are still numberless works which, if put into an efficient state, would most amply repay the outlay. I would further urge an extended expenditure, not only on this ground of policy, but also of justice; the lands that are watered by Government works are bought and sold in dependence upon the faith of Government, that it will keep up a vigilant attention to those works; there are at this moment multitudes of estates that are of one-fourth or one-half the value that they once were, owing to the decayed state of the irrigation works. None but those who have been much in actual contact with the people of the Carnatic, can believe the extent of loss to which land-owners have quietly submitted from this cause. Those who have seen, as I have, miles of valuable land, which within 10 or 20 years were excellent property, actually over-run with jungle, and really unsaleable from the failure of the irrigation works, can only be astonished that violent disturbances have not followed from it. When I visited the Southern Talooks of South Arcot in 1826, and again in 1833, and also the tract above-mentioned in the very centre of Tanjore, the whole body of Merassidars came to my tent and complained bitterly of the state of ruin into which they had fallen; and there could be no possibility of doubt about the state of the case, for the fields were covered with jungle, which had been some years before valuable paddy-land, and which are now again covered with grain, and the causes were equally obvious. In one case, the main channel had literally been allowed to fill up to the extent of six feet, as above stated, so that it had only two feet of water in it when it ought to have had eight; and in the other, the bed of the river had lowered about three feet, so as to leave the lands, formerly watered by it, so much above its level, as to deprive them of their supply. In both these cases, the fault was in the total inadequacy of the Inspecting Department, and of the expenditure.

20. But besides the direct loss to Government and the country, arising from the want of a sufficient number of officers to prepare the estimates, &c., another consequence of so confined a department is, that what is done must be done without sufficient local knowledge; for no officer can ever remain so long at any one work as to enable him to form anything like a proper acquaintance with its circumstances, for want of which he is continually in danger of making serious mistakes in his plans; I can say, from my own experience, that this is constantly the case. In the instance of the Vuddavaur Channel, in South Arcot, a former Engineer officer recommended a large head sluice to be constructed, in order to prevent the Veranum Tank (which it fills) from being breached by too great a supply of water; when I visited the work first, the people earnestly begged to have it destroyed, declaring that it had done much harm, by obstructing the flow of the water. From want of a sufficient knowledge of the work in particular, and the Civil Engineer duties generally, I was quite unable to judge in the case; but it appeared to me to be advisable to remove some of the cross stones, which could do no harm, and I therefore did so. Before I could again visit the work, I was succeeded by another officer, equally inexperienced, and equally unacquainted with the localities; he, however, upon further investigation of the case, destroyed the sluice, with the exception of the wing walls. Since I have returned to the Division, I have had occasion to examine the works much more thoroughly, and have satisfied myself that the sluice was no protection to the tank at all, which is endangered, not by the water it gets from the Vuddavaur, but by the floods in the Vellaur, which come into the tank from another direction; so that the tank was burst in 10 or 12 places in 1827, while the sluice was still in good order: and again, that as it was of no use, so neither did it do any harm, and there

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was nothing gained by destroying it. This case seems to me suited to show, that unless the officers and surveyors in the department are sufficiently numerous to secure the Divisions being under the charge of an officer who has previously had some experience, and who has also been long enough in it to obtain some considerable personal acquaintance with the individual works, it will be impossible to get the works efficiently managed.

21. As I have remarked above, it will probably be very difficult for many persons to bring themselves to believe the extent of loss that has been incurred by the grievous misapprehension of the importance of this question; I have been compelled to believe it myself by proofs which left no room for doubt. The loss by actual diminution of revenue in the two Talooks of South Arcot, in 30 years, has been certainly not less than 26 lacs of rupees; and no reason can be assigned why it ought not to have increased, under the circumstances of peace and orderly government which they have enjoyed. The revenue is said to have once been four or five lacs, and I feel assured that it ought now to be near five lacs: if they had been managed properly for 30 years, I have no doubt that the revenue would by this time have been at least 4½ lacs, and in that case the revenue of the 30 years would have been about 100 lacs instead of 56 lacs; a sum saved in the management of two Talooks sufficient to have covered one-fourth of the cost of the whole tank expenses of the Carnatic for 30 years, at the rate of expenditure allowed of late. That this is not a preposterous calculation, seems to me to be indisputably shown by the improvement of the revenue since the year 1832, as shown in the statement (Appendix B.).

22. In the year 1836, the whole cost of the lower annicut is included, but certainly not more than one-fourth of that sum should be charged to these Talooks, because by far the greater part of the benefit derived from it fell to Tanjore.* The total sum expended upon the Talooks, in six years, may therefore be reckoned at about 1½ lac; and the revenue has been increased from 118,000 to 258,000 per annum, though only a small part of the benefits that the improved state of the irrigation works will produce, has yet been realized; as it is of course only by degrees that the lands will again be brought into full cultivation.

23. In the General Statement of Revenue, Appendix (A.), the returns of the first 20 years do not correctly distinguish between the Nunjay and Poonjay revenue; but to persons acquainted with the country, the column containing the total land revenue of each year, is a sufficient proof of the astonishing diminution of the revenue from Nunjay lands. Even in the last 20 years, omitting Tanjore, the land revenue of the watered districts was, on the average of five years, terminating with—

Fusly 1214	-	-	-	-	-	-	-	214 lacs.
" 1219	-	-	-	-	-	-	-	216 "
" 1224	-	-	-	-	-	-	-	203 "
" 1229	-	-	-	-	-	-	-	215 "

since which it has regularly declined in 15 years to 189½ lacs, being a falling off in that period of 26½ lacs per annum, more than four times the whole cost of the Tank Department at present. I believe it will generally be allowed that this diminution has not by any means occurred principally, if at all, in the dry land (the fact probably is, that there has been an increase in the Poonjay cultivation generally, as there certainly has in some Talooks); but in proof that it has not, but that it is on the Nunjay land that the loss has been sustained, I will bring forward those districts in which the Nunjay revenue is stated separately: in Nellore, it is only stated for the last eight years, in which indeed it was pretty regular; in Bellary, it is stated for 13 years, in the first 11 of which it had not much declined, and in the last two it had increased, the restoration of the tanks having been most vigorously taken up by Government, and a much more liberal expenditure allowed. In Cuddapah, also, from the time it began to recover from the effect of the decennial lease till 1244, a period of 12 years, it had not very materially declined, but in those districts the tanks were in so bad a state previously, that they could scarcely decline much. In North Arcot, it has declined, in 13 years, from about 15½ lacs to about 12, or to little more than three-fourths. In South Arcot, it declined from 9,90,000 in 1234, and 10,80,000 in 1235, and 11,50,000 in 1236, to 8,70,000 in 1241, being eight years; in 1242, it was only 7,50,000, which was an extraordinary year of drought; in the two following years it improved, owing to the expenditure in the two Southern Talooks above stated. In Salem, the falling off has not been great; it may be considered as having fallen from about 8 lacs to 7½ lacs in 10 years. In Trichinopoly, it had fallen about half a lac in 13 years. In Tinnevely, it had fallen nearly two lacs; the average of five years, terminating in 1229, having been 11,40,000, and of the same period terminating in 1244 (but omitting 1241, an extraordinary season), 9,45,000. In Madurai, it was pretty regular for a period of 10 years, up to 1244. In Coimbatore, it has been quite regular; this district requires some remark: the works in it consist chiefly of noble channels of from 30 to 50 miles long, supplied by very solid annicuts across rivers filled by the south-west monsoon, and they are an excellent proof of the superiority of works constructed on a large scale; the expense of keeping them in order, according to calculations I made some years ago, is very insignificant. They afford also a strong proof of the value of irrigation

* For this reason: owing to the depth of the bed of the Coleroon, below that of the Vuddavaru, the latter was not supplied until there was a great superabundance of water in the Coleroon; and but for this annicut, that superabundance must have been allowed to pass the upper annicut, and, therefore, be taken from Tanjore, so that the construction of the lower annicut actually throws that quantity into Tanjore, besides what the S. Kijali Vokkal supplies from the lower annicut itself.

irrigation from the rivers supplied by the south-west monsoon. While the rest of the revenue, from want of rain and other causes, has miserably declined, and the district has suffered most severely for seven years, the Nunjay revenue has not in the least diminished.

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It thus appears that in most of the districts there has been an actual and, in many, a very considerable falling off, even during the short period of which we have any returns; and as the irrigation has undoubtedly been better attended to for the last 10 years than it was 20 years ago, we cannot be mistaken in concluding that it had been declining previous to the period of the returns; and when to this is added the consideration, that almost all the districts, when they came under our charge, had been in such a state of confusion for some time, that all the public works were in a dilapidated state (and the comparison is made with their revenue while in that state), the sad effects of the neglect of the irrigation must be most palpable; for it is certain, that instead of the revenue having declined, had the tanks, &c. been put into a state of repair, it would have very greatly increased. In Appendix (D.) is a statement of the cultivation and revenue under tanks in a part of the South Arcot district, which may be taken as a specimen of the Carnatic generally.

24. The total average land revenue of five years, terminating in 1229, was 215 lacs; the average of the succeeding 15 years, up to 1244, was 197 lacs; had the revenue kept up to the former amount, there would have been collected, above what has been realized, 18 lacs per annum, or 270 lacs in 15 years. I believe the whole of this loss has been sustained in the Nunjay lands; but allowing it to be only three quarters of it, it amounts to 200 lacs. I will venture to say, that had the Tank Department been on an efficient footing, not only would this have been saved, but the revenue would have greatly increased, so that I cannot reckon the loss at less than 300 lacs in 15 years, or 20 lacs a year, which I feel equally assured would have been saved by an increase in the expenditure averaging eight lacs a year, or 120 lacs in the 15 years. The total collections of land revenue for 30 years, viz., from Fusly 1215 (about which time the districts appear to have got over the extreme state of depression they had been in during the anarchy that preceded the Company's Government) to 1244, both inclusive, were 6,222 lacs, making an average of 207 lacs per annum; the average of the five years ending Fusly 1219 (the first portion of this period), was 216 lacs, making the average of the period of 30 years nine lacs less than the average at the beginning of that period; and, as the average of the last five years was only 189½ lacs, the revenue had fallen no less than 26½ lacs per annum in 25 years.

25. I must here observe, that in taking the averages, I have omitted those seasons which were evidently extraordinary ones, such as that of Fusly 1242, which is therefore not included in the average of the last five years; had it been included, the deficiency would have appeared much greater. It seems to me, that using this precaution, the average of periods of five years affords a very fair ground for judging. I have also stated all the sums in round numbers, that the statement might be clearer, taking care however not to omit any sums of sufficient amount to affect the general conclusions.

26. In all these statements I have omitted Tanjore, because the circumstances of that district are as striking a proof of the good results of a liberal system in the management of the irrigation, as the other districts are of the opposite. I do not mean to say, indeed, that the other districts would have afforded as great a result as this does had the irrigation been equally well managed; because it is notorious that it has natural capabilities far beyond the Tank Districts; but still it is very encouraging, and to my mind proves that every district in the Carnatic would have been actually improved instead of declining in revenue, and also in prosperity, if the irrigation works had been kept in order, though not in the same proportion to the amount expended. At all events, it is not in any view possible to conceive that there can be any ground for supposing that all the other districts should have actually declined, and in a great degree, while this has been most rapidly improving, had these works been equally well attended to; nor do I think there can be the least doubt that had the Tanjore works been as much neglected as those of other districts, it would have suffered more than they have, notwithstanding all that could have been done for it in other points of management; neither do I pretend that all its improvement has arisen solely from its Collectors having been careful and judicious in their attention to the public works. I allow that a very great part of that improvement has arisen from the able management of it in other respects, or rather I should say, that it is from the two combined that its present prosperity has arisen, for good revenue management would have availed it little if the irrigation had been neglected, and but little could be effected by supplying the greatest abundance of water, where it was unaccompanied by a vigorous and lively system of revenue management, and a moderate and well regulated assessment. The following statement shows the comparative results in Tanjore, and in the other 11 irrigated districts.

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	In Tanjore.	In other 11 Districts.
Average total land revenue of five years, terminating Fusly 1214	26,20,000	2,14,10,000
Average total land revenue of five years, terminating 1244	36,00,000	1,89,50,000
Decrease in 11 districts	-	24,60,000
Increase in Tanjore	9,80,000	-
Average total land revenue of five years, terminating Fusly 1214	26,20,000	2,14,10,000
Average total land revenue of following 30 years, termi- nating Fusly 1244	33,60,000	2,07,00,000
Average decline in 11 districts	-	7,10,000
Average increase in Tanjore	7,40,000	-
Total loss in 30 years in 11 districts	-	2,13,10,000
Total gain in 30 years in Tanjore	222,00,000	-

27. I cannot omit here to remark upon the amount of the extra sources of revenue, not that I think they affect the present question, but to show why I think they do not, lest it should be supposed that as they have increased in all the districts, it is because, some how or other, the money that used to be paid in the form of land revenue, is now derived from these things, which form the luxuries of the middling and lower classes. This merely shows a more equal distribution of property now than formerly; and it is supported by two facts, viz., the impoverished state of almost all the families that were once possessed of great property (at least in this part of the country), which is notoriously the case; and 2dly, the almost complete annihilation of the foreign trade in the Ports of Porto Novo and Nagpore, from which it appears certain that the property which was once (as it would naturally be under a weak and unprincipled Government) concentrated in the hands of a few, while the great body of the people were in abject poverty, has, under the strong and upright Government of the Company become diffused through the great body of the people, and consequently that a great portion of what once went to support foreign trade, which supplies the luxuries of the very rich, now goes to the purchase of those articles of home produce, which form the luxuries of the great body of the people. I conclude, therefore, that notwithstanding this increase in the extra revenue, there has been a real diminution of Nunjay produce, and so of revenue, to the extent stated, under 30 years of perfect peace, under a strong, orderly and upright Government, and without any one natural cause that can possibly account for it; a thing which perhaps never occurred in any age or country before. I think it will be generally allowed that there has been nothing in the revenue arrangements which can satisfactorily account for it; those parts of the country which are chiefly under native revenue management such as the zemindaries, not being included in these districts.

28. Supposing it to be considered as allowed, that the loss in revenue, from not keeping up the irrigation works has been enormous, and far beyond what the expenditure would have been to have kept them in an efficient state, I will now consider the third question, What might be expended beyond what is necessary to keep the present works in good order? and must I not add, what would probably have been done under a Native Government, had it been favoured with the prodigious advantages we have had from continued peace, and such an extent of country under one authority, as would allow of works being executed upon a noble scale, so as to include great tracts within the influence of individual works or sets of works, which would have many and great advantages over a multitude of small unconnected schemes? Had anything approaching to what might be called an energetic system of proceeding in the irrigation question been followed up, who can estimate what might have been the state of the Carnatic at this time?

29. Had a hundredth part of the time, labour and money that has been lost by droughts, or expended in trying to obviate the effects of scarcities, been expended in providing against them, very much might have been effected. It is undoubted, that in the worst year that ever occurred, enough water has been allowed to flow into the sea to have irrigated ten times as much grain as would have supplied the whole population. The Carnatic, I acknowledge, is like England and every other country, not very able to support a large population, if nothing is done to provide water when naturally it would be deficient, and to carry it off when naturally it would be in excess; but I am fully assured that there is no reason whatever why it should not be one of the most populous and fertile countries in the world, if the energies of its Government were exerted as they must be, to render any country whatever what it is capable of. The present state of Tanjore will answer for the rest of the country; the one grand difference between that and the other districts is, that it is supplied with water. It is often supposed that it has great advantages in point of soil, but this is a mistake, the great proportion of land is by no means of particularly good quality: the proof of which is, that in general, if it is not irrigated, it is not worth cultivating for dry grains; what enables it to bear its crop is the fertilizing effect of the water. There are certainly in the other districts tracts of rocky ground, but they bear a small proportion to the lands which are of a quality equal on the average to those of Tanjore. What was the state of Tanjore itself 30 years ago, as shown by the returns of gross produce? That varied in different

different years so much as to be in some nearly double what it was in others; a variation as great as, I believe, if not greater, than in any other districts; and for this reason, that if the main freshes failed, or exceeded in any considerable degree, the whole year was lost; whereas in the other districts dependent upon the local rains, they often get rain enough to secure them a crop in another part of the year, though they may have failed at the regular season. That which has now made the crop of Tanjore so much more certain than it was, is, not that there has been any change of the seasons, but only the same thing which is wanted in other districts, viz., arrangements for securing the water better in deficient seasons, and getting rid of it better in excessive ones. I have before observed that the supply of water is ample throughout the Carnatic. If there is any doubt about this, let it be observed how much water runs into the sea by the Pennar, in Nellore, the Pallaur and the Poniaur, in North Arcot, the Vellaur, the Colleroon, the Vygay, and the Tambrapoorney, not in severe freshes, but in moderate ones; undoubtedly more than enough to water the whole Carnatic. There are at this moment passing to the sea, by the Colleroon, at least 100 million cubic yards of water per day, sufficient for a crop of paddy on 8,000 cawnies; in a good fresh, sufficient water for a crop on 30,000 cawnies runs to waste daily. In a moderate season enough is lost to water certainly at least a million cawnies, or a tract double the extent of Tanjore, which would provide grain for about 2½ millions of people.

30. It would doubtless cost more to lead the same quantity of water through other districts, than it does to distribute it over Tanjore; but this is the only difference; and still it would most amply repay the cost of the necessary works, so far as I have been able to ascertain by inquiry. I estimate the value of water as follows: on an average, the value of the gross produce of a cawny of paddy, in one crop, may be reckoned at Rs. 20, the expense of cultivation at five, and the revenue at Rs. 10; the quantity of water required for it may be estimated at 12,000 cubic yards, and allowing a portion of this to be supplied by the local rains, a supply of 10,000 cubic yards, secured by means of artificial works, will generally be sufficient. This water, so supplied, will almost certainly secure a revenue of one rupee per 1,000 cubic yards, besides about half a rupee net profit to the landowner. To compare this calculation with actual results on a large scale, I find that Tanjore receives, in an average season, 6,600 million cubic yards of water; but this includes a considerable quantity which is not required, viz., during the high freshes, and also during the local rains, when a great proportion flows into the sea. About 5,000 millions may be actually used, the revenue from which would be, if the rent-free lands were included, about 40 lacs; this gives rather more than 1,200 cubic yards per one rupee of revenue. This is sufficiently correct for our present purpose. As for the expense at which a certain quantity of water may be brought upon the lands, I judge from the cost of works now in use, and from the general experience I have had in the irrigation, that there are yet openings for undertakings to a very great extent, by which water may be obtained at the rate of 500 cubic yards per annum, for one rupee of outlay in entirely new undertakings; and hence Rs. 2½ expended on new irrigation works would secure a revenue of one rupee; but as the same portion of the population if employed on Poonjay land would pay to Government, as far as I can ascertain, about two-fifths of the revenue that they would if employed on wet lands, the advantage to Government would be only three-fifths of the whole Nunjay revenue, or three-fifths rupee for Rs. 2½ of cost, or about one rupee per annum for four of capital expended, or 25 per cent. This result, I am well assured, is under the mark. In the case of the Colleroon annicuts, I reckon that certainly not less than 2,000 millions of cubic yards have been added to our annual supply of water for the irrigation below the Head of Seringam, in Trichinopoly, South Arcot and Tanjore, and this has been obtained at a cost of about Rs. 3,00,000, including a considerable sum for some small works which yet remain to be executed; this gives not much less than 7,000 cubic yards per rupee; but it is quite an extraordinary case, and the returns cannot probably be less than cent. per cent. on a series of ordinary years; not taking into calculation their effects in extraordinary seasons such as that of last year. There are however cases somewhat similar to this, where water may be obtained at a less cost than one rupee for 500 cubic yards, as above calculated; such as those in which advantage is taken of works already constructed, the usefulness of which may be increased by some additional subordinate works; as, for instance, enlarging the channels from an annicut and adding a tank, in order to store up the water of the high freshes; where this can be done, as it may in many places, the main work being already constructed, the additional ones may be completed at a smaller cost in proportion to the water to be obtained, than in an entirely new undertaking. Another case in which the effects of a certain expenditure will be greater than I have stated it, is where channel or tank irrigation has been so extended as to cause a frequent loss of the crop, as in the Amharavuty and Noel cultivation in Coimbatore, and more or less in most other places. In those circumstances the main part of the supply for the crop is already obtained, and a small addition that can be kept in readiness is all that is required; I may therefore say, without hesitation, that there is much room yet for such additional works as would yield 50 per cent. in actual returns of revenue to Government.

31. I will now merely notice a few situations where new works may be undertaken with advantage. It is evident that the first expenditure should be made upon those rivers that contain the most constant and certain supply of water, and upon those tracts where there is already extensive cultivation, but which is not well secured in its supply of water. The Cauvery and its feeders, as being supplied by both monsoons, is of course the most important river of the Carnatic; and, secondly, the Pallaur, as passing through the next greatest extent of country. The Cauvery is also the first to be attended to, because so little has yet been

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done to it, while much small rivers, and those wholly dependent upon the more precarious supplies of the north-east monsoon, are overloaded with annicuts. There was not one in use on the Cauvery, below the Ghauts, previous to the construction of those in 1836. There is an ancient one near the Ghauts, but it is partially ruined, and it is not certain that it was ever made use of. The high freshes of this noble river are, therefore, entirely lost still, excepting that the Veranum tank, and one or two small ones, get a portion of their supply from it: for the annicuts, not having any other tanks attached to them, only secure the water of the moderate freshes.

32. The first new undertaking that I would mention is one that I examined into with some care in 1828: viz., the construction of large reservoirs in the Neilgherries and Delki Hills, for securing the cultivation of the Bawany and Ambaravutty, and assisting that of the Cauvery: I did myself the honour of reporting particularly upon this project in 1829, but the plan was not supported by the Board. I do not hesitate now to mention it again, because I trust that the time has arrived for distinguishing between those things that are merely new, and those that are in themselves really visionary. I have stated in my report that the fine basins with narrow outlets that are found on the hills, the certainty of the supply of water, and the extent of the cultivation in the low country, subject to occasional deficiency of water, offer peculiar advantages which might easily be secured. As the Board have my report, I need not enter further into the details of this plan.

33. The second undertaking that should be noticed, and which has been often partially brought to the notice of the Board, is the restoration of the Ponairy in Trichinopoly. This reservoir seems to have extended 30 miles in length, and its river channel, which was apparently 50 miles long, filled besides many smaller tanks. There seems to me to be almost every inducement to restore this reservoir; and at the same time I think the work may be so planned as to form one of the most complete undertakings that could be executed in the Carnatic. I have not yet had time to investigate the case by any means completely, but so far as my knowledge of it goes, it appears that the best plan would be to lead off a large channel from the upper annicut, carrying it on as high a level as possible, so as to take it through the middle of the Arrialore and Oodiarpollium Talooks, cultivating much land immediately from the channel, filling almost every tank in those Talooks (which are now dependent upon the local rains, and by far the greater part of which are now almost unproductive), securing a great portion of the water of the various jungle streams crossed by it, and discharging itself into the Ponairy; at its head must be a lock, and from the Ponairy to the head of the Uddavaur in South Arcot, which is only a few miles distant, a cut should be made, with another lock, so as to complete the water communication to the Porto Novo Canal. The advantages of this undertaking would then be:—

1st. In the high freshes of the Cauvery a large body of water which at present runs to the sea would be stored up in the Ponairy and other tanks, against the time of the low freshes; that is, during July, August, and November, the water would be obtained to be used in September, October, December, January, and February.

2d. During the moderate freshes, when there is much more water than we can use for the present cultivation, a portion of it would be conveyed to a vast extent of lands, watered immediately from the channel, as well as to those under the tanks, for immediate use. Since this was proposed a canal is ordered to unite the Cauvery and Colleroon at the lower annicut, which makes this navigation complete.

3d. There would be a most complete water communication from the upper part of the Cauvery to Porto Novo, which would be navigable for about seven months in the year, and for boats drawing not more than a foot, perhaps for nine months.

4th. A portion of water during the dangerous freshes would be led off from the river, and thus what at present is worse than useless, would become very valuable. Every tank that is constructed to be filled during the high freshes is a step towards relieving the country from damage by floods. The main branch of this channel might also be carried across the Vellaur into South Arcot, conveying the water of the high freshes of July and August into innumerable tanks, at present dependent upon the north-east monsoon.

34. The use of the upper annicut would in this way be greatly extended. The two talooks of Arrialore and Oodiarpollium contain a vast extent of excellent lands for irrigation, and I am assured that the population is pressing hard upon the present cultivation. The people are most anxious for these works, and it is stated that since it has been known that they are in contemplation, many have been endeavouring to secure a right, by purchase or otherwise, to the lands likely to be watered. This is such a plan as I have long wished to see executed; all the present river channels, either from the smallness of their capacity and extent, or from their having too great a fall, merely water a narrow strip of ground near the river, but not one at present in use leads the water out fairly upon the general level of the country, so as to command a broad tract. In Coimbatore there are channels 50 miles long, but they have a fall of no less than six feet in a mile, and there are no channels from the Cauvery of more than 20 or 30 miles long. The total fall of the river from the upper annicut to that point which is opposite to the Ponairy, is about 180 feet, being 65 miles; hence, if the channel has a fall of one foot per mile, which is the fall of the Uddavaur, it would at the end be 115 feet above the level of the river, and this, according to the information I have, is much more than the highest level of the ground in Oodiarpollium between the Cauvery and Vellaur, so that the whole of the lands of that tract might be commanded by the

the channel. These two talooks might thus be made almost as productive in proportion to their extent as Tanjore, and they would have greatly the advantage over it in respect of floods. I would strongly recommend this being immediately taken in hand, but it cannot be done properly without additional officers and surveyors, unless almost all other business of the department is stopped in the division.

Appendix (B.)

35. The third work I would mention, is, to carry the waters from the lower annicut across the Vellaur, at the north end of the Veranum tank, into the Bowanygherry Talook, filling the great tanks called Wallajah and Paroomal yairy (yielding, I believe, near Rs. 50,000 revenue, if filled with water), and others, and terminating at Cuddalore. This is not a very extensive work, but it would, I should think, be extremely productive. The great object, of course, is to find means of storing up the water of the high freshes which the new annicuts have placed at our disposal, and wherever there is a large reservoir we should make use of it for this purpose if possible.

The Ayacut of the Paroomal yairy alone is about Rs. 18,000; if now only waters land yielding Rs. 6,000.

36. The fourth improvement, which I have good reasons to believe would be of great utility, and abundantly answer, is one that has been talked of for a great many years, but never thoroughly investigated; viz., the restoration of the Nerinjapet annicut across the Cauvery, 15 or 20 miles above Bowany, and nearly due west of Salem. This is a very old work, about 400 yards long, and though breached, a great deal of it is still standing. I have not seen it myself, but have had an account of it from several persons; I have been however also informed, by an officer of the department, that a few miles higher up there is a good situation for leading off a channel without constructing an annicut. Next to the restoration of the Ponairy, this appears to me the best part of the country in which to construct an extensive tank for securing a further portion of the high freshes of the Cauvery. A very large channel should be led off from the East bank to convey water to the first site, where an extensive tank could be constructed, and I conclude that somewhere in that neighbourhood a large valley could be found fit for the purpose. A channel, 100 yards broad, would convey about 10,000,000 cubic yards per day during the high freshes, and if the tank was 15 miles long, three broad, and 10 yards deep in the deepest part, it would contain about 500,000,000 cubic yards, and would probably be filled every season, and supply water for a complete crop on 40,000 cawnies; the value of it, however, would in effect be much greater than the revenue of that extent of land, for it would be used to complete the supply on lands already cultivated, at those times when the river was too low, and hence it would (with the supply to be received from the river during a great part of the season) secure an extent of cultivation of three or four times that amount. At present the cultivation every where is limited by the height of the water in the low freshes; thus, in a river channel which, when the river is high, conveys water enough for 10,000 cawnies, perhaps only 5,000 will be cultivated, because that is the utmost limit to which they can expect a sufficiency of water during the low freshes, so that if there is water enough for 10,000 cawnies on 60 days in the year, and only enough for 5,000 on 60 more, half the water during the 60 days is lost, and allowed to run to waste. But if there was a tank to provide only for the times of scarcity, the cultivation might immediately be extended. This is, however, besides securing the present cultivation, some of which is lost almost every year, and when the freshes are more irregular than ordinary very great remissions are made. Thus, last year there was probably one-ninth of the main crop of Tanjore lost, which, if such a tank as that now proposed had existed, would have nearly all been saved, and it would have in that one year produced about four lacs of rupees in revenue, besides greatly relieving the distress of the Southern Districts, by furnishing an additional supply of grain to the extent of perhaps 20 lacs of culloms. This would have been in Tanjore alone, besides the other Cauvery cultivation. The effect of such a work, in diminishing the danger of breaches in Tanjore, &c. would also probably be as good as if a lac of rupees was laid out on the Colleroon and Cauvery embankments. It would lower the rivers nearly a foot in a severe fresh. I think it probable that a channel from this annicut might be led on a sufficiently high level to carry water over the ridge which separates the feeders of the Vellaur from those of the Cauvery, between the latter river and Salem, in which case it might be turned into the former river and conveyed along its channel through the Abtoor Pass, and when clear of the hills, it might be turned by an annicut into a channel which would lead north-east through the north-west parts of South Arcot, and across the Pallavaur near Conjeerem, thus carrying another supply from the Cauvery into the very heart of the Carnatic, on a higher level than those mentioned in the preceding proposals.

37. The fifth improvement I would propose, should be a more extended use of the Pallavaur. That great river, in one day, sometimes pours into the sea, I should suppose, as much as 200,000,000 of cubic yards, while there are, within a few miles of its banks, lacs of cawnies of good land perfectly waste, and on the lands that are cultivated the crops are continually lost for want of water. Probably the best works for that tract of country would consist of one annicut across the Pallavaur, as far to the westward as the nature of the country would admit, that is near the mouth of the Amboor Valley, with a large Rajah Voykal leading from each end of it, and extending 50 or 60 miles to the eastward, with small channels leading to the innumerable tanks already existing there, and another annicut lower down, perhaps near Arcot, with similar main and branch channels extending quite to the coast; when all the present cultivation had thus been provided for, advantage might be taken of every suitable situation for the construction of additional reservoirs. By this means the country between the Ghauts and Madras might be incalculably improved.

I shall not here say anything of the first division, as I am only speaking from report; but

Appendix (B.) but it is well known that there are at least as fine openings for improved irrigation there as in the others.

38. I have mentioned these as instances of what might be done to make the Carnatic a fully cultivated and populated country; and I do not doubt in the least, that were these plans followed out, even the climate would be greatly altered. Extended cultivation, accompanied as it would be by extended planting, would greatly diminish the severity of the hot winds, as in North America the climate has been wonderfully improved by clearing and draining the country.

39. Before concluding this part of the subject, I must remark upon the state of the population. I have been greatly disappointed in being unable to obtain from any person, to whom I have spoken on the subject, anything like a certain opinion as to the rate at which it is increasing; all say that the returns are so inaccurate that they cannot be depended upon so much as to enable us to judge what addition there has really been in a certain number of years.

However, all seem to agree, 1st. That the returns are a tolerable approximation to the real number of people; and 2dly. That it is considerably on the increase. In the towns of Madras and Trichinopoly, it seems to be fully ascertained that the population has greatly increased; and I suppose that this certainly indicates an increase in the rural districts. If this point is allowed, the question is, how is the additional population to be provided with grain food, by means of wet or of dry cultivation? Supposing, for instance, that the population of the 12 districts is 9,000,000, and that it is increasing at the rate of one per cent. per annum, which, from what information I can obtain, seems certainly within the mark, there is an annual increase of 90,000 persons to be provided for, or within the next 11 years, 1,000,000. These would require 125,000 cawnies of Nunjay cultivation to supply them with food. Probably the quantity of Nunjay has been decreasing in about that proportion during the last 25 years. If, while the population has been increasing, the Nunjay cultivation has been decreasing, can it be a matter of surprise that every bad season causes such dreadful scarcities? Surely it is desirable at least that provision should be made for the increasing population by means of irrigated lands, otherwise their food must be supplied from Poonjay land, and must therefore be extremely uncertain. But besides increasing the Nunjay cultivation up to what it once was, and providing for the additional population in the same way, why should not every effort be made to substitute Nunjay for Poonjay? Every step that is taken towards this end, both diminishes the danger of scarcities, and greatly increases the comforts of the people; for perhaps one-half the number of persons are required to raise a certain quantity of food on wet land that are required on dry, and the remainder will of necessity be employed in manufactures. While the country is mainly dependent upon a system of cultivation so precarious that four-fifths of the whole population must be employed in raising food, it is impossible that the great body of the people can be well clothed, or supplied with other comforts. Nor can the population itself increase rapidly; there can be no doubt that the scarcities, and even famines, that are so often experienced in this Presidency, must seriously check the population. I conclude the actual number of deaths by famine, in the last 15 years, must be very great, from the accounts I have had from eye-witnesses.

40. I should on the whole recommend most earnestly that arrangements should be made, first, for the partial or complete restoration of the present works, not, however, without carefully comparing the probable results of each individual case with those of new works on a more extended scale. Where it can be done without direct injustice to individuals, it would certainly be better to construct new works on a large scale, that would yield 30 per cent., than restore old and small ones that would yield an increase 40 per cent. upon the required outlay; on account of the great advantage of having rather a few works of magnitude to watch over than a multitude of small ones. It is also very possible, that in some cases where extensive works are constructed, the cultivators under small works, still partially in a state of repair, might be induced to remove to the lands watered by the new works. I do not, however, see how the present works, however imperfect and poorly supplied, can be allowed still further to deteriorate, without some distinct and equitable arrangement being made with the Ryots.

Second. For the construction of new works, either to water new land, or to secure the supply to lands already cultivated as Nunjay.

41. For the last question, as to what encouragement we have in respect of new works, from the results of those already executed, I would refer chiefly to the reports which the Board have received respecting the Coleroon annicuts; perhaps the following statement will show still more clearly the effects of the lower annicut than my former report.

STATEMENT of Height and Quantity of WATER at the GRAND ANNICUT.

	Average of 20 Years.			Fusly 1241.			Fusly 1246.		
	Height.		Quantity.	Height.		Quantity.	Height.		Quantity.
	C.	I.	Millions.	C.	I.	Millions.	C.	I.	Millions.
			Cubic Yds.			Cubic Yds.			Cubic Yds.
June	2	8 1/2	below	1	4	below	2	3 1/2	below
July	0	13 1/2	above	0	11	ditto	0	6 1/2	above
August	0	9 1/2	ditto	0	8	above	0	9	ditto
September	0	4	below	0	3 1/2	below	0	6	ditto
October	0	1 1/2	ditto	0	3 1/2	above	1	13	below
November	0	10 1/2	ditto	0	10	below	2	2 1/2	ditto
December	1	12 1/2	ditto	1	4	ditto	3	5 1/2	ditto
January	2	13	ditto	2	11	ditto	3	12	ditto
February	3	8 1/2	ditto	3	5	ditto	3	17 1/2	ditto
Total of last Five Months									

The measurements are cubits and inches above and below the crown of the Grand Anicut.

42. From this it appears, that in the year 1241, when the revenue was at its lowest in Munnargoody and Chellembraam, the supply of water in the Cauvery for the whole year was above the average, and that the supply of 1246 (the year the annicut was built), was very greatly below the average, and nearly as low as in the worst year of which we have any records.

HEIGHT OF WATER at GRAND ANNICUT in the Four last Months of the Season of Cultivation.

	Average of 20 Years.		Fusly 1241.		Fusly 1246.		Worst of 25 Years.	
	C.	L.	C.	L.	C.	L.	C.	L.
October	0	1 1/2	0	3 1/2	1	13	1	10
November	0	10 1/2	0	10	2	2 1/2	2	2
December	2	13	1	4	3	6 1/2	2	15
January	1	12 1/2	2	11	3	12	3	12
	3	37 1/2	3	28	9	33 1/2	8	39
Average of Four last Months of Crop	1	4 1/2	1	2 1/2	2	31	2	10

All below the crown of the Grand Anicut.

43. Again, taking the averages of the four last months of the cultivating season, October, November, December and January, it appears that 1241 was above an average year, and that 1246 was so much worse than any previous season of which we have any record, that the supply in the Augunda Cauvery could not have been one-half of what it was in the worst years since 1812, being 25 years. For it must be observed, that the above heights show the quantity of water in the Cauvery at the grand annicut, which, up to 1246, was always in moderate freshes from one-third to one-half of the whole supply of the Augunda Cauvery; but in 1246, by means of the upper annicut, almost all the water was thrown into the Cauvery, and in the latter months none at all was allowed to pass that work into the Colleroon; thus, by means of the new works, the whole of the water in the Augunda Cauvery was distributed to Tanjore and Trichinopoly; and the South Arcot Talooks were so much better supplied from the drainage water of the bed of the Colleroon alone, than they had been in 1241, by more than an average supply in that river, that they produced a revenue of Rs. 2,58,000, while in 1241 they produced only 1,18,500, being an excess of Rs. 1,39,700 in these two talooks alone. When it is also considered that there was a very great failure of the rains in this part of the country last year, and that the cultivation commenced within a few months after the annicut was sanctioned, so that scarcely anything had been done to improve the distribution, I trust it will appear indisputable that the results of these works are perfectly satisfactory, and by no means below what I estimated them at in my reports; that they amount to nearly a certainty that the irrigation of these talooks will be secured in future, and that they only require to be properly attended to, and such minor works as may be necessary for the distribution and draining executed, in order to ensure after a time a revenue equal to what it is said formerly to have been, viz., 4 or 5 lacs or more, for there is yet a very great extent of land unwatered, though every part of the talook is below the level at which we can obtain water.* Again, the best year's revenue of the

* I have obtained statements of lands capable of being watered in Chellumbrum alone which would yield an additional revenue of Rs. 1,00,000, besides much other lands.

Appendix (B.) The period of 30 years preceding 1244, was only 2,20,000; last year's was 2,38,000, that is in the very year that the annicut was built. Though the supply of water in the river was less than half of the worst of the preceding 25 years, the revenue exceeded that of the best year of the first 30 years of the Company's management, by Rs. 18,000, yet there is an estimated increase this season of Rs. 35,000* upon last year, making already a total of Rs. 53,000 above the best year of the first 30 years.

44. With respect to the results in Tanjore and Trichinopoly, I do not yet see the least reason for thinking my former view of the last year's returns incorrect, excepting that I understand the revenue exceeded that of the preceding by 2 lacs, instead of falling short of it, as stated. Thus far, I think, there can be no possibility of doubt; viz., that the whole cost of the works was much more than repaid within 15 months from the commencement of their construction; almost every month of this year has been below the average in the supply of water in the Agunda Cauvery, yet the district has been plentifully supplied with water, without any intermission of consequence from the beginning of the season up to this time, which has never been known before, I believe; and the accounts I have got from the district are most satisfactory.† These results are, I think, abundantly sufficient to afford encouragement to proceed with such works, as respects the actual returns in revenue to Government; but I believe the increase in the value of property to individuals is also at least proportionately great: in Trichinopoly, I have ascertained that the value of the lands in Seringam has actually doubled, and I am informed that the same is the case in Munnargoody and Chelumburum; in Tanjore, also, I am assured that the price of land has greatly increased; so that when it is considered that as much as 5,60,000 cawnies of land are affected by the annicuts, the saleable price of which is perhaps 800 lacs, it does not seem too much to suppose that they have been the means of causing an increase of private property to the extent of no less a sum than 50 lacs.

45. If this has been effected with our present means, we may surely without the least doubt expect that, when after a time the divisions are in charge of men of experience and local knowledge, and something like real system is introduced into the department, such a state of things may be established, as respects irrigation and communications, as will make the Carnatic altogether different from what it now is.

46. I beg to apologize for the unreasonable length of this paper, but it is not easy to know what to omit in a case which I am confident affects the welfare of the country essentially, and I must yet make some remarks on the other branch of the duties of the department, viz., the communications; though, as I have before had the honour of forwarding a report on that subject, there does not remain much to be said by me here. I should first observe, that I have not seen reason, upon further consideration and experience, to alter my views of that question (as stated in the above-mentioned paper) as to the indisputable superiority of railroads on every account in this country; but at that time I by no means expected that there would be so great a traffic as I have since seen reason to expect. This so far alters the case as to make it, in my opinion, a matter beyond all doubt that a single railway will pay most abundantly on any of the great lines, and on some I think it may even be advisable to lay a double line.

47. The principal point which appears at present to require consideration is, whether upon the whole it is better to repair the present roads at a comparatively moderate expense, or to make railroads at a much greater. This seems to me capable of a very easy solution. I take it for granted, that it will be allowed that capital can be obtained at five or six per cent., to almost any extent. If so, the question seems to be reduced to this point, upon which kind of communications would it make the best return? That which will yield most must of course be the best for the country. Now, the utmost that can be done by means of common roads will not reduce the expense of carriage one-half, probably not one-fourth; or, in other words, it would not produce such effects as to enable the Government to levy a toll worth mentioning; so that the capital must be either paid out of the taxes or borrowed, and the interest form a permanent charge upon the Treasury. This would certainly be better than leaving the communications as they are now; but what will be the effect if railroads are constructed? The expense of transport will be reduced, at least, as much as to one-twelfth of what it now is: on the Red Hill railroad, one bullock drew 18 times as much as on a common road. Then, supposing the present traffic on any line to be equal to 100 tons per day,—

	<i>Rs.</i>	<i>a.</i>	<i>p.</i>
The present daily cost will be, per mile, at 2½ annas per ton	-	15	10
Or, per annum, about	-	5,700	-
Deduct ½ for the expense of draught with railroad	-	475	-
	-	5,225	-

Sum

* Increased cultivation, 40,000. Estimated cultivations, 35,000.

† The increase of cultivation this year above the last is 2,000 raylies, in revenue, Rs. 10,000, besides the saving of crops on lands previously watered.

PAFERS RELATING TO PUBLIC WORKS, MADRAS. 309

Sum remaining to cover the interest of capital, expense of management, repairs, &c.	Appendix (B.)
Interest - - - - -	5 ½ per cent.
Repairs - - - - -	2 "
Management - - - - -	2 ½ "
	10 "

Rs. a. p.

If the first cost is Rs. 6,000, the annual outlay will be 600 - -

Net annual income - - - - - 4,625 - -, or 76 per cent.

And, supposing that the first cost should be three times as great as above estimated, or Rs. 18,000 per mile, which will probably be beyond what any person will think a single line would cost, then—

The annual outlay will be - - - - -	<i>Rs.</i>
Receipts, deducting draught - - - - -	1,800
	5,225
Net returns upon Rs. 18,000, or 19 per cent. - - - - -	3,425

48. This is the total advantage to be gained by it, supposing the rate of carriage to be the same as at present; in what proportions it may be advisable to divide this between the Government and the public, is a separate question. Thus, to make common roads, so much money must be expended by Government and so much annual expense incurred, and no direct returns whatever can be realized. Railroads will not only literally cost nothing, because the capital can be obtained for asking for it, and the railroads will pay the interest, but will yield a large revenue besides. Before anything can be done of any consequence in improving the common roads, the state of the treasury and of taxation must be carefully considered; if railroads are to be constructed, nothing is required but to begin upon them at once; the less surplus revenue there is, and the more severe the taxation, the more advisable at once to commence upon these works. If once this important principle of using the public capital upon public works is recognized and acted upon, there will no longer be any limit to the power of Government to improve the country. It has already been extensively brought into action in America. If a Government does not make full use of the confidence which it has established in its subjects, by acting upon upright and sound principles, it throws away so much of the power which it possesses of promoting the welfare of the country. In cases of necessity and emergency, as in times of war, this confidence is without hesitation taken advantage of; and if it is thus made use of in a case where it entails a permanent loss upon the country, I cannot conceive what reason there can be for allowing such an invaluable portion of the power of the Government to be thought unavailable when it might be used to increase the wealth of the state. Supposing 1 crore of rupees employed in this way, and that it would only lay 1,000 miles of road, the direct saving to the country, or annual increase to its wealth, would be 40 lacs of rupees, if laid out on lines where there was traffic to the extent of 100 tons, not taking into calculation the innumerable indirect sources of advantage, which would at the least double that sum. I have supposed that lines can be found on which the traffic is 100 tons per day. By the returns of the traffic on the Adyaur Causeway, it appears that in goods and travellers it was equal to nearly 400 tons per day; on the great West and North lines leading into Madras, it could hardly be less than 600 tons, and if the cost of carriage and travelling was greatly reduced, as it might be, it is more than probable that it would be 7 or 800 tons per day. At one place in Tanjore, the average of 15 days was 172 tons in goods and travellers, bandies only; on another, 75 tons. It is often asked what is to be carried on the railroads, as though there was no traffic in the country, and I have no doubt that the extent of traffic shown by these returns will surprise most people; but the number of travellers is still more remarkable. In the Adyaur Causeway, the average of 16 days is—

Foot passengers - - - - -	3,320
Palanquin ditto - - - - -	7
Carriage and bandy ditto, reckoning three to each - - - - -	421
Persons - - - - -	3,748 per day.

In one place in Tanjore, the number of men travelling on foot was 1,555 per day.
At another place in Tanjore, the number of men travelling on foot was 1,287 "

49. Supposing that 16 persons are equal to a ton, and that the rate charged is one anna per ton per mile, the poorest class of travellers might be conveyed at one anna for 16 miles, which would bring it within reach of almost all; and it may be confidently expected, that if travelling in this country is rendered thus cheap and quick, that the number of travellers would be increased in many situations, at least, as much as in England, that is, three or four-fold. On a great line in the neighbourhood of Madras, it would probably be not less than 3,000. On several of the roads in Tanjore it would hardly be less than 3,000 per day, nearly equivalent to 200 tons.

50. I would now beg to make a few remarks on the details of the department. If these

Appendix (B.) two branches of its duties are to be vigorously attended to, I consider the following as absolutely necessary, but not sufficient to make the department what it ought to be.

For one division, consisting of three collectorates—

- 1 Civil Engineer.
- 1 Head Assistant.
- 3 Second Assistants.
- 7 Surveyors.
- 7 Maistries.
- 9 Draughtsmen and Writers.

Besides extra officers and surveyors to be employed on any new or extensive work.

This will, of course, appear at first quite unnecessary to those who compare it with the present strength of the department; but if it is compared with the wants of the country, the present state of irrigation, the amount of money required to be expended, the space of country over which the works are scattered, the nature of the duties, the effects of the climate upon Europeans, and the value of the property at stake, I am not afraid of its being found by any means too great.

51. In proportioning the numbers, I suppose the principle to be acknowledged, that it is waste of money to employ any person in doing duties that can be done by others at a less cost; this principle has indeed been hitherto rejected in arranging the department, and thus a miserably weak and inefficient department has been still further weakened. An Assistant on *Rs.* 400 or *Rs.* 500 a month, and a Surveyor on *Rs.* 176, are employed in making two copies of their own diaries, which could be done by men on *Rs.* 20 a month; and an experienced Surveyor, capable of planning works, is employed in copying plans of tunnels and cutcherries, which require no thought or ability at all, and for which men could be obtained at one-third of their cost. It is very remarkable that such a system has never been thought of in other departments of Government; the idea of employing a Superintendent of one of the Government offices, on *Rs.* 200 or *Rs.* 300 a month, in copying papers, would at once be seen absurd, much more so an officer on *Rs.* 400 or *Rs.* 500. I am quite at a loss to understand how such a plan could have escaped observation. I propose that every officer should invariably have attached to him—

- 1 Surveyor.
- 1 Writer and Draughtsman.
- 1 Maistry.

And I cannot see how, on any principle of economy, he can be allowed to be without them. If they are not with him, he must of course do their duties, and in the meantime, who should do his? If he has no Surveyor, a young European officer, not at all inured to the climate, must be employed upon a duty which, of course, he cannot long stand, and the consequence is, that besides being rendered often unfit for the execution of his proper duties at the time, he is after a few years (if he lives), when he is beginning to learn his business, obliged to leave either the country or the department.

52. From this and other causes, we have never had an experienced officer in the department since I have been in the country, who was not quite unequal to his duties. The Civil Engineer's office, I propose, shall consist of one Surveyor, one Draughtsman, two Maistries, and three Writers; one Writer was probably enough formerly, but certainly it is even now quite insufficient. If there is anything like a vigorous and comprehensive system adopted, less than this cannot possibly be adequate. One or two of the Surveyors, if not more of the senior ones, should also have Writers.

53. The above scale allows one officer constantly in each district, besides the Civil Engineer of the division, for there will be one of the officers almost invariably unfit for duty, and one employed on particular works, such as examining works of great magnitude; and allowing one Surveyor to be absent, there will be two disposable to detach on any separate works, besides those employed with officers. There will thus be for the general duty of inspecting works, only one officer and Surveyor for each district; they will have a range from 100 to 120 miles long, by 80 or 100 broad, an expenditure to control of not less than one lac, and from 1,000 to 3,000 works to look after, besides the communications. This must be a less force than a sound economy calls for. Further, unless a considerable number of officers are employed in the department, it cannot be expected that men of experience will be always obtainable to take charge of divisions. The Board will excuse my alluding to my own history as an exemplification of the effect of the system hitherto followed. In 1822, after being half a year in the country, I was sent to be an assistant in the Southern Division; the officer I was placed under had not been long enough in the department to gain any considerable stock of experience. I remained with him one year, the principal part of my time having been spent in surveying and copying plans and diaries. I was then placed under the Superintending Engineer at Madras for a time, and from thence was ordered to Burmah; at the conclusion of the war, I was appointed a Civil Engineer, because there was scarcely an officer in the country of any standing who had been in the department, and it was not to be supposed that a married man would willingly undertake the charge of a division of the size they then were, which would oblige him to be almost always separated from his family. When I thus got charge of a division, I was perfectly ignorant of the duties, and having a range of five collectorates, and no other officer with me, I was very soon worn out by fatigue and severe attacks

attacks of jungle fever, and after three years was obliged to return to England. On my return I was again appointed to the department, but my health so soon sunk under the duties, that I have since been scarcely half my time actually employed. I am now, excepting one, the officer of longest standing in the department, and yet have had only about seven years' actual experience; having been also, except the first year, without any one to instruct me. If such a state of things was allowed in other branches of the service, what could be expected? If the irrigation is found annually to diminish under such a system, it cannot be a matter of surprise.

54. But if the department is to be increased greatly, the question arises, where are officers for it to be found? First, there are now a good many officers in the corps of Engineers altogether; but it so happens that at present there is an extraordinary number of officers absent on sick certificate, and it is very remarkable that so great a number of young officers have so soon lost their health as to be obliged to return to England without having done any duty of consequence. We may, however, fairly expect that, after a time, with our present numbers, we shall have more disposable officers. Secondly, I must presume so far as to observe on the grievous loss of Engineer officers employed in making roads with the Sappers; I suppose that it will be generally considered that the plan of officering the Sappers by Engineers has not answered the end proposed. They are now employed upon precisely the same duties as Line officers were before, and which undoubtedly do not require an Addiscombe education, while duties, which cannot be done without instruction in particular branches of knowledge, are left undone for want of these very officers. There is, indeed, a saving in employing Engineers in that way, as the old Pioneer allowances were withdrawn; but this saving is much more than counterbalanced by the employment of men on duties which are of less importance than others which they are capable of performing. Thus at the very time that several officers (educated at a great expense) were employed upon works to which numbers of officers of the Line are perfectly competent, the Board were waiting for many months last year for an officer capable of superintending the levelling of the line from Madras to Arcot, and the Tank Department wanted several officers even to complete its present complement. And there are now two officers of Artillery employed on the duties of Engineers, while there are officers of Engineers employed in the duties of Line officers. I should also mention that an officer of Engineers is employed in Travancore; it seems scarcely advisable to send officers to foreign states if they can really be advantageously employed in the Company's country; thus, rather than let the irrigation of the country be neglected, perhaps it might be deemed proper to call off every Engineer officer from less important duties.

55. But I beg strongly to recommend the consideration of the question, whether it would not be much better not to confine the department to Engineers. There are now abundance of officers in the Line and in the Artillery who have been at Addiscombe, and doubtless many who have not, who are perfectly equal to these duties, and would gladly undertake them. If the department is increased, and thrown open to all, I have not a doubt that the Government will soon find that they have many servants in the other branches of the army who will be far more valuable in this department than where they now are, having a natural turn for such duties. Nor would I exclude those who are not in the Company's service. I would propose that the highest appointments should be open to any one who could fit himself for them. I cannot see anything in the nature of the department which can make it advisable to keep it exclusively for one body of men; a turn for these duties may be found in any class, and in England civil engineering is open to all, and the effects of it are very evident and beneficial.

56. I trust that there is now no occasion for me to say much on the importance of this subject. Though the country cannot advance without good judicial and revenue management, yet it is indisputably certain that nothing will avail unless the irrigation and communications are attended to. While the population are mainly dependent upon the local rains of so precarious a climate for their cultivation, four-fifths of the population must be employed in merely raising food; every five or six years we must witness the deaths of tens of thousands by famine, and the great body of the people must be without clothing or anything but a bare subsistence, even in fruitful seasons; and, without communications, nine-tenths of the natural treasures of the country must continue to be useless. At present, what cannot be procured on the spot where it is wanted, cannot in general be had at all. A great portion of the population are even deprived of salt, which the country so lavishly produces, because of the expense of transport. Above all, the want of communications is, and ever must be, almost a total bar to the progress of knowledge and improvement generally.

57. Many attempts are now making to improve the state of the people in various ways; but unless there is freedom of communication throughout the country, it will be perfectly impossible that such improvements can spread rapidly. However well any new plan succeeds, if the communications are not opened, it will never extend. And again, if we want to promote the general wealth and comfort of the community, we must be sure to lay a good foundation by supplying them with plenty of food. If a man was so circumstanced that four-fifths of his time was employed in getting only just enough of the plainest food to keep him in health, and the remaining fifth was not sufficient to enable him to supply himself with two yards of cotton cloth, with a prospect every four or five years of being either starved to death, or in imminent danger of it; and if we were to offer to show him how to grow sugar, he would probably say, "If you will first put me in the way of insuring to myself a supply of food and a bit of cloth, and a comby, without my whole time being taken up

Appendix (B.)

about them, I will then employ some of what time I have to spare in raising luxuries that I want myself, or that I can exchange for others; for it can scarcely ever answer to a country to bring much food from a distance; it will always be advisable to raise most of it on the spot; but when a country is in a state to provide abundance of food for its population, manufactures, &c. will flourish. Again, the price of exportable produce, of course, depends entirely upon the facility with which food is raised, and upon the price of produce entirely depends its capability of competing in foreign markets; thus, if food could be raised in this country with one-half of the labour that it has hitherto required, cottons, iron, &c. could be produced at greatly diminished prices, and the profits upon them in foreign markets proportionally increased.

58. It is often remarked that there are so few manufactures in the country; how can it be otherwise, when almost all are required to raise food, and of the remainder such a number to carry it about; and when everything must be brought to where it is required at such an enormous price, at a price, which, if it existed in the same proportion in England, would at once destroy nine-tenths of the traffic of the country.

59. If this view of the irrigation question is not upon the whole a fair representation of the case, how does it happen that Tanjore, the only district well irrigated and producing a sufficiency of food, is the only district of the 12 that is in every respect regularly advancing. If it really is not a correct view, it must at least be allowed that this is a question which should not be lost sight of till it is fully investigated.

60. I am quite satisfied that there is nothing in the natural state of the Carnatic which should prevent its being one of the most populous and fertile countries in the world; and I think that the results of what has been done in Tanjore and in South Arcot, even without considering the utter insufficiency of the Tank Department, are such as to give the fullest assurance of ample success to the most extensive system of operations. Everything is ready to commence upon it. With a healthy climate, abundance of fertile soil, unlimited mineral treasures, especially the finest iron probably in the world, ample supplies of water, if taken care of, an increasing population, a surface extraordinarily favourable for communications, internal and external peace, and almost any amount of capital at the disposal of Government (for crores can be obtained from England if necessary), there is really nothing wanting but action, to produce such a change in the whole face of things as cannot now be conceived.

61. The following is a summary of my views on this subject:—

1st. That the nature and importance of the subjects of the irrigation and communications has been hitherto altogether misapprehended, leading to a loss of revenue, and a retardation of the progress of improvement in the state of the community, which is quite beyond calculation.

2d. That as respects communications, no country whatever can prosper if they are not made the very first objects of attention; and that as respects irrigation, it is in this country, owing to the peculiar character of the climate, undoubtedly the very first subject to be attended to; inasmuch as we cannot rationally expect that there will not be famine and want of every kind, just in proportion as the cultivation is more or less dependent upon local rains, without the help of artificial works.

3d. That the expenditure upon the irrigation has certainly not exceeded one-third of what, upon the strictest principles of economy, it ought to have been; and that from the little consideration that the subject of communications has been thought worthy of, there has been in most cases nothing at all expended; and in others, as in the Hyderabad and Masulipatam road, and in that from Madras to Poonamallee, the most expensive and unaccountable expenditure, totally disproportioned to the advantages to be attained, and to the real necessities of the case. The former cost at the rate of Rs. 10,000 a mile, the latter Rs. 50,000. Most of the other great lines of road in the Presidency are literally at this moment impassable, at times, for want of a few bridges and trifling works, that would not cost more than Rs. 200 per mile; and some other lines on which bridges were built, are now, and have been for many years, totally impassable from want of repairs, that would not exceed Rs. 20 per mile per annum. These things could not possibly have happened had the subject been viewed as it really is, one of the very first subjects to be attended to.

63. 4th. That when once a country is favoured as this is with a strong and upright Government, the only things which can possibly support effectually internal arts and manufactures, and foreign trade, are an abundant, certain, and cheap supply of food, and rapid, easy, and cheap transport; nor without these can a nation make rapid progress in knowledge. While a people are scarcely provided with food, and not at all with clothing, they cannot be expected to think much of any other things; and while intercourse is so restricted, the state of a community approaches to that of men in a prison, each one shut up in a separate cell, so that the progress of the individuals depends wholly upon the discoveries of their own mind, instead of having also the full benefits of all the thoughts of the other inmates of the place; whereas, just in proportion as the freedom of intercourse approaches to completeness, the state of each individual approaches to the state of a person possessed in himself of all the powers and capacities of the multitudes of minds of which that community is composed.

64. 5th. With respect to what should be done in our present circumstances. That such a systematic

a systematic arrangement should be made for the conducting of public works, as would secure these branches of the management of the country one of the first places among the subjects which require the attention of Government, either by the establishment of a separate Office or Board of Public Works, on a liberal footing, or by such other arrangement as may appear necessary.

65. 6th. That every officer of Engineers, whose present occupation can possibly be taken up by others, be immediately made available for this department.

66. 7th. That the department be thrown open to every person, whether in the service or not, who can fit himself for it.

67. 8th. That at least double the present expenditure should at once be allowed for the irrigation, besides very large sums for the communications.

68. 9th. That capital should be obtained on loan, and on no account that any money should be paid out of the treasury for improvements. Capital paid from the treasury costs the community perhaps double its actual amount, taking into consideration the expense, &c. of collecting, the cramping of private enterprise by the diminution of funds of individuals, &c. &c., while capital obtained on loan costs absolutely nothing. If Rs. 10 are taken from a man as a tax it is sheer loss to him, and it must often happen that it is taken when he has an opportunity of laying it out to great advantage; if it is taken on loan, and laid out in a way that will yield both public advantage, and actual returns in money besides, more than sufficient to pay the lender his interest, no individual loses anything, but the community gains. And for such works as bridges, upon which it is not advisable to levy tolls, how much better is it that the interest of its cost should form a permanent moderate charge upon the community, than that the cost itself should be paid at once; in the latter case the present moment must be heavily taxed to obtain an advantage, which will only be realized in a course of years; in the former the advantage is only paid for as it is actually possessed; in the latter case works may at once be undertaken to a prodigious extent, and the country greatly improved without delay; in the former only a small extent of work can be undertaken at first, and the community must wait many years for others equally necessary.

69. 10th. That various details of internal management now wholly omitted, are indispensably necessary to keep the department in any kind of order, and prevent the recurrence of such mistakes as I have endeavoured to show have hitherto been committed in it; such arrangements as these, for instance, annual reports on the state of the irrigation, both from the Civil Engineers and Collectors. A general annual report from the Board of Revenue; rewards and penalties to secure every person in the department, obtaining a competent knowledge of the language of the division; examination of officers, &c., and other details, which in almost all organized departments are considered necessary to insure their efficiency, but of which this has hitherto been thought quite unworthy.

70. I trust the Board will be pleased to excuse the length of time that I have taken to prepare this Report. Since I resumed charge of the division, I have had to discuss and estimate for all the main works to be proposed for execution next year, and respecting which the lateness of the season would not admit of delay. I have also had to obtain and prepare various papers that affected the question; and all was to be done while moving about, and with a single Office Writer, who had of course all the current writing business of the department. It has in fact taken three or four weeks to get this paper copied, and I have been obliged to employ a Surveyor at last in making a fair copy.

71. For the last week I have also been fully occupied with the duties entrusted to the committee appointed by Government on the affairs of the Indian Iron Company, and which are not yet concluded.

Since writing the above a letter has been received from the Board, which reminds me of one point of this subject which should not have been omitted.

The regulations make no particular provision respecting the preparation of estimates for new works of small amount. A Surveyor or young officer in his tour, finds an opening for the improvement of the irrigation of one or two villages, the cost of which will be perhaps Rs. 1,000. He examines it, and reports upon it, and the Civil Engineer having made all the inquiry he can about it, approves of it, and perhaps recommends it for sanction. The papers are returned for his personal inspection of the spot, and report. He has now the choice of three things, either to go at once to the place, which may take him from a week to a fortnight going and returning, in which case his pay and the pay of his establishment will cost the Government from Rs. 350 to Rs. 700 directly; and as it will take him away from other far more important duty, the indirect loss to Government cannot be less than three or four times as much, or from Rs. 1,200 to Rs. 2,400, which will double or treble the cost of the project, and probably make that an unprofitable scheme which would otherwise have been a profitable one; or, secondly, he must wait till other more important duty leads him into that part of the division, which may be even several years; for his time is so totally disproportionate to his duty, that he cannot see a tenth part of the division every year, unless he very greatly neglects the great and important works in it; or, thirdly, he must entirely give up all new works of small amount. The peculiar circumstances of the Tank Department, in two respects, require that some specific plan should be settled respecting the expenditure of such small sums; viz., first, that the number of works in a division is so greatly beyond the utmost power of the officers to attend to them; and, secondly, that they are spread over so great a space, that in a country where there are no facilities for travelling,

Appendix (B.)

the inspection of the most trifling work may require a fortnight of his time. Even when the department is put on an efficient footing, it will often cost more than a small project is worth for the Civil Engineer to inspect the spot: but at present it will do so in the majority of cases. In a fixed office, where all the duty is done by inspection of papers, the head of it can afford to look into very minute matters, because it costs him little time; but where the business requires the inspection of tracks of ground at a wide distance from each other, the case is entirely different; yet even in the former case it is not always considered necessary that every case should come under the personal investigation of the head of the office; for instance, in the judicial line, the inquiries of a Moonsiff are considered sufficient in cases of small sums, and he is allowed to decide them; were the Judge required to investigate every case, the only result would be that his time would be so swallowed up that he could not possibly give the important cases that consideration which they deserved. Possibly it might be arranged that for works of a certain amount, as Rs. 500, it might be sufficient that a Surveyor or native Superintendent had personally inspected the spot, and that the project had been investigated by the Civil Engineer or his First Assistant; for larger works, as Rs. 1,000, that it had been personally inspected by an experienced Assistant, and investigated by the Civil Engineer; and for works of Rs. 3,000 and upwards, it should be required that the Civil Engineer should visit the spot. It certainly seems advisable that this point should be examined, and some definite plan decided upon, otherwise either nothing now involving only a small expenditure can be done in parts of the country at a distance from important works, or the Civil Engineer's time must be so taken up with them, as to prevent him effectually from duly considering the more important cases which may come before him.

I am, &c.

(signed) A. Cotton, Captain,
Civil Engineer.

Civil Engineer's Office, 13 December 1837.

Appendix (C.)

No. 316.

To J. D. Bourdillon, Esq., President of the Public Works Commission.

Sir,

Civil Engineer's Office, 1 June 1851.

Appendix (C.)

In reply to the additional questions transmitted from the Commissioners, dated 2d May 1851, I have the honour to state,—

1. The Commissioners are aware that the main works required for the improvement of irrigation of this division have been brought forward by Captain Lake and myself, viz., those required for the two great Deltas of the Kistnah and Godavery; that both sets of works have been approved and sanctioned by the Honourable Court without reserve; these works providing for—

- 1st. The irrigation.
- 2d. The drainage.
- 3d. The protection from river floods.
- 4th. Water communications.

The Godavery amicut is now very nearly completed, and so far as to be in full operation; and the water has been thrown into seven channels, extending through the Delta, and filling all the old ones. A large aqueduct across a considerable branch of the river, about eight considerable branch channels and one main one, about 15 locks, 60 or 80 miles of river embankments, and all the small branch channels remain to be executed; probably eight lacs, and three years, will be required to complete the works, and irrigate, &c. a million acres, at an expense in interest and management of about two lacs a year, or 3½ annas per acre per annum.

The Kistna works, though sanction for them arrived months ago, have not yet been begun. It is understood to be arranged that that part of the division will be separated from this, and placed under Captain Orr.

2. The only thing that it seems necessary to say in reply to this query, in connexion with the Godavery works is, that as the summer water is not sufficient to water the whole Delta, when the river is at its lowest, it will eventually be desirable to store water in the freshes. At present there is perhaps not more than 100,000 cubic yards per hour for a month or more in some seasons, sufficient for only 33,000 acres of sugar, or 1,50,000 acres of cotton; for some years probably this deficiency will be little felt, and therefore it is not of immediate importance. But it may be well to mention that there are two fine lakes just at the point where the river leaves the hills, so situated that they might, at a small expense, be filled to the level of the river flood, and drawn off in the summer months, to the extent of perhaps 12 yards depth. One of these I have seen, and it might thus be made to store up perhaps 20,000,000 of cubic yards, or 30,000 cubic yards per hour for a month. The other is also capacious, as I am informed, but I have not seen it. These reservoirs might also be used to irrigate lands above the level of the amicut, but I think it would be far more advisable to reserve them for the use of the Delta, where they might be of incalculable value in case of a year of very extraordinary drought. No doubt many other good sites for reservoirs might be found, so situated as that they might be used to support the Delta irrigation, if necessary.

3. With

3. With respect to those parts of the division which are above the Delta, there is no limit to what might be done to improve the irrigation. Urgent applications are continually made to me by all the Revenue Officers and by the Commissioner, for officers to plan and estimate for works, by which the small rivers may be turned to better account, and in which 100 per cent. and upwards might be obtained for the outlay, but I have not been able to attend to them. Several of the zemindars also are very anxious to have the aid of a European officer to plan new works, or the improvement of old ones; and some have applied to officers to give up a portion of their time regularly to their estates. There are a great number of tanks and channels now existing, not one of which is not capable of being greatly improved. There is thus an immense field for improvements in the parts of this division, which are above the level of the annicuts. There are numberless individual villages in which a revenue of Rs. 1,000 to Rs. 5,000 is lost for want of some comparatively trifling work. The undulating country, sprinkled over with low hills, which extends from the Deltas to the north-west, is so full of tanks and good sites for tanks, that almost the whole of the water of the numerous streams might be turned to account, instead of, as at present, helping to drown the flat country near the sea. I should also mention, that the whole bed of the Colair Lake should of course be eventually irrigated from the Kistnah and Godavery, instead of the water being allowed to collect in it and form a tank; as it is all above tide water it can be drained with the greatest ease; indeed it is at this moment being emptied, in order that it may be supplied with fresh water when the freshes come, as the soil is slightly saline, and the last of the water retained in it becomes brackish at the end of the hot season.

4. The whole division is almost absolutely without roads, excepting about 12 miles of the great northern line from Rajahmundry, and a road from Narsapore towards Rajahmundry, about 30 miles, not yet completed; there is, I believe, no metalled road in the division. The road from Masulipatam towards Hyderabad was undertaken at one time by the Pioneers, and about Rs. 2,000 a mile, I think, spent upon it; but the officer employed having no knowledge of road-making, and no metal having been laid on it, I understand it has never been practicable in the monsoon, and it was so bad when the Commander-in-Chief lately passed along it, that he obtained an order for its completion to be estimated, which has accordingly been done. In the Delta there is not the least attempt at a road; in the monsoon a palanquin cannot proceed faster than at a mile an hour; even on the Great Northern Road, just out of the Delta, I have known a gentleman four hours riding seven miles. Of course there is no possibility of moving produce by land to the ports and markets for about five months in the year; but the villages that are close on the banks of the rivers can send their produce by water; though, from the strength of the current, the irregularities of the bed, the want of towing-paths, the liability to a heavy sea, from the great breadth of the river, and other causes, the navigation is very imperfect, and this mode of communication is generally very circuitous. It is, however, carried on at about four pice or one-third anna per ton per mile up stream, and three pice down stream, so that when and where practicable it is very cheap. But it is quite stopped in the high freshes and in the dry months.

5. I should also mention with reference to the communications generally, excepting the Great Northern Road, that there is no recognition of the Government authority whatever with respect to them. A Brahmin superior Ryot, a head of village, or anybody that thinks himself a person of consequence, ploughs up, fences across, cuts a channel along, or in any other way he thinks proper, takes possession of any line of road, and nobody interferes with him. I have met with cases of this sort every where. In one place where the river bank formed the only practicable road, and was, in consequence, a line of great traffic, a principal Ryot had put a line of stacks all along it, occupying every inch of its breadth for some distance, so that every passenger had to go down into all but impassable mud. The perfect lawlessness of the people in this division, who from caste, office or money, look upon themselves as important persons, is one of the most curious of the circumstances of these districts.

6. I should not omit to mention the river embankments in this connexion. Where we have completed the new banks, making them from three to four yards broad at the top, being composed of loam, with a large proportion of sand in it, they form excellent communications at all seasons, and are really a very important addition to the means of travelling. They, however, of course only run in the direction of the river, and afford no help to those who have to move across the Delta. On this account I have long purposed to estimate a line to run direct from Cocanada to Masulipatam on a straight course, which by connecting all the lines of embankment would alone afford a vast extent of communication—such a line just raised above the general level a foot or so, and sanded or covered with the fine gravel procurable here, and which might be conveyed by water, would cost only Rs. 200 or Rs. 300 a mile. This, however, is only for foot passengers and animals, not for wheeled vehicles. With respect to carriage roads there are two things to be said: 1st. As there is at present not a mile practicable, excepting the Narsapoor and Rajahmundry road already mentioned, there is no use in commencing upon them unless it is intended to introduce them generally, and this is a thing we cannot think of doing till the irrigation works are completed; and 2dly. As the Delta will so soon be intersected in every part with excellent navigable channels, so that no village can be more than two or three miles from a water communication to the ports and to every other part of the Delta, of course there will be very little heavy traffic by land, and no doubt as the people get more into the habit of it, almost all the passenger traffic also will be by water. Even at present on one line where

Appendix (C.) — there is a constant cooly traffic, and water can be conveniently used for a distance of only 12 miles, boats are always in attendance to convey the coolies that short distance, a clear proof that the people will soon learn to make full use of the channels. From the present cost of river transit, and from what we have seen this year in the use of the Thooliah Bagah, I think we may safely reckon upon the channel transit being carried on at two pice, or one sixth of an anna per ton per mile, and as the average distance of villages in the Delta from the ports will not be more than 30 miles, it would cost only five annas per ton for the conveyance of produce to the port, a rate which would not be felt in the coarsest goods. I have in my answers to former queries (*see* Appendix E.) given an account of the water communication that will be formed in connexion with the annicats for 240 miles along the line of the Northern Road, and which might be so easily extended to Madras.

7. With respect to the communications with the distant interior, there cannot be a shadow of a doubt that the navigation of the Godavery is the grand thing to be attended to. The cost of a single mile of railroad would probably make the whole 450 miles from the coast to Woony on the Wardah, within 80 miles of Nagpoor (which is already navigable for a great part of the year), practicable throughout the dry season. The Government have, at the recommendation of the Revenue Commissioner, proposed to the Bengal Government an expedition for the examination of the river, and I have not the least doubt it will lead to important results if judiciously managed. Almost the whole basin of the Godavery is inaccessible to trade at present, on account of the 300 or 400 miles of land carriage without roads, which cannot be avoided, while this noble river is neglected. And it is remarkable that just at this moment the attention of merchants is much turned to that tract, and agents at Coringa have unlimited orders for hides, wax and other things, the produce of it. From its having been hitherto almost cut off from the rest of the world, the value of money is very high, or in other words, all produce is very cheap, offering a peculiarly favourable field to the merchants. Compare the effects that can be produced by opening up the transit by this river, and its branches, with what could be done by equal sums expended on railways which, if executed for nothing, would even then be many times more expensive to work than it would be to navigate the river. Our steamer here of 20 horse-power costs about 2½ annas a mile, or the same as a single bandy on a common road, or as perhaps two tons on a railroad, a lively proof of the enormous advantage of natural water communication where it can be obtained. When we look at the vast cotton tracts of Candeish and Berar, and the many other productions of a basin of 100,000 square miles on the one hand, and the safe port of Coringa on the other, perhaps the cheapest for shipment in the world, it is not easy to over estimate the importance of opening a water communication between them. I need only just mention also the great point of opening out this dark corner of the earth to European influence.

But it would be better to refer the Commission to the correspondence between the Commissioner of these districts and the Government, on this subject.

8. From all that I have learnt respecting the works in this division they are in all respects, both as to original construction and present condition, in a most imperfect state. With respect to their former state, it is to be observed that, 20 years ago, by far the greater part of these districts was in the hands of zemindars, and a great number of the estates have only come under Government management very lately; much is still under zemindars. The state of the works under the zemindars seems to have been very various, but I judge that almost all of them took much better care of them than our Government has done. In one, the Pittapoor estate, I have satisfied myself that the works were in excellent repair under the grandfather of the present zemindar, but at his death, the estate came under Government management, in consequence of a minority, and when the estate was given up to his son, 15 years afterwards, the whole of the works were in a complete state of neglect and ruin. I inspected several of them at the request of the zemindar. During the last 10 years some little has been done to put the Government works in order, but since I came into the division, my time and attention has been so taken up with the annicat project, that I have not been able to do anything about the old works out of the Delta, further than to urge a liberal outlay upon them by the Collector's Department. I have reason to believe that most of the tanks are in want of complete revision; they have no proper calingalabs, sluices, supplying channels, &c., and the drainage of the country is in many places as bad as the supply. Below the Colair, numbers of villages are submerged till the rains are over, and begin to cultivate when they have hardly any hope of rain enough to secure a crop; late last year, at the very end of the rains, I passed in my boat over a great extent of water, many miles together, and if I had not been assured that there was a talook underneath, I should have supposed I was in the Colair Lake. In one place, I saw the people punting in a piece of water, which I was informed they were going to bale out, that they might begin to cultivate; this was the only sign of land and cultivation that I saw in 15 or 20 villages that I passed near. The drainage of this tract will of course come under our present operations, but it shows the state of neglect which was permitted in these districts; no wonder that, under such management, this rich country yielded only one-third of what Tanjore did in revenue, though naturally the latter is much inferior to it.

I have, &c.

(signed) A. Cotton, Lieut.-Colonel,
Civil Engineer, First Division.

Rajahmundry District,
Camp Dowlaisheram, June 1851.

P.S.—Since writing the above, the orders of the Bengal Government have been received, withholding

withholding sanction from the Godavery expedition, on the ground that they cannot see the use of it. On this subject I now beg to make the following remarks :

1st. This river affords the cheapest possible access to that part of India where the best cotton for the English market is produced at the cheapest rate, and it is mainly for the purpose of getting at this cotton, that the line of railroad from Bombay, 350 miles, has been proposed, at a cost, I suppose, of 200 lacs (see Mr. Chapman's book on this subject), so different are the judgments of different parties on the importance of the communication with this tract of country. One thinks it worth an expenditure of 200 lacs, the other thinks there is so little to be gained by it, that it is not worth an expenditure of Rs. 10,000 to examine the river, which has been ascertained to be navigable.

2d. This is one of the innumerable proofs how impolitic it is to trust the interests of one Presidency to those who belong to another. It cannot be expected, it is impossible, that others can take the interest in our own Presidency, which we do ourselves. Local and personal knowledge will necessarily rouse men to exertion, as nothing else will. It appears to men who have passed their lives in Bengal a matter of no importance whether the largest river in Madras, leading into a fine cotton country, and bringing us as it were 200 or 300 miles nearer some of our most important cantonments, is navigated or not, the subject is dismissed with three words. How differently is the navigation of a Bengal river treated.

Nothing can be more paralyzing than this subjection of one Presidency to the inhabitants of another. If each carried on its own improvements independently of the other, but directly under the Honourable Court, instead of efforts to keep back the progress of the others, each would be stimulated by a wholesome rivalry to activity in the race of improvement. Were there really a Council in India equally independent of all the four Presidencies, it would be different, though even then the one they resided in, would inevitably be advanced at the expense of the others, such is the power of local connexions. The disheartening and paralyzing effect of this subjection of our local questions to the judgment of men of another Presidency is felt continually, and it is productive of nothing but mischief; any restriction respecting the amount of expenditure may be laid by the Honourable Court, so that the expenditure here may not require to be known in its details for the sake of financial arrangements, and the questions about individual works need then to be referred to the Court only; which being composed of men from all the Presidencies as well as others connected with none of them, certainly forms a much safer tribunal to pass judgment on our proposed improvements than the officers of another Presidency. If we look to the actual operation of the present system, it has certainly most seriously retarded our progress, and never in the remotest degree tended to advance the works of this Presidency. We have never heard of an important public improvement in Madras suggested or even urged by Bengal; the very mention of such a thing sounds absurd; on the other hand, the certainty which the Government here feel, that if any reason or excuse can be found for stopping one that is proposed, it will be rejected, has of course a most powerful tendency to prevent the Government from running the risk of incurring a refusal. This is one of those many things that have combined to keep this unfortunate Presidency in the rear in respect of improvement. Whereas, were every Presidency free to carry on its own improvements, the only alternative the others would have, in case of one appearing likely to have the honour of taking the lead, would be to bestir themselves the more.

Besides the evil arising from this system in entirely preventing works, there is at all times the evil of delay—a most notable instance of this lately occurred here. The estimate for the extension of the Vezasweram branch of this aicut was so long delayed, that it was impossible to execute the work before the monsoon, and even when the papers had actually been approved at Calcutta, they were not sent to Madras for a month or more; and had I not, in anticipation of such an event, proceeded exactly as if I had known that the work would not be sanctioned, and done all I could to secure that branch without extending it, most serious mischief might have occurred. It appears from this that the most imminent danger of the most important works here cannot prevent their being thus exposed to the risk of leaving them exposed to another monsoon in an insecure state.

In conclusion, I must earnestly recommend these two questions to the Commissioners. First, The particular one of the navigation of the Godavery, represented in the reports of the Collector of Rajahmundry, the Commissioner of the Northern Circars, and the Civil Engineer, first division, and also in some English publications; and, second, The general one of the subjection of each individual proposed improvement here, to the judgment of a Council entirely ignorant of our localities and circumstances, and necessarily wanting in that personal interest in this part of India felt by those who are directly connected with it.

1 September 1851.

(signed) A. Cotton.

Appendix (D.)

Appendix (D.)

EXTRACT from a Letter from Lieut.-Colonel A. Cotton, Civil Engineer, First Division to the Secretary to the Board of Revenue, Department Public Works, dated 2 December 1851.

2. As to probable returns, those already obtained are an unanswerable proof that there is no room for doubt on this head. The direct returns from the villages already watered are much beyond the calculations, and if the whole Delta improves in anything like the proportion of those villages, the profits will be immense. But, besides the direct profit in increase of revenue of the watered villages, the whole district has been materially affected by the expenditure on these works. Nothing can be more erroneous than to suppose that the whole expenditure upon public works is so much actual loss to Government. Every lac of rupees spent by Government in a district materially affects the collections. I particularly insisted upon this in my Second Report, and the result here fully confirms that view. The moment the expenditure commenced here the revenue felt the effect of it; how could it be otherwise? The impoverishment of the district and the want of capital was so great, that, in a thousand cases where an improvement in a man's land, at an expense of one rupee, would produce five the same year, he could not execute it for want of capital. The dispersion of a few lacs by these works and the sugar manufactories, put life into the district, enabled the Ryots to extend their cultivation and improve it, and thus to raise a greater quantity of produce for export, by which again a large additional income is brought into the district; the exports last year amounting to 14 lacs.

3. The results upon the whole are shown by the accompanying statement of collections in Rajahmundry, by which it will be seen that after deducting the whole expenditure on the new works and repairs, there has been a net increase of collections of about seven lacs in the five years. And the present annual increase of revenue upon the average of years preceding the commencement of the works is five and a half lacs; and, supposing we continue to spend two and a half lacs per annum, even if there were no further increase of revenue, there would be still a clear surplus of three lacs a year above the former revenue. But it is still increasing, and there is every prospect of a great additional revenue this year; not less than 1,00,000 acres additional having benefited more or less by the works brought into operation this year. By one channel alone ample water for 30,000 acres has been supplied throughout the season, to lands which had not before received any help from the new works. I lately examined some of the newly watered villages, and found them entirely covered, even the mangoe tope land, with a luxuriant crop of transplanted paddy, where two years before not an acre of rice had ever been grown; the value of the old crops of cholam, gram, &c., being about Rs. 6 per acre, while the rice is at least Rs. 20 per acre. In one village, Biccavole, there has been an increase of Rs. 600 a year in revenue; the Government interest upon Rs. 1,20,000, a tenth of the whole expenditure up to this time, while it contains about 2,400 acres, only $\frac{3}{100}$ part of the lands commanded by the annicut. The former collections averaged 1½ rupee per acre, it now pays 3½, being an increase of 2½ rupees per acre, at which rate the whole of the lands under the annicut in this district, and Masulipatam, would yield an increase of 30 lacs a year; and yet this village is, in two respects, inferior to the villages generally: 1st, as part of its lands are above the level of the annicut; and, 2d, it had previously some tank irrigation which the Delta villages generally have not. And if the value of the produce is increased from 6 to 20 rupees (leaving out of consideration the more valuable products, sugar, American cotton, chillies, &c.), no wonder that they can bear an increase of taxation of 2½ rupees an acre. Further, we have every reason to believe that the energies of the people have been greatly roused by the execution of these works. The employment of so large a portion of the population at different times on the annicut and other works, has shown them the practicability of doing many things that they never before thought of; but much more have the new works effected in giving them hope, while before they were in a state of stupor and despondency. The efforts of Government to give them water, and improve their condition, has already greatly inspirited them, and every day we have increasing proofs how alive they are to the value of the new works, and how prepared to take advantage of them; continual applications are now made to me for channels to irrigate and to drain lands which the new works have not yet effected.

But, as I have shown before, the expenditure is much more apparent than real; if two or three lacs are spent this year, a great portion of it will immediately find its way back to the treasury; and what does not, will, as capital, be the seed of future profit to the revenue. Further, at the utmost it will only be out of the treasury a few months; about one rupee per acre is sufficient for the detail works; and I have shown how easily and certainly that rupee per acre, and much more, may be returned in annual revenue; so that it is difficult to conceive how the non-execution of these works can benefit the treasury even at present; and most certainly, if we look forward a single year, it is a ruinous way of saving. How can we draw any other conclusion than this from the actual progress of the district since we commenced the improvements? While we have spent 13 lacs, we have drawn additional revenue to the amount of 20 lacs; and yet that money has been chiefly expended on works which do not yield profit directly, as the annicut for instance; while all the works now before

before us immediately and directly affect the lands through which they pass. Lastly, had the Government to wait several years for returns, and had they to pay 50 per cent. instead of five, for capital, it is most certain that they would be amply justified in proceeding with the works; rather, I cannot see that they would be justified in stopping them after thus raising the hopes of the people.

4. As we are now so far advanced in the undertaking, I append an estimate of the probable actual cost of the improvements per acre, supposing it be considered as if it were a private speculation in which only the direct profits can be calculated upon.

Expenditure on labour, &c.	-	-	-	-	-	-	-	20 lacs.
European and other superintendence	-	-	-	-	-	-	-	4
							—	24
							—	
Interest on ditto, at 5 per cent.	-	-	-	-	-	-	-	1,20,000
Annual repairs and management	-	-	-	-	-	-	-	1,00,000
							—	Rs. 2,20,000

which, divided among 1,200,000 acres (including 2,00,000 in Masulipatam) is about 3 annas per acre per annum, while the difference in the value of produce, even leaving out of consideration all the valuable products, is about Rs. 14 per acre. But when to this is added, that by means of these works the district is brought into the condition of an almost unlimited field for produce for the European market, in sugar, rice, cotton, oilseed, &c. (already in the last year there is a foreign export trade of 11 lacs), the results of the works, if fully carried out, are really incalculable.

* * * * *

10. I must again and again insist upon this point; it is the foundation of all my conclusions, and unless it is kept in view no correct conclusions can be arrived at. I have not yet seen one word in any document connected with these works about the receipts, or the loss of receipts by not executing the works. One would suppose that all had hitherto been expended, and was to continue so for some years longer. But, in the present case, every rupee retained in the treasury instead of being a gain is an immediate loss. If three lacs are granted for the works this year I will answer for it that that amount is in the treasury again before the 12 months are over, before the whole of it is expended; that is, if the works are stopped the treasury will certainly be poorer when the accounts are made up at the end of the year than if they are executed, instead of being richer, besides a much greater loss to the people.

11. I cannot say less than this on the subject; it only seems extraordinary to me, after the astonishing progress the district has made in revenue, in exports, and in everything which indicates prosperity, that it should be necessary for me to say anything. We have thus now actually before us, as a thing already accomplished, the change from a torpid, indifferent economical system of management, to an active, vigorous, intelligent, liberal system, and we see the results; an expenditure of 12 lacs, and an increase of collections of 20 lacs, in the first six years of the change; and yet it is still said that money cannot be found for public improvements; and no doubt while the vast expenditure of 12 lacs is continually thought of and dwelt upon, not a word will be said about the 20 lacs received.

* * * * *

13. I append to this, three short statements, as indisputable proofs of the soundness of the ground taken up in this view of the case: No. 1. The total collections of the district: No. 2. The increase of revenue in the tract first reached by the water; and, No. 3. The exports by sea from the district for a series of years.

No. 1.

STATEMENT showing the Collections, the Expenditure on Irrigation Works, and the Clear Revenue, in the District of *Rajahmundry*, for a Series of Years.

YEARS.	Total Collections.	Increase above the Average of the 11 Years before the Annicut Works were begun.	Outlay on Irrigation Works.	Net Revenue, after deducting the Outlay on Irrigation Works.	Increase of Net Revenue above the Average, prior to the Annicut Works, after deducting the Outlay on them.	REMARKS.
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	
1835-36 - -	19,83,888	- - -	5,654	19,78,234		
1836-37 - -	21,43,769	- - -	9,017	21,34,752		
1837-38 - -	19,94,614	- - -	5,948	19,88,666		
1838-39 - -	15,54,148	- - -	16,917	15,37,231		
1839-40 - -	17,13,201	- - -	19,772	16,93,429		
1840-41 - -	16,83,767	- - -	40,833	16,42,934		
1841-42 - -	19,23,702	- - -	17,166	19,06,536		
1842-43 - -	18,77,745	- - -	12,258	18,65,487		
1843-44 - -	19,86,148	- - -	37,858	19,48,290		
1844-45 - -	20,37,358	- - -	34,187	20,03,171		
1845-46 - -	20,91,085	- - -	44,734	20,46,351		
Average of 11 Years	19,08,129	- - -	22,213	18,85,916		
1846-47 - -	22,10,008	3,10,960	2,44,182	19,74,916	66,787	* A year of unprecedented flood in the Godavery, by which fully a lac of rupees of revenue was lost. † Estimated.
1847-48 - -	22,73,485	3,65,356	3,45,561	19,27,924	19,795	
1848-49 - -	23,18,180	4,10,051	2,20,611	20,97,569	1,89,440	
1849-50 - -	*23,02,984	2,94,855	2,55,067	19,47,917	39,788	
1850-51 - -	24,81,709	5,73,571	†2,00,000	22,81,709	3,73,571	
Total Increase - -	- - -	19,54,802	- - -	- - -	6,89,381	
Estimate for } 1851-52 } <i>Rs.</i>	25,50,000					

No. 2.

STATEMENT of the Cost of Improving the *Samulcotta* Channel, in the *Rajahmundry* District, and of the Increase of Revenue so obtained.

YEARS.	Collections in the 10 Villages watered by the Channel.	Increase of Revenue in each Year above the Average before the Channel was dug.	Total Increase up to the End of each Year.	Outlay on the Work in each Year.	Total Cost up to the End of each Year.	Balance against Government up to the End of each Year.	Net Profit to Government at the end of each Year, after deducting the Cost of the Work.
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>
1840 - -	20,846						
1841 - -	31,138						
Before cutting the channel	1842 - -	22,580					
1843 - -	26,930						
1844 - -	28,385						
1845 - -	21,775						
Average of the 6 years - -	25,280						
After cutting the channel	1846 - -	39,486	5,206	5,206	13,472	8,266	-
1847 - -	36,093	10,813	16,019	8,465	21,937	5,918	-
1848 - -	42,940	17,660	33,679	3,680	25,623	-	8,056
1849 - -	47,910	22,630	56,309	1,580	27,203	-	29,106
1850 - -	51,245	25,965	82,274	2,023	29,226	-	53,048

Note.—The average annual profit, from the very first year that the improvement was commenced, has been 60 per cent. on the whole outlay, and the revenue is still increasing.

No. 3.

STATEMENT showing the Value of Goods Exported by Sea from the District of *Rajahmundry*, from the Year 1843-44 to 1850-51.

YEAR.	1843-44.	1844-45.	1845-46.	1846-47.	1847-48.	1848-49.	1849-50.	1850-51.
Value of Produce Exported -	Rs. 6,33,991	Rs. 7,29,287	Rs. 9,06,554	Rs. 13,53,503	Rs. 10,95,397	Rs. 10,56,727	Rs. 9,76,719	Rs. 13,96,228

(signed) *A. Cotton*, Lieut.-Colonel,
Civil Engineer, First Division.

Appendix (E.)

REPLY of Lieut.-Colonel *A. Cotton* to a Query circulated to the Civil Engineers by the Public Works Commissioners, respecting the Roads in their Divisions.

Appendix (E.)

THERE is a very small extent of road in this division that is in a practicable state in the monsoon, a very large part of the Great Northern Road is quite impassable in wet weather. Most of it neither metalled, nor bridged, nor drained; and in the deltas the roads are in the same state; indeed they are not in general even marked out for bandies; so that there is scarcely any bandy traffic even in the dry season. Twice I have been able to average only a mile an hour in a palanquin; on the Great Northern Road I have known a gentleman take four hours to travel seven miles on horseback. The Superintendent of roads has applied to me several times about the roads, but I have not been able to do anything that he required. Nothing to signify has been done of late, except the building of some small bridges.

But, perhaps, I may here properly enter upon this subject of the roads, in connexion with our present works more particularly. The Great Northern Road lies directly on the line of the high level channels from the two annicuts for more than 200 miles; and as these works must be executed for irrigation purposes, and when executed they must be incomparably superior lines of communication to the best common roads, it seems quite out of the question at this moment to waste money on the latter. To make these channels thoroughly complete for navigation, they will certainly require more money to be expended on them than would be necessary for the irrigation alone, but half or a quarter of what would be required to make the Northern Road practicable, all the year, if added to the sum necessary for irrigation, would make such canals as would undoubtedly be the most suitable communications for this country; far superior to railroads, which would entail a permanent high rate of transit that could never be got rid of; for the mere interest of the money would cause a much higher tax on transit than the working expense and interest together on the canals. I was in hopes we should this year have had some good data for the cost of canal transit from one of our delta channels, but we have not been able, while the work was going on at the annicut, to keep a sufficient depth of water in it, to make it fully available for the common boats. At present it is worked by boats against the stream, at seven pice per ton per mile, but they are not more than one-third loaded, and greatly retarded by grounding; I should think they will certainly be worked at three pice per ton per mile, and at two pice when suitable boats are built, and the canals are complete with towing-paths, &c. Our 20-horse steamer is worked at about 1½ anna per mile, the cost of less than one ton of goods on the common roads and a little private steamer capable of carrying 20 or 25 passengers at four miles an hour, costs less than one anna a mile; showing sufficiently at what exceedingly low rates all the ordinary heavy goods and slow passenger-traffic could be carried on such canals; and for the few quick travellers a very good speed might be used, still at a very low rate.

This material advantage also would be gained, that, whatever the amount of traffic, very little increase of wear and tear would be occasioned. The channel already cut from the Toolial Bagah, one of the annicut channels, to Samulcottah, 27 miles, has cost about Rs. 1,000 a mile; 1,000 more would make it a navigable channel of 15 yards broad. Its breadth is now eight at its head, and five at its end, with a fall of half an inch per mile, so that it might at any time be rendered a simple still-water canal, by closing the calingulahs, thus providing against a scanty supply of water. The rest of this line of canal would cost on an average rather more; but if the whole cost Rs. 3,000 a mile, it would be a mere trifle for such a line of communication, combining irrigation also. Ordinary travellers could be conveyed at one pice a mile, and one anna per mile would provide for a very good speed; such navigation would of course be incomparably superior to any canal navigation in England, nor could any river navigation compare with it. I would give them a fall of half an inch per mile, and have a depth of six feet at the upper end, and four at the lower, when the greatest extent of irrigation was going on, so that in a channel of 50 miles there would then be a surface fall of one inch per mile, which would give a current at the head of about

Appendix (E.) 800 yards per hour, and with a section at the head of 40 square yards, it would convey 32,000 cubic yards per hour, or sufficient for 32,000 acres in the monsoon. I am now preparing the estimate for the high level channel, from here to Ellore, 50 miles, and I think it highly desirable to widen the Samulcottah channel, and extend it 30 miles. It is evident that with such a communication running parallel to it, there could be no traffic on the common road worth making it practicable for.

I consider this question of the construction of canals for navigation one of the most important on the subject of public works in India at this time. For the last few years there has been such a general frenzy on the subject of railroads, that people in general have been quite incapable of patiently investigating the comparative results of railroads, canals and common roads; the first moment of the subsiding of this ferment should be seized to examine this matter thoroughly. This project forces upon us an inquiry into it; we must now decide whether while we are constructing a canal for 240 miles parallel to the Great Northern Road, it is advisable to lay out money in forming an effective road. I may here state my own conclusions on this point; they are, 1st, that in India, under the actually existing circumstances (and looking forward for a long time), wherever the surface of the country is such as to admit of an effective steamboat canal being cut within certain limits of cost, there can be no question whatever between a canal and railroad; and, 2d, that where, as is generally the case, irrigation can be combined with navigation, the advantage is much more in favour of the canal. As to constructing a railroad at Rs. 70,000 a mile, while the great Ganges Canal can be executed for Rs. 20,000, no greater mistake can possibly be made. If that work is opened in 1852, as expected, it will soon be seen that for Indian communication there can be no doubt about its superiority to a railroad; at all events, nothing in the way of railroads, and comparatively little in the way of common roads, should be expended till the grand experiment is tried. The question will not here be in general between canals on the English plan, unfit for steam-draught, and double railroads of the most perfect kind, but between steamboat canals and comparatively imperfect railways, and that in a country where every drop of water stored and distributed, is of importance.

Of the 480 miles from Madras to near Vizagapatam, 240 miles of canal must be constructed in connexion with the Kistnah and Godavery project; and if Rs. 1,500 per mile are expended on this beyond what the irrigation would require, and the same sum per mile for the remaining distance to Madras, in all seven laes (not near so much as a good common road would cost), there would be a water communication connecting the whole basins of the Kistnah and Godavery with Madras, capable of being worked at 15 or 20 miles an hour by fast steamers, and at about two pice, or one farthing, per ton per mile for goods; no railroad, whatever the traffic or whatever the construction, could effect the latter. The mere draught on an imperfect railway, and the mere interest of money on a good one, would far exceed the whole cost of transit on a canal, including both draught and interest. Wherever a railway is constructed on a line suited for a canal, that part of the country will be closed perhaps for ever against cheap transit, and an irreparable mischief will have been done; and wherever a good common road is constructed in such a situation, there will have been just so much waste of money as it cost. There are already evident symptoms of men, who are not actually committed on this subject, again becoming capable of exercising their judgment upon it; and I have not the least doubt that shortly it will be discussed with some degree of impartiality.

Appendix (F.)

Appendix (F.) REPLY of Lieut.-Colonel A. Cotton, Civil Engineer, in the First or Northern Division, to the following Circular Query from the Public Works Commissioners.

"HAVE you sufficient assistance, whether 'Officers,' 'Surveyors' or 'Overseers,' to enable you to do your work in all its parts, thoroughly; and if not, what addition of strength in each grade do you wish for?"

REPLY.—Next to the utter inadequacy of the department to the duties belonging to it, I consider the grand mistake is, the want of a due proportion of the subordinate grades. The old idea was, that if you could make an officer copy his own plans and diaries, you gained the Rs. 30 a month that a Writer or Draughtsman must be paid; but the palpable absurdity and waste of having the work of a man on Rs. 30 a month, done by one on Rs. 300, is now pretty well acknowledged in words, though by no means so in practice. So much is this the case in the Tank Department, as to offer a most encouraging view of a great improvement at a comparatively small expense: probably, the work performed by the department may be at least doubled, without any addition to the costly appointments.

Para. 2. The officers have nothing like the number of subordinates that they could direct; every officer ought to have at least one Surveyor, two Overseers, a Maistry, a Writer and a Draughtsman. The latter class is entirely wanting; so that a Surveyor, and very often an officer, is wasting his time in copying plans of sluices or canals, which could be done by a native on Rs. 20 or Rs. 30. If a division consisted of three districts, there might be one Civil Engineer, three Assistants of experience, and three younger ones; there would then be at least two Surveyors and four Overseers in each district. It should, however, be observed, that

that the number of Surveyors and Overseers would necessarily be very different in different districts, even if the same extent of work were going on, because native agency might be obtained to so much greater extent in some than in others. In this district, I have been entirely disappointed in my expectations of the effect of the annicut works in raising up native Maistries and Superintendents. We have now only three superior natives, and they have all come from other districts; excepting them, we have scarcely a native whom we could trust with the most insignificant work. In this respect, these districts are far behind the southern ones, no doubt in a great measure owing to the want of public works; but is not this want also an indication of the want of engineering qualifications in the Telooogo people?

3. Upon the whole, I have nothing like sufficient assistants of any kind; I have not even near enough to carry out the Godavery project with energy; not half the work has been done this year that ought to have been done. For want of subordinates of all grades, but especially Overseers and Surveyors, a vast deal of work that should have been done by them, has been done by officers; and besides this work, I have had most urgent requisitions for officers from everybody who could officially call upon me for them. The three Collectors, the Sub-collector, the Superintendent of Roads, the Commander-in-Chief, through the Government, and the Commissioner, have all pointed out work most necessary to be done; and now also the Kistnah annicut, though ordered to be executed, is not undertaken, I suppose because it is considered that there are no officers to build it. Every one of these requisitions were reasonable ones: many of them showed how thousands of rupees were lost annually from want of some comparatively trifling works or repairs; but the treasury cannot bear such an expenditure on the public works, yet it can bear the loss of ten times the amount in deficiency of revenue.

4. The strength of the department that I should recommend in this division, if the whole three districts are continued under one charge, for the next six years, is as follows:—

- 1 Civil Engineer.
- 1 Experienced Assistant in Rajahmundry.
- 1 - - Ditto - - in Masulipatam.
- 1 - - Ditto - - in Guntour.
- 1 - - Ditto - - in charge of the Kistnah Annicut.
- 3 Assistants in the three Districts, for the Ordinary Works.
- 9 - - Ditto - ditto - - for the New Works.
- 2 Non-commissioned Officers or Surveyors to every officer.

Also the usual establishment, with the addition of a Draughtsman to each officer.

The expenditure remaining for the works in this district is probably about six lacs, and the Kistnah works are estimated at 15 lacs, which would give three-and-a-half lacs a year for six years, besides the current expenditure, which ought to be two lacs more per annum. There would then be 51 Europeans to an expenditure of five-and-a-half lacs per annum, or one to every Rs. 11,000; including those employed in surveying and levelling, and those who would be absent on various causes.

5. This would cost about Rs. 1,20,000 a year, or an addition of 20 per cent. upon the outlay; and I feel confident that this amount of superintendence is necessary for the careful planning and executing of these works. We have had nine officers, four Surveyors, and about seven non-commissioned officers, since the annicut works have been going on; but then the whole of the ordinary works have been neglected, excepting that one officer and one Surveyor have been stationed in Guntour. But this is not economy, but waste. When the Kistnah works are taken in hand, we ought to have about six officers and 12 non-commissioned officers or Surveyors employed upon them, about the same number upon the Godavery new works, and at least three or four officers for the other works of the division.

6. I should, however, particularly mention that, in my opinion, the non-commissioned officers, if properly managed, will be so useful as to allow of the number of officers being diminished. From what I have seen of this class, I have no doubt that there will be real economy in employing them, as they will do much of the work that is now performed by officers; and I look forward to the time when a proportion of one officer to four or five non-commissioned officers, will be sufficient, if a regularly-graduated service is formed from that class, from Conductors downwards, and something like fairness is shown in promoting them. I would also most strongly recommend that no appointment should be withheld from any man who shows himself fit for it; there is no reason in the world why men of first-rate engineering talents and qualifications may not come out of that class as well as out of a higher.

7. I cannot conclude the answer to this question without urging a full consideration of this most important point. When an increase of the department is mentioned, the question is usually settled by a reference to what has been customary hitherto; that is, if three officers have been employed before, it may be thought that an addition of one or two more must be ample, without the slightest reference to anything which can by possibility help us to judge rightly in the matter. When I first entered the department, there were three officers in the divisions and one at Madras, to perform all the duties of the Tank and Road Departments, about five or six Surveyors, and no subordinate Europeans; when more help was called for, one was appointed in some particular case, and so on; it was an increase, but whether it was what the duties really required or not was never investigated upon any real grounds. Had any one then proposed that 30 officers should be employed, besides many non-commissioned

Appendix (F.) officers, which I believe is about the present strength of the two departments, it would have been considered absurd, simply because it was so much more than there were before. With this number, it is now evident that we are almost as far from such a number as could properly perform the duties, that is, as could with strict economy be employed, as we were 30 years ago, for the increase is only a small part of what the irrigation works and roads require.

8. The question is not at all how many have been employed hitherto, but how many do the works require: so far from the paucity of officers and smallness of expenditure being an argument for a small increase, it is in fact usually just the contrary. The superintendence and expenditure having been so utterly inadequate for so many years, has thrown everything into arrears, and much more is in consequence required. When the question of the establishment for these districts was discussed some years ago, it was settled upon the ground that Rs. 6,000 or Rs. 8,000 had been usually expended in each district; that is, that all the works had been left to go to ruin ever since they had been under our Government. In my report to the Board, dated 13th December 1837, published in the Engineer Transactions,* I endeavoured to establish some real grounds for ascertaining what establishment and expenditure were necessary, by showing the amount of revenue at that time received from irrigation works, the probable cost of existing works, the revenue that they would yield if kept in order, &c. Till some tolerably correct statements are prepared on these points, and a judgment based upon them as to the proper strength of the department in general, or in any particular district is formed, it is all mere guess work.

9. In this division there is scarcely a single work that is in a respectable state, and almost the whole of them are without proper sluices, calingulas, &c. &c., so as to ensure their safety or efficiency. There are numbers of individual villages that would much more than pay for an officer to be permanently appointed to their sole charge. One of the villages under the Samulcotta Channel, Biccavole, is now yielding Rs. 6,200 a year more than before the water was led to it, and it is not yet by any means properly watered or drained, for want of some small works. Were it necessary therefore to appoint an officer on Rs. 240 a month (salary and establishment) to this one village permanently, it would have been better economy than to have left it in its former state, as there would still have been a gain of Rs. 3,000 a year, which would have covered a very large outlay on the works required. The grand question is, what is lost, wantonly wasted, squandered in revenue, much more than in expenditure? The whole cost of the Tank Department is a trifle compared to the waste of revenue, even leaving out of consideration altogether the wealth and safety of the people.

10. The present works in this district have been now on hand four years, and yet very little has been done for the distribution of the water. I cannot see what has been gained by this loss of time; the channels, &c. might just as well have been going on while the ancient was building; as soon as it was across the river the water ought to have been turned into all the main channels. The delay of these works is only the delay of receipts; several lacs more might already have been received into the treasury, had officers been allowed sufficient to have planned and superintended the minor works during the last three years. It cannot be said, as it is continually said or implied, that the treasury could not supply the money so rapidly, for the actual increase of receipts of the districts has far exceeded the expenditure from the first; instead of the works having drawn out Government money, there has all the time been a larger surplus revenue than there was before.

11. There can therefore be no reason whatever for not increasing the strength of the department so as to allow of the main and minor works all going on together, as well as the repair, or rather the restoration or completion of the old works above the Deltas. The great difficulty is to get persons to look at things as they really are here; irrigation works are considered as things for which the Government must be content to lay down a large sum at first, with the hopes of receiving, after a few years, 10 per cent. if they are very successful; whereas the results in this division show, that such is the state of things, viz., the value of water, and the want of capital among the people, that much more than the sum expended returns directly and indirectly into the treasury immediately.

12. With respect to the question, supposing such an amount of expenditure is allowed, what proportion of superintendence may be required for it,—20, 40 or 60 per cent. upon the outlay; I answer that it may be anything; it entirely depends upon the peculiar circumstances of the district, and the work. The cost of planning works, for instance, is often in inverse proportion to the cost of the works; a young man may take a month to plan a work to cost Rs. 5,000, and his salary during that time may be Rs. 300, or six per cent.; a man of more experience may see that the same end can be more effectually obtained by a different kind of work, which will cost Rs. 1,000, and the planning may then cost Rs. 500, or 50 per cent.; but there will still have been a saving of Rs. 3,500. The waste of money from what is called economical superintendence in this country is incalculable; the loss to the Government from ignorant planning, and slovenly, indifferent and fraudulent execution, is ten times what the cost of good superintendence would be.

13. In this division I am really in despair about native superintendence. Such has been the corrupt state of things here in the whole Revenue Department, and such is the apparent

unfitness

* See Appendix (H.)

unfitness of the natives generally for the conduct of engineering works, that for the present I can see no alternative but to use almost exclusively Europeans, with natives only in very subordinate capacities, and under incessant watching. We have indeed a most valuable native Superintendent, but he has come from the southward; no doubt by degrees a native agency may be raised up, but it can only be by means of European instructors.

Appendix (F.)

Appendix (G.)

EXTRACT from a Letter from the Board of Revenue in the Public Works Department to the Chief Secretary to Government, on the subject of Improvements required in the Department, dated 15 February 1847.

Appendix (G.)

20. THE Honourable Court proceed to observe, that "measures are being taken for supplying an additional number of Engineer Officers, so that the Government may be enabled at all times to have at least two Engineer Officers in each of the eight divisions."

21. The Board have frequently expressed to Government their opinion of the great necessity of keeping a sufficient number of Engineer Officers in employment in this department, and they now observe that it is still short of the minimum stated by the Honourable Court, and more so of what is really required.

22. The First Division has two Engineer Officers, neither of whom, or of the extra Assistants from the Line, recently appointed, can be employed out of Rajahmundry, in consequence of the paramount importance of that district, which will require even more attention should the Godavery anicut be sanctioned; it will in that case be indispensably necessary to constitute Vizagapatam and Ganjam a separate charge, and two Engineers there, with three in Rajahmundry, are the least number that would be required for the real interests of Government.

23. In the Second Division there is now but one Engineer Officer, and two more are required.

24. The vast extent of the Third Division or Ceded Districts (containing more ground than Scotland), and the difficulties of the communications, make it a most onerous charge for one officer, who can never attend to it properly, so as to propose the extensive measures of improvement which the irrigation requires. In Bellary, indeed, the works have been kept in excellent order, chiefly by means of the exertions of the late Mr. Robertson, but beyond that nothing has ever been attempted; and yet there is no district where the uncertainty of the rains requires such careful attention to make the most of the great sources of supply. In Cuddapah, the maintenance of the existing works even has not been effected, and the mischievous results of inadequate expenditure are everywhere seen.

25. Since 1838, when the present divisions were formed, there has never been more than one Engineer in this division, and Kurnool is since added to the Company's territory, having such a geographical position that it must either be attached to the Third Division, or made a separate charge; it is at present under the officer employed in constructing the Bellary barracks, but when these buildings are finished, it will be highly desirable to constitute Bellary and Kurnool one charge, and Cuddapah another; for this arrangement five officers would be required, or three in excess of the present number.

In the Fourth Division a first Assistant is required.

In the Fifth a second Assistant.

In the Sixth a first Assistant.

In the Seventh a first and second Assistant.

The ghauts in this division requiring more constant attention from officers than most other works.

In the Eighth, two Assistants; besides one for the work in Travancore.

26. It thus appears, that in addition to those now employed, there are required—

In No. 1 Division - - - - -	3 officers.
In No. 2 Division - - - - -	2 officers.
In No. 3 Division - - - - -	3 officers.
In No. 4 Division - - - - -	1 officer.
In No. 5 Division - - - - -	1 officer.
In No. 6 Division - - - - -	1 officer.
In No. 7 Division - - - - -	2 officers.
In No. 8 Division - - - - -	3 officers.

Total - - - - - 16 officers.

27. Three have been already nominated to the department from the Sappers and Miners, but are not yet appointed to divisions; 13 are therefore still required. And it should be observed that these are not more than sufficient for the ordinary duties of the department.

Appendix (G.)

For the special superintendence of large works others are required, but if the number above-mentioned were always kept complete, as a matter of course the want of a reserve for special duties would be less felt. Hitherto no sooner has an Assistant been appointed to a division, than he has been called off from ordinary to special duties, and the department has gained no real increase of strength; but were there always two Assistants in a division, one might be spared for extra superintendence without much inconvenience.

28. In addition, however, to the officers required for the present duties of the divisions, it appears to the Board very necessary to represent to Government that some should be specially appointed for a time, to investigate the means of perfecting and extending the irrigation from the great rivers, such as the Poniar, Pennar, and Palar, which now for the most part run to waste.

29. The Board do not doubt that the result of such investigations, ably conducted, would eventually amply repay any expense incurred, whether on their account or in the works based thereupon.

30. For it certainly is not sufficient that the present works of irrigation should alone be maintained. The greatest part of them are precariously situated for supply, and being consequently dependent for their efficiency upon favourable seasons, are of little avail in averting periodical famines. By supplying such works from the great rivers to such extent as may be practicable, there can be no doubt that great advantages would be gained; but the difficulties of diverting the waters of the rivers for the purpose, are such as can be overcome only by the patient investigation of qualified officers, withdrawn from all other duty.

31. The Board, therefore, trust, that a sufficient provision of officers may be made both for the permanent duties of the divisions, and for those which have been above briefly indicated, and which, though described as temporary, would occupy many years to bring to a satisfactory conclusion. Four officers would probably be sufficient for the purpose in view, and the additional number therefore required would, including those four, be 20.

32. While upon the subject of the officers attached to the department, the Board would observe, that it appears to them very desirable that an increase of pay should be allowed to the First Assistants, after a certain length of service.

33. Captains Shaw and Smythe, the senior two First Assistants, have been each 19 years in the service; and yet their salaries, had they not temporary employment of a superior kind, would be no more respectively than that of the youngest of the same class, whose service extends to four years only.

34. In proposing an alteration of the existing system, the Board considering that the Engineer Officers are available for all kinds of professional duty, civil and military, would annex the privilege of increased salary to simple length of service, without reference to any period of employment in the department; they are persuaded that it would be impracticable to introduce any limit that would prove either fair or useful.

35. The increase which the Board consider to be necessary is *Rs.* 100 to officers of 10 years' actual service, to make their salaries *Rs.* 500, and *Rs.* 50 additional to those of 15 years' service and upwards, with one rupee per diem additional tent allowance.

* * * * *

63. The Board proceed to report upon one of the most important branches of the department, namely, that of native superintendence, which it must be allowed is at present in a most inefficient and unsatisfactory state, with no hope of amendment unless the system be changed.

64. The principal faults of the system are the want of any preparatory education, and the want of sufficient inducement in the form of emolument. These points, with others, are forcibly urged in a letter from Major H. C. Cotton (since retired), which the Board now submit for the consideration of Government.* Five years have passed since that officer wrote, and the lamentable want at this moment of good Maistries, notwithstanding the experience acquired in many important works, clearly proves that they cannot be produced (except in a few rare cases of superior intelligence) by the existing system. The mass can never overcome their original ignorance. Experience may be said to be thrown away upon them, because they have no comprehension of the processes which they witness, and in which they take a part.

65. It should be here observed that the want of good superintendence for the more important works, under the immediate direction of the Civil Engineers, will be met by the appointment of European Overseers in sufficient numbers. But the great mass of works must always be left to the native Maistries, and consequently even more require that they should be skilful persons, since they are comparatively without control. And were there no such pressing reasons for improving their efficiency, it would be anything but politic or just to continue for ever dependent upon European agency in this department, when, in every other, better prospects are opening to the natives of the country.

66. The

* See Appendix (I.)

66. The Board, however, are not prepared to recommend the full extent of Major H. C. Cotton's propositions. They do think it necessary to fix (for the present at least) the salaries of particular offices (as those of the Maraumat Superintendents of different districts) all at the same amount. It will be sufficient at first to establish a maximum salary for Maistries in the same manner as for Surveyors, and to hold out to every Maistry the prospect of attaining to that degree of emolument by different stages, after a certain length of service, and with a certain amount of qualification. No one should be promoted merely to fill a vacancy; but on the other hand there must be a limited number of salaries of each class, and when all are occupied no promotion should take place without a vacancy.

Appendix (G.)

67. In the second place, since very few of the present Maistries are fit, or ever will be fit for promotion, it is of great importance that provision should be made for the education of future functionaries of this description by the enlistment of boys, of whom 20 should be entertained at Rs. 5 a month, and instructed at the Presidency in the first instance, according to a certain course to be hereafter determined.

68. The accompanying memorandum will explain in detail the arrangements which the Board would recommend with regard to the Maistry Department.

Note by the Public Works Commissioners.—The following is the scale of the Maistry Establishment proposed by the Board of Revenue, in the memorandum referred to in the 68th para. of the foregoing letter :—

CLASSES.	Monthly Salary.	Number of Maistries in each Class.	Total Monthly Salary.	Total Yearly Salary.
	Rs.	Rs.	Rs.	Rs.
1st Class, after twenty years' service - -	100	10	1,000	12,000
2d " sixteen " - - - -	70	15	1,050	12,600
3d " twelve " - - - -	60	20	1,000	12,000
4th " eight " - - - -	35	25	875	10,500
5th " four " - - - -	25	30	750	9,000
6th " under four " - - - -	15	50	750	9,000
TOTAL - - - -	295	150	5,425	65,100

A standard of qualifications to be fixed for each class, without which no man was to be promoted to it.

There was also to be an establishment at the Presidency, under the management of a practical teacher, on Rs. 50 a month, for training up boys as Maistries: 20 boys to be under instruction, receiving each Rs. 5 a month for the first two years, and Rs. 7 a month for the third year. Probably, therefore, a three years' course was intended; but this establishment was not to be considered permanent. The Maistries were to be removable from district to district, at the discretion of the Board.

Appendix (H.)

LETTER from the Board of Revenue in the Public Works Department to the Secretary to Government, Fort St. George, respecting the Defects of the Department, and the best Means of removing them, dated 30 July 1849.

Appendix (H.)

1. I AM directed by the Board of Revenue, with reference to the Government orders as per margin, to submit the returns called for by the Government of India, of the Engineer establishments and operations for the period of five years, from 1842 to 1846, with observations on the means of promoting greater efficiency in the Department of Public Works, both in its superior and subordinate branches.

11 May 1847,
23 November 1848,
2 January 1849.

2. Besides the returns for five years, the Board have prepared one of the establishment as it now stands, there having been a considerable increase in the number of officers and subordinates since 1846.

	Engineer Officers.	Other Officers.	Unconvenanted.	Non-commissioned.	TOTAL.
3. The average of the five years period gives - - - -	16½	6	22½	-	44½
And those now on the establishment, including absentees, are - - - -	25	8	24	29	86
Increase - - - -	8½	2	1½	29	41½

Appendix (H.)

4. In the order dated 23 November 1848, the Government direct the Board to "again consider the arrangements proposed by them for improving the efficiency of the Department of Public Works, and to prepare and submit, in a concise and connected form, a report of the measures admitting of immediate adoption for the object in view, which they would now recommend, &c."

5. The letter of the Government of India, however, calls for a statement of the "improvements or alterations of which the present distribution [of Engineers] is susceptible, with a view to show how far the complement of Engineers is sufficient or insufficient for the departmental duties now required to be performed."

6. It will therefore be the duty of the Board to report the arrangements that seem to them expedient, either with or without the condition of an increase of Engineer officers.

7. At the date of the Board's Report of the 15th February 1847, which was submitted to the Honourable Court of Directors, and is referred to in their general letter, dated 31 May 1848, No. 12, the number of Engineer officers in this department was,—

1 Secretary to the Board of Revenue.
8 Civil Engineers.
6 First Assistant ditto.
3 Second Assistant ditto.

Total - - - 18

Para. 20 and 31.

And the Board were then of opinion that 16 more were required for general and four for special duties.

8. The actual increase up to this time has been seven, and this has been obtained only through the addition of four supernumerary Second Lieutenants to the corps of Engineers, and to the presence of an unusual number of officers in India. The only two absentees above the rank of regimental Lieutenant, being within the limits of the Charter, are holders of appointments in the department, and are included in the return; while there are but five subalterns absent in Europe out of 34.

9. If all the officers were present, only five more, instead of 13, the number remaining of these applied for in 1847, could be added to the department; and only one, were there no supernumerary Second Lieutenants.

10. The Board are consequently unable to recommend any arrangements for "immediate adoption," with regard to the distribution of the officers of the department; the want of officers absolutely precluding any new arrangements such as they would consider expedient. But their opinion is unchanged that an increase of officers is urgently necessary; and, in the hope that it will be granted by the Court of Directors, they proceed to discuss the requisite arrangements for the disposition of the number which they would deem adequate.

11. The disposition existing in February 1847 was altered in October of the same year by a different arrangement of the divisions, and by the constitution of Vizagapatam and Ganjam, a separate charge under a First Assistant Civil Engineer.

12. At the present moment there are,—

In the Sub-division	-	-	-	-	1 officer.
In the First Division	-	-	-	-	5 officers.
In the Second Division	-	-	-	-	1 officer.
In the Third Division	-	-	-	-	2 officers.
In the Fourth Division	-	-	-	-	1 officer.
In the Fifth Division	-	-	-	-	2 officers.
In the Sixth Division	-	-	-	-	3 officers.
In the Seventh Division	-	-	-	-	2 officers.
In the Eighth Division	-	-	-	-	2 officers.

Total - - - 19 doing duty.

13. Of the remaining six included in the return, one is the Secretary of this department, two are sick absent beyond the Presidency, one sick absent within its limits, one is employed under the Superintendent of Maraimut in Mysore, and one under the Military Board, giving also a partial attention to the Kurnool District.

14. If all the provincial officers on the roll were distributed equally among the divisions, exclusive of Vizagapatam, Ganjam and Kurnool, there would be just three for each, the least number that the Board would consider sufficient as a permanent establishment; and it is abundantly evident that such a number can never be permanently reckoned upon in the present state of the Engineer corps. It may safely be averred that, with allowance for extra duties and for furloughs, the number will be usually below rather than above that which is now in actual employment, namely 19, which would give two for each division, with a remainder for Vizagapatam, Ganjam and Kurnool.

15. It appears to the Board necessary, that whatever general appointments there are in the department should be always filled, according to the practice which prevails in every other

other department of the public service, but which has never prevailed in this, because the qualified officers are too few. Appendix (H.)

16. During the China and Sindh wars, there was not a single Assistant Civil Engineer doing duty in the department for months together, and an officer of the Line, possessing no professional qualifications, was even in charge of one of the divisions. There is no certainty that the same state of things will not occur again; but leaving out of consideration foreign expeditions, the demands for special service at home are quite sufficient, if supplied by professional officers, to disarrange the general duties of the department to an equal extent.

17. Yet the general duties in this Presidency are far more important than is commonly supposed, or can be well understood by those who are not familiar with a country thickly studded with tanks or interlaced with channels, all requiring to be kept in efficient repair, and all sure to be neglected by the natives or to become objects for practising the grossest frauds upon the Government, without the vigilant care and attention of European officers. A revenue of no less than 132 lacs of rupees (exclusive of that of the Northern Circars, which cannot be distinctly shown, and of village settlements), is directly dependent upon these works, besides which the numerous roads should be taken into consideration.

18. That very great effect may be produced by such care and attention the Board have not the least doubt; that it has already been produced in some instances there are proofs, which they will briefly notice.

19. In the Bellary district, it is well known that the late Mr. Robertson occupied himself to an extraordinary degree in personal visitation of the tanks and superintendence of the repairs; and it is certain, from the testimony of Engineers acquainted with that and other districts, that the superior condition of the Bellary Tanks is most marked and decided.* What it was at an earlier period may be learned from Sir Thomas Monro's report of the enormous losses caused by 48 hours rain in 1804.

20. Since that period, doubtless much has been done in other districts also, but there are none in which the results are to be compared with those of Mr. Robertson's labours; and in Chingleput alone 600 tanks were breached or greatly damaged in the monsoon of 1846.

21. In the Eighth Division the Civil Engineer, Captain Horsley, having seldom had large works requiring his attention, has been able to devote more than most other officers to the visitation and superintendence of the tanks, and the results of his labours are stated in the last two paras. of the accompanying letter. He attributes his success principally to the system of estimating and measuring introduced by him; but the Board believe that the system, however good in itself, has derived its chief virtue from being worked to a considerable extent by the Civil Engineer in person. 20 December 1848.

22. It being granted, therefore, that the appointments to the general duties of the department ought to be all permanent, the Board are further of opinion that such permanent situations should include, besides the Civil Engineers, an officer for every collectorate, whose duty it should be to superintend the entire Marumut of the district, under the general control of the Civil Engineer; and in offering this opinion, they would observe that they are following out those of the Honourable Court of Directors, expressed in despatches dated 28 October 1835 and 17 December 1833, in which it is stated that "they attach great importance to all works in the department being placed under the constant personal control of European officers, and that they hold it to be an unwise economy to commit the management of extensive and important works to native agents," and "that all operations of the Tank Department should be under the superintendence of officers perfectly qualified to conduct them, and to keep an effectual check on the disbursement of the large sums expended on this branch of the public service."

23. For this arrangement there would be required (inclusive of the present Civil Engineers) 28 or 29 officers, whose situations should be considered as permanent as those of Collectors and Sub-collectors, and to supply whose vacancies there should be always a sufficient reserve of Engineers. The special duties of the corps would furnish ample demand for the full amount of such a reserve, and every officer in the corps present for duty would be usefully and profitably employed.

24. Substituting for the eight infantry officers of the line, &c., now employed, an equal number of Engineers, the excess above the present supply required to give effect to the arrangement proposed by the Board would be, at the lowest, 17; but if a greater number of absentees be supposed (there being very few at present), and if allowance be made for other special services now not attended to, and those to which allusion is made in the last para. of the letter from the Government of India, an increase of 25 officers to the corps of Engineers would be no more than adequate to supply means for the efficient working of the department.

25. It is here necessary to explain, with reference to the former report, that the additional

* Note by the Public Works Commissioners.—There is no doubt that the irrigation works in Bellary District were much improved by the constant efforts of Mr. Robertson; but we believe it is admitted by all officers capable of judging, that the amount expended in effecting that improvement was very much larger than would have been found necessary under the direction of professionally skilled European officers.

Appendix (H.)

tional officers therein applied for were simply mentioned as Assistants to the Civil Engineers, and that the difference in the present proposition is, that such officers should be located in districts instead of divisions, being subject to the orders of the Civil Engineer, but permanently attached, with more responsible duties than they have at present, to their proper districts.

26. The difference in the numbers proposed arises from the circumstance that the present arrangement exhibits more distinctly the number which should be permanently employed under all circumstances.

27. Whatever increase the Honourable Court may think it proper to grant, the Board desire to repeat their opinion that no change in the present arrangements of the department can be beneficially introduced without a sufficient number of officers, including a proper reserve for the supply of the permanent situations which they have described.

28. It will be remembered that the Civil Engineers and their Assistants are required to attend to the works under the control of the Military Board, as well as to those of this department; and the more so that there are no executive officers under the immediate orders of that Board, who have lately brought strongly to notice the inconvenience of the system of entrusting the works to the Station Staff Officers.

29. There is no certain remedy for this state of things while the Civil Engineer's Department remains upon its actual footing; but the proposed District Engineers would be able to take direct charge of the military as well as civil works, with a prospect of great improvements in the execution of both. But to this the Board feel it right to add, that besides the eight officers of other branches of the service under the immediate orders, there are four under the Superintendent of Roads, one under the Chief Engineer at Paumbum, one under the Superintending Engineer at the Presidency, and one attached to the Sappers and Miners, but doing duty in this department at the Godavery amicut; total 15, not one of whom could be dispensed with.

30. There are also six other officers doing duty with the Sappers and Miners, the services of most of whom may be said to be equally indispensable; since there are never more than two or three of the youngest Engineer Officers, besides the Commandant and Adjutant, with that corps.

31. The Board are constrained to notice these circumstances, extraneous as they appear to be to this department, because, if, as they have shown, there are fully 11 or 12 officers, not of Engineers, whose services are absolutely required in other branches of the public works at present, and if, as will be admitted, it is highly important to provide regularly educated officers for those branches, it will follow that about 37 additional officers should be added to the Engineer Corps, to ensure the constant supply of the permanent and extra situations.

32. It thus appears that the present strength of the Engineer Corps is far below the real wants of the country, and that the execution of the public works which are everywhere so urgently demanded cannot be provided for efficiently, if at all, without a large increase.

33. It is true that efficient assistance has been rendered in the Department of Public Works by non-professional officers; but it cannot be said that their employment as a system works well, having this serious disadvantage among others, which will be obvious, that the promotion of such officers to higher situations can only take place at the expense of the Engineers who have no other means of advancement; so that the former have little inducement to continue in the department if any better prospect is opened to them. With regard to qualification, whatever may have been acquired after a certain amount of service, very few examples of its previous existence in the officers selected to do duty in the department have come to the knowledge of the Board, and it may be fairly presumed that the service would supply but very few more.

34. Should the recommendations of the Board be adopted, they would lead in time to the establishment of a new executive system, in the hands of the District Engineers, with the prospect of most important advantages in the more efficient and economical performance of work, and in many other respects.

35. With regard to the execution of work, the Board have recently placed before Government the report of the Civil Engineer, Fifth Division, upon the Trivady amicut, showing in that work, which was virtually under the executive charge in all respects of his overseers, a saving of no less than Rs. 3,241. 8., upon an estimate of Rs. 16,081. 3. 5., or about 20 per cent.; a result which must not be understood to impeach the correctness of the estimate, the whole of which, in the opinion of the Civil Engineer, would have been expended under the ordinary system.

36. Again, nothing could be more unsatisfactory than the progress of the Trichinopoly bridge in 1847, and the state of the accounts, which subsequently required the investigation of a special officer; and, on the other hand, nothing can be more gratifying than the result of this year's arrangement, both in the rapid and efficient collection of the work, and in the moderate amount of the expenditure as reported by the Civil Engineer.

37. Captain Lawford has since taken charge, by permission of Government, of extensive road

Superintendent
of Roads - 4
Chief Engineer 1
Superintending
Engineer Pre-
sidency - 1
Sappers and
Miners, say- 5 or 6

11 or 12

road works, both in this and the Road Department; and it is believed, on good grounds (no official reports being at present before the Board), is carrying them forward with great expedition and economy.

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38. The last example of this kind, which the Board will produce, is that of the formation of the Sattiamungalum ghaut, under the superintendence of Lieutenant Chauncey, of the 39th Regiment, reported upon by the Civil Engineer, Seventh Division, in his Diary for February 1849, herewith submitted.

39. The work of the ghaut, commenced by Lieutenant, now Captain Collyer, who was removed when small progress had been made, had, after a lamentable loss of life among the native officials of the district, been wholly suspended for two or three years, when Lieutenant Chauncey took charge of it, and by his excellent arrangements effected the results stated by the Civil Engineer.

40. This last example, and that of Mr. Robertson, the Collector of Bellary, are adduced to show the advantage of the constant and vigorous supervision of European officers, but without reference to professional qualification, which the Board consider to be an essentially necessary element of the system which they propose.

41. Such examples as these may be repeated under the present system, but not upon an extended scale, which is attainable only by the appointment of district officers.

42. Another important reason for such appointments is that the proper selection may be made of tanks and other works for repair, and that the estimates may be prepared with an accuracy now very generally made light of.

43. The Tahsildars and other Revenue Officers are too much occupied with their proper duties to attend (with some exceptions) to those of the Maramut, with such regularity as would insure to Government the greatest advantages from the large expenditure which takes place; and hence repairs are neglected in some, and unnecessarily executed in other cases; the estimates are inaccurate, and the works are too long delayed, and, being entrusted to the Ryots themselves, are commenced too late, and inefficiently and fraudulently executed. It is also very difficult for Tahsildars to attend to the details of accounts, and to render them with the requisite punctuality in large and important works, and it is highly desirable that they should be relieved as far as regards these works from such duties as much as possible.

44. The only sufficient remedy appears to be the control of an Engineer Officer over the entire Maramut of the district.

45. Were the district appointments which the Board have recommended, constituted, the pay of the officers holding them should be the same as that of the present First Assistant Civil Engineers, with the increase after 10 and 15 years' service proposed in the former report. And the Board would here again recommend, without reference to any increase of officers, that the said increase of emoluments may receive favourable consideration and sanction.

15 February 1847.
Paras. 33 to 40.

46. The principle of such an increase is already partially recognized in the appointment of Superintending Engineer, which is paid according to the rank of the officer; but in this form it operates less as a reward for length of service and experience, than as a penalty upon slow promotion. There are at present 14 Subalterns of Engineers of 23 down to 15 years' standing, and it appears to the Board contrary to sound principle that all the professional knowledge and experience of such officers, who, according to the custom of the service, can only be employed in professional duties, should be reckoned at no higher value than that of some of the youngest in the corps, merely because they have attained no higher military rank. If the principle of payment according to length of service were objected to, it would probably be allowed that the district appointments should at least be arranged in classes; but the objection to this plan would be, that it would lead to constant changes of situation, and would cancel the advantages of local experience, which can scarcely be too highly estimated.

47. The Board therefore trust, that the scale of payment before recommended by them for the First Assistant Civil Engineers, namely, an increase of Rs. 100 after 10, and of Rs. 50, with one rupee a day additional tentage, after 15 years' service, may be approved for present adoption, with a view to its extension to whatever new system may hereafter be organized; the increase however to be dependent in each case upon the recommendation of the Board.

48. In the latter part of para. 2, of the letter from the Government of India, a request is made for "a conjectural outline of the demand for Engineer Officers during the next five years, whether any of the subordinates in the department are qualified for appointment to the smaller charges now held by officers, so as to render more extensively available the services of the Engineer Officers now at the disposal of Government for duties of greater importance, &c."

49. The answer to this inquiry is in considerable measure supplied by the remarks already offered upon the necessity for District Engineers.

50. The "Engineer operations of the next five years" will probably be much the same as those of any preceding period, and will continue to be the same for any length of time of which a judgment can be formed in advance. That is, the duty of constant attention to the

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exceedingly numerous works of irrigation will always be of the highest importance to the interests of the State, independently of that of the superintendence of individual operations of considerable extent and cost. Regarding the probable frequency of such occasional undertakings, demanding the services of special officers, it is not easy to form conjectures; but should the Court of Directors be pleased to sanction the important project of the Kistnah annicut already submitted to Government, it will, with its dependent works, and those of the Godavery annicut now approaching to completion, demand a larger number of special officers for some years than any that has been employed during an equal period heretofore. Seven or eight officers, besides those properly belonging to the division, are the least number likely to be required, and the average operations of a special description in the other districts would certainly require the number to be increased to about 15.

51. As it has already been shown that there are not nearly enough Engineer Officers for the present duties of the department, it is almost superfluous to add that there are no appointments now held by them which might be more properly entrusted to subordinates. So little is this the case, that it is found in numerous instances expedient to appoint officers wanting both professional education and experience to the charge of works, rather than technically qualified subordinates, because of the superior influence and command obtained through the higher rank of the commissioned officer.

52. It is certain that no Engineer Officer can be withdrawn from his present duties without serious inconvenience, though the measure may be often unavoidable.

53. It is further asked by the Government of India in the same para., "whether any plan can be recommended, by the adoption of which the departmental officers generally would be relieved from the minor and more common details of their officers, which it is apprehended, under the present system, occupy much of the time that might be employed by them with greater advantage to the public service."

54. The Board are not of opinion that any new plan is required in this Presidency to remove the evil adverted to in the foregoing quotation. The Civil Engineers and their assistants are indeed often burdened with details of duty, particularly in their offices, which might be more economically performed by subordinate servants; but all that appears to be required is a moderate increase to the office establishments. A Draughtsman for each Civil Engineer is especially needed, and this addition the Board would recommend for sanction. Other arrangements of the kind must depend upon the view taken by superior authority of the Board's major propositions above detailed.

55. The next subject for consideration is that of the Subordinate Department, brought to notice by the officer commanding the Sappers and Miners, and the Adjutant-general of the army.

56. The military authorities are probably not aware that the present civil salaries, drawn by the non-commissioned officers of Sappers and Miners attached to this department, are only those of the junior rank; and that besides intermediate ranks undetermined, the salary of the highest has been already fixed by Government, in a resolution which was communicated to the Military Department.

57. The arrangement sanctioned in that resolution would give to the highest class of Overseer, called by the Superintendent of Roads "Supervisor," a total salary of Rs. 140, including the pay of a Conductor, to which warrant rank it is supposed that the Overseers of this class would be promoted.

M. C. 4 Aug. 1848,
No. 836.

58. The order of Government for attaching the non-commissioned officers to this department not having appeared till January 1847, and the men not having generally joined their divisions till some time after, the Board, until lately, were of opinion that the longest period served by any of these men, scarcely entitled them to promotion; but they would have ere this submitted some names for the favourable consideration of Government, had they not been informed that a "measure" was "contemplated" by the Government of India, the effect of which would be to place the "Overseers and Assistant Overseers on this establishment, in point of emoluments, on a footing with persons of the same class in Bengal." With the expectation of this arrangement before them, the Board thought it proper to delay recommendations for promotion while the several ranks were indeterminate.

59. It was presumed that the previous approval by Government of Captain Best's minimum and maximum salaries being communicated to the Military Department, would be made known to the non-commissioned officers about to be posted to the department; but this would appear not to have been the case. The Board, however, communicated the order last quoted, to the Civil Engineers, who must have made the Overseers acquainted with its purport, and thereby supplied the motive to good behaviour, the absence of which is complained of by the officer commanding the Sappers and Miners.

60. The Government will be aware, from the foregoing statement, that the subordinate branch of the Department of Public Works is already partially organized, and is only awaiting the final orders of the Government of India for the completion of the arrangements.

61. One of the Surveyors now in the department was formerly a non-commissioned officer of Sappers, and the Board consider that similar situations are open to the present Overseers,

Overseers, (independently of their claim to promotion in their own line) if they are qualified according to the rules, and have acquired a colloquial knowledge of the native tongues. Appendix (H.)

62. The Overseers have certainly, for the most part, behaved extremely well, and their services in the conduct of important works have proved highly valuable; inasmuch that it can scarcely be doubted that the whole amount of their pay has been saved to Government by their efficient superintendence. The instances of misconduct which have occurred, do not, in the opinion of the Board, militate against the general efficiency of the new system, imperfect as it still is. The three men that have been returned from this department were all addicted to intoxication, a vice which is too common among Europeans of that class to be attributed to characteristic circumstances in these instances.

63. The Board proceed to notice the subject of the reform of the Maistry Establishment, upon which they have nothing to add to their former remarks, but that their opinion is still the same as to the necessity of the proposed alterations and additions. 15 February 1847.
Paras. 63 to 68.

64. With regard to the increase to the establishment of this office, the necessity for the measure is considerably greater than it was when the Board last addressed the Government on the subject.

65. The correspondence has necessarily much increased with the increase of officers and Overseers, as the following Table will show :—

	Letters received.	Letters sent.	Number of Sides of Collection.	Number of Sides of Current Business.
In 1846 - - -	3,016	1,672	6,537	10,246
In 1847 - - -	3,554	1,885	6,800	13,225
In 1848 - - -	3,961	1,883	7,850	16,195

66. It is consequently impossible to attend to any branch of the business so fully as is necessary for complete efficiency; and Government have remarked upon delays, which would not occur, were a more reasonable amount of work imposed upon the office servants.

67. The amount sanctioned by Government for copying the arrears of proceedings has been expended; but the work has exceeded the estimate in the sum of Rs. 350, besides Rs. 380 required for indexes to the years 1845-46. These amounts are consequently entered in the estimate for bringing up the arrears of 1847-48, which have accumulated as a matter of necessity, the Office Establishment being totally inadequate to carry on this part of the business.

68. The Board are obliged to solicit sanction for the amount of the said estimate, namely, Rs. 4,350, and at the same time to renew their recommendation that the increase to the Office Establishment and to the salaries of three of the present servants proposed in their last report may be granted.

69. They also consider it necessary again to lay before Government the proposition submitted 18 December 1844, for the appointment of an Assistant to their Secretary.

70. Government were pleased to observe, in negating that proposition, that "it is not asserted that the Secretary's duties are more than he is able to perform;" but since that period the business has so largely increased as to be a serious burden upon the attention and labour of one officer. In 1844 the letters received amounted to 1,992, and those sent, to 1,241; in 1848 the former were 3,961, and the latter, 1,883. M. C. 31 March
1845.

71. The Board trust that it will be remembered that the office of Secretary, in this department, is not one of mere routine, but that many questions requiring patient consideration and the exercise of judgment, appertain to it at all times, besides the duty of attendance on committees and to other business not immediately connected with it, so that it seems of much importance that provision should be made for relieving the Secretary from some of the numerous details which distract his attention from more important matters, but which are of sufficient consequence to require the supervision of an officer.

72. Provision is therefore made in the estimate of Engineers required to give effect to the proposed new system, for a First Assistant Civil Engineer to be attached to this office; but the Board are desirous that the appointment, if approved, should be sanctioned at once, the necessity for it being undoubted, without reference to future arrangements.

73. The last proposition which the Board have to bring forward is, that permission may be granted for adding to the ordinary estimates a sufficient allowance for extra superintendence, whenever circumstances may require an increase.

74. There is at present no limit to the amount of superintendence that may be estimated for occasional works; but the rules, strictly understood, prohibit the extension of the principle to the ordinary works, however much their number and probable cost may exceed the average, or however plain may be the necessity of employing Superintendents to prevent unnecessary expenditure. This distinction between ordinary and occasional works is purely arbitrary, and in the opinion of the Board ought at once to be abolished; the amount of

Appendix (H.)

16 December 1844,
No. 718.
15 Februar 1847,
No. 140.

extra superintendence being left to be determined in all cases by the local officers, under the usual control of superior authority.

75. The Board trust, that in forming a judgment upon their propositions, due consideration will be given to their former Reports, in which some of the subjects here briefly noticed are treated of in detail.

76. It will be seen that their opinions in substance remain unchanged, and that in the present letter they have principally endeavoured to define the arrangements contingent upon the increase of officers, which they have long felt to be urgently required, and which they are firmly persuaded would, if granted on a liberal scale, with a commensurate improvement in the Overseer and Maistry Establishments, abundantly repay the Government in the greater economy with which the works would be executed.

77. The propositions above referred to, are:—

1. An increase of officers sufficient to provide 20 permanent District Engineers, and an Assistant to the Secretary, besides the present Civil Engineers, with a reserve to fill vacancies, and to be employed on special works, or as Second Assistants; that is, an increase of from 25 to 37 officers to the Corps of Engineers.

2. A graduated scale of payment of the District or First Assistant Civil Engineers, as already recommended.

3. The addition of eight Draughtsmen to the establishment of the Civil Engineers.

4. The completion of the measure contemplated by the Government of India for placing the Overseer Establishment on the footing of that of Bengal.

5. The reform of the Maistry Establishment, already recommended.

6. The increase of the Office Establishment, as already recommended.

7. The sanction of an estimate of Rs. 4,350 for copying the present arrears of proceedings.

8. The appointment of a First Assistant Civil Engineer as Assistant to the Secretary.

9. That permission may be granted for adding extra superintendence, when required, to the ordinary estimates.

78. Of which nine propositions, Nos. 2, 3, 4, 7, 8 and 9 are recommended for "immediate adoption," and the Board would further solicit attention to these remarks on the necessity of providing Engineer Officers for the appointments in the other branches of public works.

(signed) J. H. Bell.

Appendix (I.)

Appendix (I.)

LETTER from Major H. C. Cotton, Civil Engineer of the Fifth Division, to the Secretary to the Board of Revenue in the Public Works Department, on the subject of the Defective Qualifications of the Maistries, and the Measures necessary for Improving that Class, dated 26 February 1842.

Sir,

IN consequence of a conversation I lately had with Colonel Sim on the subject of the Maistry Establishment of this department, I am encouraged to propose, for the Board's consideration, a plan for its improvement.

2. The Government has, on some late occasions, in the case of the failure of works, expressed, in the strongest terms, its determination to hold the Civil Engineer responsible for the security of all constructed within his range, directing that he shall not undertake works until he can obtain competent persons to superintend them. In my letter of 25th March 1841, on the subject of the Moothetamooty Vany Bridge, in Tanjore, which failed three or four years ago, and on which I was ordered to report, I ventured, in some measure, to enter upon this subject, not so much to account for that particular failure, as to show the hazard every work is subject to from the incompetency of the Maistries; and the decision of Government was, as I have quoted, that the Civil Engineer should not undertake works without good superintendence. Were the Civil Engineer literally to fulfil the orders of Government, I am bold to say that scarcely a new work of importance, in any of the divisions, would ever be undertaken at all, unless the Civil Engineer confined himself to its superintendence, to the neglect of his other duties. No measures whatever are taken for the education of men for this very important and responsible line, and few indeed are found who have qualified themselves. The reason is palpable: the uncertainty of the service, and the want of prospects of advancement in it, prevent any respectable young man, who can get a sure livelihood in any other way, from entering it. The situations are usually filled by men of the lowest grade of mind, who perhaps can write, and, in an indifferent way, prepare the ordinary estimates, and perhaps draw the plans roughly of the common works of the country; but very few indeed can do more, and having grown up in the way of thinking themselves equal to their forefathers in the same line, are altogether incapable of improvement. These men, if put in charge of a work of any new description, or of any magnitude, have neither the

the mind to comprehend the plans, nor the judgment necessary to manage the details of the work. Without education, without natural talent (which would always find a better market in a thousand other trades or professions), without inducement to exert what talent or energy he may have, the Civil Engineer can never be justified, under the present orders of Government, in employing him to superintend a work of any magnitude. Appendix (I.)

3. The Civil Engineer's range is extensive, his works numerous, his time extremely limited: he can but expect to visit his greatest works two or three times during their construction; of many he cannot see the foundation even laid at their requisite depth: a vast deal must depend upon the Maistry. In the preparation and selection of materials, it is required that the Maistry should have judgment, experience and energy. In the arrangements for the conduct of the work, the proper division of labour, the judicious formation of embankments about the foundations, the baling apparatus, suitable to the depth, for raising the water. Whatever general instructions an Engineer may give, he requires not only a man who will thoroughly understand and endeavour to obey them, but one well qualified to do so, and who is capable of meeting unforeseen difficulties when left to himself. The generality of Maistries are, in a great measure, indifferent as to the permanent security of the works they are employed on, never, probably, for a moment looking so far forward, or being at all prepared to do more than follow the plan given him. Whatever varieties of soil he may meet with, the foundations would be laid the same depth. I have frequently found excavations going on in soil much more secure than any new brick masonry could be, and I have as frequently known foundations laid insecurely, through the sub-soil being of unequal firmness, and the plan adapted to a uniform soil being strictly followed; and not only the foundations, but every part of a work require tact and good judgment on the part of the Maistry. I need, therefore, only state that, generally, men so qualified are not to be met with. What the department requires is, that it should be permanent, respectable and well paid; and for the present, at least, measures should be taken to educate and bring up boys qualified for the service.

4. There is now no certainty in the service, men selected or taught by Civil Engineers themselves are, at a moment's notice, thrown out of employ, absolutely destitute, having given up, probably, good prospects in the revenue or other departments under Government, or private occupations, in which they might have gained a respectable subsistence. This was the case when Assistant Civil Engineers were called away for other service; and if the same principle continues, the whole establishment of the division will be thrown out of employ by the withdrawal of the Civil Engineer himself, when the corps is deficient in officers. This is the most decided bar to a hope of any improvement in the line. A man so cast out has no resources; it is not as in a country where private works open a great demand for professional men. In losing his situation he loses his bread; and as long as this is the case, we cannot expect to have anything but a most inferior class of men in the department.

5. The next requisite is that the line should be made respectable; what I have just mentioned prevents it entirely; but besides a permanent employ, a man who has been brought up for a particular profession reasonably expects to rise in it, according to his attainments; and as he would, in other professions, attain to distinction, he reasonably may expect to have some prospect of it in this.

6. The next consideration is, that the line should be better paid. A native is very willing to work on almost nominal pay, with an after prospect of providing, as he advances in life, for his family as well as himself, and as in all other departments of the service, regular grades of pay are urgently called for in this. There are, it is true, at present a few higher paid Maistries, and therefore there is less reform requisite in this particular than in any other, but system is wanting. There should be regular grades of advancement, and these made sure to those who most deserve it, merit and time of service combining to render each man eligible for promotion in rank and pay. A well-organized corps of Maistries would not be so expensive compared with its effects as the establishment under the present loose system.* There is, perhaps, no expenditure out of the public treasury so badly economized as in the Department of Public Works, owing to the total inefficiency of the Maistries. A cubic yard of earth deposited in a wrong place is often not only useless but injurious; not only is so much money wasted, but involves, perhaps, a far greater expenditure to remedy the mischief it has done; and this, as an example, is no untrue one of the waste of money on the one hand, or the want of systematic expenditure on the other, which is general throughout the department in this Presidency.

7. The last desideratum I have mentioned is the education of boys for the service, at least for the present, until the department is so occupied by qualified men, and established on so secure and respectable a footing, that it will invite into its body young men self-prepared

* I believe in some districts the pay of the Head Superintendent is given to a Gomastah, from that branch being deficient; and the man performing the duty of Head Superintendent drawing the pay of inferior Maistry. This, however, can scarcely be considered the intention of Government, and it is, I suppose, temporary. I merely mention it to show the necessity of the Maistries being regularly embodied in a corps. They should be all qualified men, recognized, selected and reported on, both as to qualification and conduct, by the Civil Engineers as well as the Collectors; the latter chiefly because, while officers are so few in the department, the Civil Engineer cannot well ascertain the merits and faults of all.

Appendix (I.)

pared for its lower grades; but before I could recommend a single step in this matter, I consider that the faith of Government must be pledged to afford them all the advantages of a sure provision and advancement which are held out in other organized departments of the service. Without this it would either prove unsuccessful, and therefore a useless measure, or young men would be misled by false hopes into a line in which after all they may not find bread.

8. I will not attempt to propose in exact detail such a system as the exigencies of the service seem to require; but, as far as my experience leads me to judge of what is required, I would venture to propose, generally, the organization of a Maistry Corps on the following general principles. There should be one Maistry in every talook; with one Head and one Deputy Superintendent in each district; also, a Head and Assistant Maistry under the Civil Engineer, a First Class Maistry under every Assistant Civil Engineer, and a Second or Third Class Maistry under each Surveyor, with six boys or more to be placed by the Civil Engineer under the charge of himself, his Assistants or Surveyors, or the Maraumat Superintendents, as he may judge best for their education.

9. The Corps to be one, and every member eligible for advancement according to his proficiency; not merely in his particular district or division, but wherever he may be required; the Board of Revenue appointing them as vacancies occur, or giving especial employment to them according to their judgment, founded upon the reports and recommendations of the several Civil Engineers.

10. The Head Superintendent of each district should be on an equality with a Tahsildar, and the Deputy with the Deputy Tahsildar; I mean both to be paid as they are, and to be held in the same respect. They should not be advanced to the rank or pay for time of service only, but if duly recommended, after a fixed period of service, should be promoted as vacancies occur.

11. The Talook Maistries should be in three classes, according to their qualifications and time of service. The boys to be taken under instruction should be about 14 years of age, and able to read and write English, and understanding arithmetic, before they are received. The first two years to be employed in plan-drawing and estimate-making, in quarters and in the field; the third year they should be employed in actual work as a bricklayer. This I consider a most essential point in the training of a Maistry; and these three years should be considered probationary, no boys being placed on the list for regular promotion as Maistries, until in conduct and attainments they have qualified themselves fully to the satisfaction of the Civil Engineer.

12. The pay I would establish for each grade and class is as follows :—

Maraumat Superintendent of a District	- - -	100 rupees a month.
Deputy Superintendent of a District	- - -	60 - ditto.
Civil Engineer's Head Maistry	- - -	70 - ditto.
Civil Engineer's Assistant Maistry	- - -	40 - ditto.
Talook Maistry, 1st class	- - -	35 - ditto.
Ditto - 2d class	- - -	22 - ditto.
Ditto - 3d class	- - -	14 - ditto.
Boys under instruction, 1st and 2d year	- - -	5 - ditto.
Ditto - ditto 3d year, while at work as a bricklayer	- - -	7 - ditto.

It is necessary to give somewhat higher pay to the Maistries employed under the Civil Engineers and Surveyors, on account of their being continually moving. In the above scale this has been considered.

13. In this proposal it will not, of course, be supposed that I would recommend the present Maistries to be embodied into an establishment of this kind. I believe that there are few who could be reasonably placed in a higher grade than the first class Talook Maistry; and not many fit to be employed at all.

There are, however, a few whom I happen to know fitted for the higher grades, and these I will mention :—

Ramasawmy Naick, at present Maraumat Superintendent in Tanjore.
Kisthasawmy Naick, at present Maraumat Superintendent in South Arcot.
Trimul Naick, Deputy Maraumat Superintendent in Tanjore.
Veerasawmy Moodelly, Deputy Maraumat Superintendent in Salem.

Being unacquainted with the other divisions, I can mention no more; but I have no doubt each officer could bring forward others.

These, with some selected from the talooks, and thoroughly examined and recommended by both the Collectors and the Civil Engineers, might at once be placed on the list, according to their qualifications, and the remainder filled up as qualified men are obtained.

14. In proposing an establishment of this kind, I cannot omit to notice that, in order to train and keep it up in order and efficiency, the attention of the Engineer Department is absolutely necessary; it could scarcely be expected to answer if, as at present, a whole division is left to one officer. I have made suggestions on several occasions respecting the number and description of Civil Engineers suitable to the present demands of the country, but this, of course, must depend on the principles to be pursued with respect to the general improvement of the country by public works. If it should be the intention of Government

to

to follow a system of which occasional examples are displayed on a magnificent scale in Bengal, and, in one or two instances, in this Presidency: if it is confessed, as a principle, that improving the irrigation of the dry districts, arresting the volumes of water passing waste through the parched plains of the Carnatic, establishing navigable canals, roads and harbours; if it is admitted that such improvements are the positive right of a country which has so long been under British rule, and sent so much of its wealth to Great Britain; that such improvements would not only not impoverish this country or its ruling Government, but work vast changes in the condition of the people, and as great in the declining revenues of the Government, then an efficient corps of European Civil Engineers, as a permanent arm of Government, should be established; † and the native portion, of which alone I intended to treat in this letter, would be formed into one of the most suitable and useful branches of the public service.

Appendix (I.)

15. I must not omit to mention, however, the present class of Surveyors, a highly valuable and important establishment, when duly attended to by the officers; but there is no establishment in the world where order and efficiency can be kept up without directors; the want of officers in this department, and want of regular system throughout, has been the ruin of many an individual, and greatly crippled that portion of the department, while it has left the native portion in a degraded and extremely inefficient condition, for the most part little better than useless, and in truth an extravagant outlay of money, producing most disproportionate returns. If, in the common repairs of tanks and channels in earth-work, one-tenth could be saved by its being done with judgment, or one-tenth more effect produced from the same outlay, what means would not the Government have for the payment of a good establishment! My experience assures me, that considering the failure of embankments from bad construction, the loss of water and expense of construction, the mischief done by banks being made and channels opened where they ought not, and all the other consequences of the employment of men who have no judgment, and no inducement to exert what judgment they have, in works involving so great an expenditure as is exhibited in the ordinary estimates of the districts, there can be no question that a greatly improved establishment would be one of strict economy. I say one-tenth of the charge for earth-work throughout the Presidency with confidence that no less a sum would be saved if the work were properly done; and it probably would amount to much more.

16. The education of young boys, the better payment of the whole, putting the establishment on a footing of respectability, making it a permanent body and keeping up the establishment of the Civil Engineers and their Assistants, at least to their amount before the opening of the present wars, appear to me not only highly necessary but quite practicable, and in the strictest sense economical; independently of all advantages arising from its being then in the power of Government so to improve the face of the country as to bring out its own hidden resources, stimulate trade, and advance arts and manufactures, and in all other respects the prosperity as well as the political strength of the country.

I have, &c.
(signed) *H. C. Cotton*, Major,
Acting Civil Engineer, Fifth Division.

Manargoody Talook,
Needamungalum, 26 February 1842.

Appendix (J.)

EXTRACT from a Letter from *F. N. Maltby*, Esq., Collector of Canara, to the Secretary to the Board of Revenue in the Public Works Department, being the Annual Report on the Roads of the District, dated 1 December 1850.

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14. It has been with much gratification that I have observed, during my present tour, how very much the advantages of these roads are now appreciated. Combined with the abolition of the transit duties, they appear to have given a marked stimulus to trade; and the increase in one principal article of a native's wants, as noted in the margin (which I can only attribute to the improved means of transport and the abolition of the land customs and those from port to port), will give the Board some idea of the increase to the people's comforts, which these communications have occasioned.

	Cotton Piece Goods.
	Rs.
1258 - -	1,83,500
1259 - -	2,15,900
Increase -	32,400

15. At

* A proof to this point is established far beyond question by the statement given in from the Fifth Division, showing a return of upwards of 300 per cent. per annum in revenue upon the outlay on many of the works of irrigation constructed in the last six or seven years.

† Not a corps whose services are dependent upon the external relations of the country, as those of a military corps must be, but one exclusively set apart for works of Civil Engineering; a corps of covenanted servants, educated, before leaving England, as Civil Engineers, and quite distinct from the military corps. This corps might be formed at first by volunteers from the Engineer Corps, and a few practical and experienced Civil Engineers from England. There could not be a better time than the present for drafting officers from the Engineer Corps for the purpose, because nearly all the First Lieutenants being Brevet Captains it is evident that the younger branches, who would be promoted to supply vacancies, are fully qualified for it by time of service and experience, and the Military Corps would rather be improved than injured by it. It would not be necessary to set aside the service of the Military Engineer Officers in the time of peace; employment would be found for them in the extended improvements for which peace would afford opportunity, and to which, during peace, the attention of Government would more especially be called.

Appendix (J.)

15. At Yellaneer, the people petitioned me to have the ghât of that name and that of Maula repaired, and the inhabitants of Mèl Bungady were equally anxious for the repair of the Kadidakul Ghât; and in the villages and towns below I see none of the anxiety which used to be shown to keep the roads at a distance from the villages.

16. I have dwelt at some length upon the subject of these cross roads, because an inspection of this portion of the country has satisfied me how much may be done by the outlay of small sums here and there. The villagers in many instances have shown a readiness to cooperate, and, were there a sum of money at command to be applied to improving the smaller roads of the district, I am satisfied that it would be in my power to secure results which it is almost impossible to do where every small item of expenditure must be previously sanctioned. There is no comparison between the alacrity with which works are carried on where a local fund enables the Collector to execute each portion at the most favourable moment, and the languor which results from the interval between the planning of some small improvement and its execution. I have seen this in the Salem district, where the bandy fund places a small annual sum at the Collector's disposal; and should the Ferry funds of this district be made available in the same manner, they would be applied to their most legitimate object, and secure very considerable results. I trust that it will be in my power to submit to the Board, in the present year, one or two works of this nature, which will not interfere with the execution of the larger works now in progress, and considerably extend their advantages.

17. At Bombay, the Ferry funds have now been applied to the improvement of the roads leading to them. In this district, the tax falls heavily on its commerce, and it has long been urged upon the Government that these imposts should only be considered as tolls applicable to the improvement of the roads; and I very urgently request the support of the Board of Revenue in soliciting from the Government that this means of local improvement may be placed within my control.

The Agoomby Ghât.

		Imports.	Exports.
		<i>Rs.</i>	<i>Rs.</i>
1258	-	3,50,292	43,943
1259	-	3,60,892	49,406
Increase	-	10,600	463

18. The Agoomby Ghât is reported to me to be in excellent repair, and the increase in the trade is satisfactory, as far as it is indicated by our accounts. But a more satisfactory indication than these very incorrect returns would be the fact of wheeled-carriages being introduced into the district; but none are entered, and the Board will observe, that until the roads are opened to the coast full advantage cannot be derived from the money expended in constructing this ghât.

19. I am not fully aware from what causes it has arisen that, although 11 years have elapsed since the construction of the ghât, the plan remains incomplete, and the ghât stands isolated from the principal towns whose trade it was intended to assist. I believe it may in part be attributed to the imperative necessity of limiting even the most necessary outlay during the late war; but must also in part be due to the discussions which at first took place, whether Bramawar, Oodpy or Mangalore, were the best direction in which the road could be taken. The result is much to be regretted; for each of those roads was necessary to do justice to the plan of the Mysore Engineer, and to develop the resources of this district. I fully agree, however, with Mr. Blair, that the most important was that leading to the town of Oodpy and its seaport of Mulpy; from the large concourse of persons assembling every year at the Jatra, or religious fair held at that populous town, at which a very extensive trade, especially in cloths, takes place.

20. The road to Mangalore, I am happy to say, will be completed this year. The Oodpy road has been carried as far as Perdoor, and a branch road to Bramawar has been made practicable by the Ryots. The completion of the road from Perdoor to Oodpy and Mulpy is now the most important work remaining, and for this an estimate is before the Board.

21. I trust that an early sanction for this road will be granted by the Government. This alone remains to render the works complete. The sum required is but small, and of this the greater portion will answer a double purpose. The greater portion of the expenditure will be incurred in connecting Oodpy with the seaport of Mulpy, through a range of sandy paddy fields, of about three miles long. The port of Mulpy is one of our best protected harbours, lying behind the island of Deria Bahadur Ghur; but the only communication between this and the trading town of Oodpy is literally along the narrow divisions of the paddy fields, along which I could not even ride. Were it, therefore, only to connect the port with the town of Oodpy and the coast road, this expenditure would be necessary and advantageous, independently of its opening out the port to the trade of Mysore by the Agoomby Ghât. I therefore trust that the Government will enable me to carry out this work in the present year.

22. The work upon which Lieutenant Searle is now employed will very shortly be completed, and there will not be the least difficulty in superintending the outlay of this money.

23. In anticipation of the work commencing in the present season, I have ordered that the breadth of the road be marked off through the paddy fields, and that no second crops be planted; and even this will afford considerable assistance to the trade, by giving the merchants a broad straight road, instead of the present narrow and angular one.

24. I have heard with much satisfaction that there has been a meeting of some up-country merchants with some of those of Mangalore, to open a trade in cotton as soon as the Mangalore line is open for cart traffic. Should this result follow, the ghât will prove the direct means of extending the cultivation of the upper country.

25. The

25. The branch roads to the navigable rivers and salt cotays at Bajeh and Halandy continue fully to answer the intention of their construction, and to render the ghát and roads a source of increased revenue to Government. The following Table shows the value of salt sold :—

Branch roads from Someshwur to Bajji and Hallady.

BAJEH.				HALANDY.			
Rs.				Rs.			
1256	-	-	12,966	1256	-	-	27,519
1257	-	-	22,703	1257	-	-	21,668
1258	-	-	23,011	1258	-	-	29,811
1259	-	-	24,339	1259	-	-	29,379

26. This ghaut, and the road leading to it, are in excellent repair. I drove my carriage the whole way without any difficulty, excepting that arising from the unbridged nullahs and the narrowness of the passage round one of the rocks. It is an admirable work, and an increasing trade is the satisfactory result.

The Colour Ghaut and Road.

	IMPORT.		EXPORT.	
	1258.	1259.	1258.	1259.
	Rs.	Rs.	Rs.	Rs.
Rice and Paddy - - - -	1,00,974	1,90,946	—	—
Cotton Piece Goods - - -	2,14,000	2,30,800	—	—
Jaggery - - - - -	5,957	9,237	—	—
Grain - - - - -	4,365	15,523	—	—
Salt - - - - -	—	—	7,353	9,685
Sundries - - - - -	91,227	12,968	13,750	9,025
TOTAL - - - - - Rs.	4,16,518	4,59,474	21,103	18,710

27. I am glad to find that Mr. Blane has advocated the adoption of timber road-ways, resting on stonemasonry, instead of arched bridges, for this ghaut. They are calculated to answer all the purposes required for many years, if they are overlaid with boards instead of fascines, to allow the drainage of the water instead of accumulating it. The temporary bridges have, however, been well repaired; the sum sanctioned for annual repairs will suffice for the present season, and enable me to improve the approaches to the unbridged nullahs; and since bandies are not likely to come into use until a carriage road is made in Mysore, I shall not have occasion to propose any outlay in the present year upon this line; but I think that when other important works are completed, it is very desirable that these bridges should be built.

28. It is much to be regretted that any want of concert between the authorities of Mysore and of this country should render two of our best lines comparatively incomplete, that we should have left the Agoomby Ghaut without a road to the coast, and that they should leave the Colour Ghaut without a road to the interior; but I hope that both these defects will soon be remedied.

29. The sales of salt at Wundsay continue to reimburse to the Government the outlay upon this road :—

	Rs.
1256 - - - - -	8,852
1257 - - - - -	13,058
1258 - - - - -	12,512
1259 - - - - -	13,802

30. This important ghaut remains in its former state. I have, however, already addressed the Board of Revenue on the subject, under date 23d September last, requesting them to obtain sanction of Government for the sum necessary to enable Lieutenant Walker to make the trace of a new line. The trade of last season was very considerable, employing 1,00,501 bullocks, and 14,556 men.

The Guersippa or Hossulmakki Ghaut.

	Imports.	Exports.
	Rs.	Rs.
1258 -	1,36,732	52,234
1259 -	2,21,506	42,634
Increase -	84,574	9,400

31. The sales of salt at the Guersippa Cotays were as follows :—

	Rs.
1258 - - - - -	25,959
1259 - - - - -	26,761

Neelcoond Ghát.		Imports.	Exports.
		Rs.	Rs.
1258	-	6,26,493	33,887
1259	-	7,20,760	28,219
Increase	-	94,267	5,668

32. The trade by the Neelcoond Ghát exhibits a very great increase under the head of Imports, but a decrease under that of Exports. The increase has arisen from the brisk state of the cotton trade, and notwithstanding the advantages of the Devamunny Ghát, the old Neelcoond road will still continue to be used by many of the bullock drivers. The Devamunny line may be said to be fully occupied, and the dearness of the forage, and the impediment of the Deoga ferry, render the Neelcoond road still a valuable auxiliary to this extensive trade, especially for bullocks returning unladen.

The Devamunny Ghát and Hobly and Dharwar Roads.

33. I have never been more gratified in inspecting any public work than I have been by my late visit to this line. During the season upon which I am reporting, there was a great demand for Indian cotton, and the trade along the line was most brisk, carriage by carts being in a great degree substituted for that by bullocks. The following Table will show that almost every item of export and import by this route exhibits a satisfactory increase :—

	IMPORT.		EXPORT.	
	1258.	1259.	1258.	1259.
	Rs.	Rs.	Rs.	Rs.
Cotton	40,095	9,73,050	—	—
Rice and Paddy	21,840	33,301	—	—
Grain	21,637	9,311	—	—
Jaggery	21,170	30,172	—	—
Cardamums	9,075	10,050	—	—
Pepper	7,300	30,387	—	—
Turmeric	22,032	39,780	—	—
Country Sugar	44,190	93,157	—	—
Cotton Piece Goods	23,600	70,500	—	—
Copper	—	—	3,660	11,490
Salt	—	—	68,346	76,425
Europe Cotton Piece Goods	—	—	5,300	13,600
Sundries	20,582	22,179	16,760	12,346
TOTAL	Rs. 2,31,521	13,11,887	94,066	1,13,861

But so much of the trade is carried on at night that these returns are very imperfect. The exports shown at Coompta Custom-house afford a better criterion, and from these it appears that the export of cotton was larger than has ever before been known :—

	Maunds.
1257	1,77,997
1258	72,642
1259	3,17,597

By a more accurate return of bandies kept in the Sonda Talook, it appears that more than 5,000 passed the ghát going and returning.

34. Such are the highly satisfactory results of this undertaking; I think we have now every reason to hope that, even in years of less demand, the cotton trade will be on a far more favourable footing than it has ever been before.

35. The road is now nearly complete, with the exception of three bridges, upon which Lieutenant Walker is at present engaged.

36. The trade in the present season has opened with increased vigour; while up to the 15th November 1849, 20,924 maunds had been exported; in the present season they amounted to 85,616. The road from Sirci has the appearance of the approach to some large fair, being crowded with cattle and lined with encamping grounds.

37. I have now to point out to the Board, that for such a traffic as this due preparation has not been made. The road and ghát have been made; they have most fully answered their object, but no adequate provision has been made for their preservation, and unless some measures are speedily taken, a vast outlay will be rendered necessary to repair the damage now going on.

38. Lieutenant Walker has described the state to which the ghát has been reduced by the wheels of the small Wudr bandies; and his description I can fully confirm, except that when I passed it, the mud had hardened into ridges. No public work could have been allowed to fall into such a state, were it not that the authority necessary to check it is so far removed from the scene. Badies, with wheels not two feet in diameter, piled with cotton and dragged by four bullocks, are allowed to increase by their action every little hole which a properly constructed wheel would tend to mend, and there is no fund available adequate to the constant repair required.

39. It is only necessary for me to add, that one of the most emergent calls upon the Government is for a sanction adequate to keep this great line of traffic in a proper state of repair.

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40. Connected with this line of road and its traffic, there is, the Board are aware, one difficulty still to be overcome. The Tuddery River, at the ferry of Deogah, is a very serious interruption to bandy traffic, so much so, that the bandies from the ghâts unload at the river, and the loads are ferried over and carried on hired bandies to Coompta. This is a very serious expense; the charge at the ferry is no less than 1½ anna per bandy load, and the hire to Coompta is at present 6 annas, making in all 7½ annas out of the hire from Hobly to Coompta, which is only Rs. 9 per bandy load. This is a heavy loss, and the delay is very serious, amounting to no less than three and five days.

41. To remedy this evil it appears to me, that a bridge of boats would answer, and that in the abundance of timber procurable down the river itself, the means of its cheap construction are at hand. Lieutenant Walker agrees with me that a river more thoroughly adapted to such a means of transport could hardly be found, and has promised to prepare an estimate of its cost. What proportion this would bear to the sum recoverable by a toll, I am desirous of ascertaining; should such a work be found practicable (and I have learnt that this has been found to be the case in Ceylon), the trade of this line will be relieved from one of its greatest difficulties.

42. The sales of salt at Oopinpattan, notwithstanding the extensive import from Goa, were as follows:—

	Rs.
1258 - - - - -	60,716
1259 - - - - -	72,430

43. Crossing over from Sirci to Yellapoor, I was enabled to descend the Arbyle Ghât, as well as to see the road constructed from Yellapoor to Moon-dagode last season, as well as that now under construction under Lieutenant Thornton of the Artillery, from Yellapoor to Hullial; while I was afterwards able to visit that in progress under Lieutenant Searle, to connect the ghât with Coompta, through Meerjan. The ghât is an admirable work and in excellent repair, and when the roads now in progress are completed, there can be no doubt of the trade being greatly extended. In fact, the trade has already more than doubled, having risen in value from Rs. 2,35,448 to Rs. 5,55,144. Already a considerable portion of the cotton trade is carried on by this ghât, the value having increased in the last year from Rs. 99,780 to Rs. 3,42,330, besides which a great number of bullocks which have descended by the Devamunny line return by this route in order to obtain cheaper fodder. Already bandy traffic has commenced, and it will soon be greatly extended. The work in progress under Lieutenant Searle will connect the line with the Salt Cotays of Nagurbyle, and unless the trade is superseded by the imports from Goa, must tell favourably on our sales.

The Arbyle Ghât.

	Imports.	Exports.
	Rs.	Rs.
1258 -	1,81,721	2,35,448
1259 -	4,77,976	5,55,144
Increase -	2,96,255	3,19,696

44. Two plans have been submitted to the Board for increasing the benefits of this work, and I trust they will receive early sanction. One is intended to connect the important town of Ankola with this line, the other unites this line with that of Devamunny, by a short road of about five miles. I have ridden along the trace of this line, and I consider it a most important improvement; as allowing the bandies which descend by Devamunny to return by Arbyle, and so relieving the line of greatest traffic where, as I have said before, the forage rises to an exorbitant price, viz., 8 annas a bundle. It completes the circuit of traffic, and renders Gokuru accessible to the numerous pilgrims who visit that spot during the great yearly festival.

45. Lieutenant Walker has stated that he is prepared to superintend this work at the same time that he is employed on the bridges on the Devamunny line. Lieutenant Searle's services will be available in the course of a few weeks, for employment, either on the Ankola or the Oodpy road, and the experience he has gained as well as his knowledge of the people around him, render it very desirable that his services should be continued. There will be no difficulty in carrying on these three roads during the present season, and each, though small in extent, is of great importance to the completion of the works with which they are connected.

46. I think the above report will prove to the Board, that if much has already been done, it has amply fulfilled the promises of improvement held out. I have had the gratification of seeing the most marked signs of prosperity evinced by thriving trade and extending cultivation. To extend the advantages already obtained by opening out smaller lines of communication is to ensure important results at a very trifling outlay. Since the abolition of the Customs it is less easy than it would otherwise have been to prove that Government has over and over again received an ample return for the outlay incurred, but I believe that in the article of salt alone, an ample profit has been received, while the sum paid by England to India for the cotton exported last year from Coompta may be estimated at Rs. 27,14,267.

Sales of Salt.

	Rs.
*1255 - - - - -	4,25,97
1256 - - - - -	4,31,20
1257 - - - - -	4,90,57
1258 - - - - -	4,45,50
1259 - - - - -	4,54,17
Goa imports to be added in 1259 -	17,85

47. I, therefore,

* Before the three cotays were established in connexion with the Agoombay and Colour Ghâts,

Appendix (J.)

47. I, therefore, trust that the present season will not be lost for completing the Agoomby line to Oodpy, connecting the Arbyle line with Ankola, and forming the junction between the Arbyle and Devamunny lines.

48. When I joined the district of Canara in 1831, there was not a practicable line of road in the whole country, and wheeled carriages were unknown beyond the town of Mangalore. The change which I now observe is therefore peculiarly striking. Six excellent ghâts are now open and 508½ miles of good made road will be completed within the present season. They have, as always must be the case, proved the cause of increasing industry and extending cultivation. But it must be remembered, that they are still nearly the only existing roads in a province nearly as long as England, and having the area of Wales; and to use the words of Mr. Blair, in acknowledging the liberality of the Government towards the province in late years, it should also be remembered, that till of late years nothing had been done. The province calls for but trifling outlay in any other department of Public Works. There are no extensive tanks or channels to be maintained, but there are many fertile acres still capable of cultivation as soon as the natural difficulties of the country are overcome.

I have, &c.

(signed) *F. N. Maltby*, Collector.Collector's Cutcherry, on Circuit Byndoo,
1 December 1850.

Appendix (K.)

Appendix (K.)

EXTRACT from a Letter from *F. N. Maltby*, Esq., Collector of Canara, to the Public Works Commissioners, respecting the wants of the Improvement of the Roads in his District, dated 5 June 1851.

5. I SHALL endeavour to show how far the statistics of the district, for the last few years, afford any indications of improvement in the comforts of the people and the revenues of Government, which is to be attributed to the works carried on at the public expense.

6. In some respects it may appear that the subject is an easy one. There was a period up to which it may be said, generally, that nothing was done to improve the district by a direct expenditure of the public money. The year 1836 may be fixed upon as the period at which the change took place; from that time, constant attention has been paid to the Marumut Department, and several extensive lines of road have been opened out, successive sanctions have been granted, and about Rs. 5,25,000 have been expended. Concurrently with this expenditure, there has been a constant and steady advance in the improvement of the district; and, in returning to it after an absence of some years, I can see the most striking signs of improvement, and these appearances are borne out by the public records.

7. But it would be a great mistake to attribute all this result to the one cause I am alluding to; many concurrent causes have been in operation. A revision of the assessment, which has had the result of relieving a great portion of the land from the demand suspended over it, and has thus left improvements unchecked: the abolition of the transit duties, and the Hawlut Duty on the supary, pepper, and cardamums; the reform of the Tariff, and abolition of duties from port to port; the abolition of the coffee monopoly in Mysore; are all important changes which have been in operation during this period, and have each told upon the trade of Canara. In a general view of the progress of the district, the improvement in the means of communication can therefore only be considered as one out of many favourable causes; but with this qualification, a comparison of the accounts furnished to Mr. Cotton's commission in 1838 and 1839, with those of subsequent years, will afford a very fair view of the progress of the district under a system of improvement in which the construction of roads holds an important place. After giving some instances of the general advance of the district, I shall allude to some which may be immediately attributed to this cause.

8. To endeavour to prove the fact that the construction of roads has advanced the interests of the district, may appear superfluous; but my object is rather to prove that in this district they may be said to have paid for their own construction.

9. The principal heads under which a view of the progress of the district may be best arranged, appear to me to be, the state of the population; the state of the land revenue; a comparison of the export of the principal articles of production and trade with the interior; a comparison of the import of the principal articles of consumption; and the progress of the Salt Trade, both of home consumption and inland trade. I shall give some facts connected with each of these, as briefly as I can.

Population.

10. For many years past, the returns have been made with great care, and may, I think, be considered as faithful. The following shows the rate of increase since the year 1835, being

being the first year which comprehended the territory annexed from the kingdom of Coorg :— Appendix (K.)

	Rs.
Fusly 1245 - - - - -	7,68,123
" 1248 - - - - -	8,34,874
" 1251 - - - - -	8,77,061
" 1254 - - - - -	9,20,591
" 1257 - - - - -	9,94,656
" 1260 - - - - -	10,56,333
Increase in 15 years - - -	2,88,210 or 37½ per cent.*

11. In the answers transmitted in 1839 to Mr. Cotton's Commission, the average revenue of the first five years of the Company's Government is compared with the five years from 1243 to 1247, as follows :— Land Revenue.

	Rs.	a.	p.
Average 1209 to 1213 - - - - -	16,90,704	11	11
" 1243 to 1247 - - - - -	17,10,621	6	7

From that period the revenue has continued steadily to increase from year to year, without the exception of a single year, and now amounts to Rs. 18,14,677. 9. 3, exclusive of the Coorg moganies.

12. In 1839, Mr. Blair made the following estimate of the future land revenue of the district, including the Coorg moganies :—

	Rs.
The Settlement at that time - - - - -	18,10,000
Instalments to be realized - - - - -	38,000
Future additions from waste - - - - -	17,000
	<u>Rs. 18,65,000</u>

The present revenue, amounting to Rs. 18,97,376. 12. 9, proves how steadily the instalments have been realized, and what a very satisfactory advance the agriculture of the country has made.

13. The principal export trade of Canara is rice, of home production, and imported from Mysore. As bearing upon the improvement in our roads there is no occasion to distinguish these. Export Trade.

The rice trade is affected by such a vast variety of circumstances, that it is sufficient for me to observe that, notwithstanding the great increase in population, and improvement in the comfort of the people, the district can still export more largely than when the population was 2,80,000 less than at present. Rice.

	Mooras.
Average Exports, 1812 to 1816 - - - - -	10,54,048½
" 1833 to 1837 - - - - -	10,73,469½
" 1845 to 1849 - - - - -	13,11,425
Highest Export, up to 1837 - - - - -	11,04,957
Highest known Export, 1845 - - - - -	14,66,391

14. The Export of cotton has been more affected by the improvements in our public works than any other branch of our trade. In 1836, the first improvements were made in the Neelcoond Road. In 1848, the Davamunny Ghaut was opened; and, in 1850, the Arbyle line was opened, though not completed. The results are these :— Cotton.

	Candies.
Average Export of Cotton, 1812 to 1816 - - - - -	1,630
Ditto - - - - - 1833 to 1837 - - - - -	9,721
Export of 1839-40 - - - - -	9,082
" 1840-41 - - - - -	24,732
" 1841-42 - - - - -	30,891
" 1842-43 - - - - -	33,762
" 1843-44 - - - - -	38,368
" 1844-45 - - - - -	24,239
" 1845-46 - - - - -	22,662
" 1846-47 - - - - -	25,515
" 1847-48 - - - - -	25,885
" 1848-49 - - - - -	9,413
" 1849-50 - - - - -	39,032
" 1850-51 - - - - -	42,735
Average of last 5 years - - - - -	<u>28,516</u>

	Candies.	Value Rs.
Largest Export up to 1238 - - - - -	17,237	15,44,554
Largest subsequent Export - - - - -	42,735	31,46,454

A very

* Note by the Public Works Commissioners.—But there is no doubt that the returns of the later years, and particularly of the last of all, have been much more accurate than those of the earlier years.

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Appendix (K.)

 Coffee.

A very large proportion of the cotton is now brought down upon carts, and it is brought into the market to meet a sudden demand, in a manner which was before impracticable.

15. The Coffee trade of Mysore has received a stimulus, both by the abolition of the monopoly in that country and the opening of our roads :—

	Candies.	Value Rs.
Average Export 1812-13 to 1816-17 - - -	30	
„ 1833-34 to 1837-38 - - -	474	
Export of 1849-50 - - - - -	4,077	3,24,088

16. Generally, I may state that I do not find a single important article of our trade in a declining state, while most evince a very marked improvement, of which the following are some examples :—

	Jaggery.	Sugar.	Turmeric.
	Cs.	Cs.	Cs.
Average 1812-13 to 1816-17 - - -	779	369	498
„ 1833-34 to 1837-38 - - -	702	747	1,373
Highest Export till 1838 - - -	1,805	2,386	1,714
Export of 1849-50 - - - - -	6,158	4,044	3,941

17. Our imports by sea are but trifling, as most of the articles required by the people are brought from the interior. Among those which our accounts exhibit, cocoa nuts and piece goods are fair representatives of the advance of our inland trade :—

	Cocoa Nuts.	Piece Goods.	Copper.
	No.	Value.	Candies.
Average, 1814-15 to 1818-19 - - -	4,32,540	—	—
Average, 1818-19 to 1822-23 - - -	—	85,184	140
Average, 1833-34 to 1837-38 - - -	4,17,512	78,920	180
Average of last five Years - - -	15,68,407	1,38,858	283
Highest Import to 1837-38 - - -	9,96,600	1,21,864	249
Highest recent Import - - - - -	19,86,175	1,76,528	356

The importation of gunny bags is a strong indication of active trade. It rose from (value in rupees) 9,480 in 1848 to 98,134 in 1849. Even if it should appear that this has been accompanied by a decrease elsewhere (of which I am not aware) and that it is only a change in the line of trade, this change must indicate a remarkable advantage conferred upon trade by an improved line of commerce.

Salt Revenue.

18. There is perhaps no branch of our statistics which indicates more clearly the advantages derived from the construction of our roads than the Tables of the Salt Revenue.

I find that in Fusly 1248 (1838-39) the salt sold by Government and imported from Goa amounted to Madras garce 3,082. It has since risen to Fusly 1259 (1849-50) M. G. 3,988, and in the present year will be still higher; and this, notwithstanding an increase in the selling price from Rs. 106 to Rs. 120 per garce.

The net Government revenue of the two years may be calculated as follows :—

	Rs.	a.	p.
1248 (1838-39) - - - - -	2,48,346	11	6
1259 (1849-50) - - - - -	3,68,478	14	11
Increase - - - - -	1,20,132	3	5

To endeavour to prove how far these indications of prosperity may be attributed more immediately to the improvements in our roads the salt accounts are the most useful.

The Sumpjee and the Munjarabad Ghauts lead to the Cotay at Buntwal. In Fusly 1247 (1837-38) the collections were Rs. 63,753. They have since been as high as 1,44,434; viz., in Fusly 1257 (1847-48).

The

The improvements in the north of the district affect principally the sales in the Ankola and Honore Talooks. Appendix (K.)

	Rs.
In Ankola the collections of 1247, were	17,989
They have been as high as (1257)	1,01,517
In Honore the collections were in 1247	51,548
They have risen as high as (1257)	76,449

and this, notwithstanding that the superior road of Davamunny in Ankola, diverted so much of the trade from the partially improved line of Neelcoond.

19. The Buntwall, Soopah, and Sondah Talooks are the only portion of the district * Extension of cultivation. capable of showing that expansion of cultivation which the Commissioners seem to think likely to attend an outlay of public money; and it happens that in those talooks, or near to them, the greatest outlay has been made. The result is as follows:—

LAND REVENUE.	Buntwal.	Soopah.	Sondah.
	Rs.	Rs.	Rs.
1247, or 1837-38	2,33,365	77,318	1,22,373
1259, or 1849-50	2,72,435	94,813	1,37,169
Increase	39,070	17,495	14,769

This should not be viewed as the mere result of favourable seasons, and as likely to fluctuate with them. It is the steady advance of cultivation upon the jungle, and the revenue added may be viewed as a permanent annual addition to the revenue of the state.

20. The ferry farms afford a very correct indication of the extension of our trade. Ferry Farms. They have risen from Rs. 4,964, the highest collection up to 1838, to 7,868, the revenue of the present year.

And here again, tracing this more directly to the effect of work in the Buntwall Talook (affected by the Sumpajee Ghaut) they have risen from Rs. 357 to 939. In Ankola (affected by the Arbyle Ghaut) from 493 to 1,136. In Honore (affected by the Devamunny) from Rs. 458 to 1,840.

21. Placing all these facts together, I believe I may say, that it clearly appears that even with respect to this district alone, the outlay incurred by the Government on works of improvement has been amply reimbursed; and when to this is added the advantage derived from extended cultivation and improved resources in the interior, including Mysore, Bellary, and Dharwar, I think it will clearly appear that to open out fresh lines of communication to the interior, and to improve our district roads, will be a source of actual revenue to the Government, as certainly as it will be a blessing to the people.

22. Experience and careful supervision now enable us to carry roads through the ghauts at a very moderate expenditure; and if it should fall within the office of the Commissioners to trace out any system of public improvement, I feel confident that they will consider that the roads of this district may be classed as among the most remunerative works which can be undertaken at the public expense.

Appendix (L.)

MINUTE recorded by the Honourable *John Sullivan*, Esq., Member of the Council of Madras, on the importance of improving Irrigation, dated 5 September 1840.

Appendix (L.)

In his report upon the causes of the decline in the land revenue, Mr. Cotton has observed, that "there is no country in the world where the items constituting an unfavourable season are so few, and where the means of obviating them are so extensively within the power of Government, as in the Madras territories; there is no part of any one district which cannot with the greatest facility be brought under the influence of a river; so long, therefore, as one drop of water is allowed to run waste into the sea we must take blame to ourselves for not exerting our best efforts to obviate the evils of scarcity or the dreadful effects of famine."

Report, 20 February 1840, para. 61.

2. In

* That is, the only part of the district where it is exhibited in the official accounts; because in the rest of the district the revenue is assessed on whole estates, and does not vary with the extent of actual cultivation.—*P. W. Commissioners.*

Years.	Rs.
1247 -	324,47,821
1248 -	314,34,888

2. In the last revenue year 1248, there was a falling off in the collections from the land of upwards of 10 lacs in comparison with the collections of the preceding year. Famine was felt partially in the districts of Ganjam, Vizagapatam, and Rajahmundry; and in almost every district the crops were injured materially from drought.

3. That these evils might, to a very great degree, be obviated if we took proper advantage of the means which Providence has put within our reach, is plain from the state of those districts which are to a certain extent watered from the rains of the S. W. monsoon.

4. Although the crops in Tanjore are frequently prevented from coming to perfection by the failure of the periodical rains, and are occasionally injured by an excess of rain, that district serves as a granary for the South of India in the worst of seasons. It owes this advantage entirely to its works of irrigation, the soil of the province being by no means naturally fertile.

5. It will be seen by reference to the accounts appended to this Minute, that there is the same steadiness of produce in all those parts of the districts of the Southern Division which are irrigated from the same source; that when, from a failure in the periodical rains, there is a great deficiency in the revenue from dry lands, and from land under reservoirs which depend for their supplies of water entirely on the local rains, there is little or no defalcation from the lands which are watered from the rains of the S. W. monsoon. They are always a saleable and transferable property, and yield every variety of produce.

6. Much has been done to improve the irrigation of these districts of late years, particularly of Tanjore, Trichinopoly and South Arcot; and works are now in progress, which, by turning the waters of the Rivers Kistnah and Godavery to the purposes of irrigation, will give the Northern Districts the same advantages in this respect as are possessed by the Southern. But as the advantages which would be derived from an increased and systematic expenditure in this department do not appear to be generally understood, I shall venture a few remarks upon the subject, taking as my guide a report made by Captain Arthur Cotton* to the Board of Works, a copy of which I append to this Minute.

Districts.	Rupees.
Nellore - -	7,26,301
Bellary - -	11,15,688
Cuddapah - -	9,33,679
Chingleput - -	3,04,752
North Arcot - -	12,09,086
South Arcot - -	9,77,046
Salem - -	3,41,504
Tanjore - -	35,23,761
Trichinopoly - -	7,52,030
Tinnevely - -	12,13,409
Madura - -	4,27,639
Coimbatore - -	4,15,663
TOTAL - -	12,006,688

7. That officer estimates the annual value of the crop, which depends upon works of irrigation under the charge of Government, at 320 lacs of rupees, and the annual revenue derived from nunjah or rice lands at 118 lacs, or about one-half of the whole land revenue; and he calculates from the increase which has accrued to the revenue of Tanjore, Trichinopoly and parts of South Arcot, from improvements in the sources of irrigation, that if equal attention was given to the works in other districts, there would be an increase in the gross produce of 93 and in the revenue of 35 lacs.

8. He comes to this conclusion from facts which have come under his own observation; viz., that all the tanks in the country, and all the channels, excepting those of Tanjore, and the very large ones of other districts, water "less land than they once did, many only a quarter, and great numbers from one-half to three-fourths; that the Nunja revenue in North Arcot is three lacs below what it was 10 years ago, two lacs less in South Arcot, and in Tinnevely three quarters of a lac."

Para. 10 and 11.

9. In Tanjore, where particular and systematic attention has been given to the works for many years, there has been no less an increase than nearly 40 per cent. in the gross produce; the variations in the amount of the produce in the first five of the last 30 years, were from 100 to 57; in the last five of the same series they were only 100 to 95½.

10. This steadiness of produce Captain Cotton considers to be the best test of the "state and effect of the irrigation works, both because the very object of them is to obviate the effects of the irregularity of the seasons, so that the crops may not be drowned in very wet ones or burnt in very dry ones, and also because it is an effect which is most clearly to be attributed to that cause."

Para. 13.

11. He estimates the original cost of all the works of irrigation at 825 lacs of rupees, and the annual expenditure upon them at Rs. 6,30,000, or two-thirds per cent.; 5 per cent. upon the actual revenue, viz. 118 lacs; and 2 per cent. upon the total annual produce which is dependent upon them. In England the annual outlay upon works in which water is retained is from 3 to 4 per cent. on the original cost, or from four to six times as much as is allowed in this country; this difference, he thinks, affords *prima facie* evidence that the expenditure in this country is inadequate. He shows that a tract of land in Tanjore, which yielded a revenue of Rs. 26,000, and a property of Rs. 60,000 a year, was rendered unproductive for six years, in consequence of the limited establishment of the Repair Department, which would not admit of the necessary repairs being made when they were required. They were ultimately done at an expense of Rs. 23,000, but not until "an annual loss of property nearly three times as great as the sum required to restore the works; and in six years property to the amount of 3½ lacs of rupees had been lost, for want of an expenditure of Rs. 23,000 and an officer to plan and conduct the work."

Para. 14.

12. He

* For that report, see Appendix (B.), above.

12. He gives another instance of the ruin brought upon property, and damage done to the revenue, in the district of South Arcot, from a delay of eight years in excavating a channel of importance, which from neglect had been allowed to fill up to a depth of about two yards. The revenue, which under the Nabob had been five or six lacs, and under the earlier periods of the Company's Government, Rs. 2,20,000, had gradually fallen to Rs. 1,18,000. The talooks were almost ruined, and many of the people had emigrated. In the course of six years from 1831, by an expenditure of about a lac and a half of rupees, the revenue had increased to Rs. 2,58,000, and has gone on increasing ever since. This delay, so costly to the Government and the people, was occasioned entirely by a want of hands in the department.

Fusly Year.	Rupees.
1244	1,81,180
1245	2,42,879
1246	2,37,171
1247	2,72,727
1248	2,82,305
1249	2,90,005

13. Captain Cotton observes, that as lands watered from Government works are bought and sold in dependence upon the faith of Government, that the works will be kept in good order, justice, no less than policy requires, that this obligation should be faithfully discharged; "None," he says, "but those who have been in actual contact with the people, can believe the extent of loss to which landowners have quietly submitted from a failure in the irrigation works." "There are at this moment multitudes of estates, that are of one-fourth and one-half the value that they once were, owing to the decayed state of the irrigation works."

14. Omitting Tanjore, where the revenue, from the unremitting attention which has been paid to the works has steadily increased, the land revenue of the watered districts was on an average of five years, terminating with Fusly 1214 - - 214 lacs.
 1219 - - 216 "
 1224 - - 203 "
 1229 - - 215 "

Since which it has regularly declined in 15 years to 189½* lacs, being a falling off in that period of 26½ lacs per annum (more than four times the whole cost of the Repair Department) in a period of profound peace, and "under a strong, orderly and upright Government."

15. Taking Tanjore as an example, it seems highly probable that if the works could have been maintained in the same state of efficiency in other districts, the revenue would at all events have been maintained at its former standard, instead of having declined during the last 15 years to the extent of more than a crore of rupees. Para. 24.

16. In Coimbatore, where "the works consist chiefly of noble channels of from 30 to 50 miles long, supplied by very solid annicuts across rivers filled by the south-west monsoon, while the rest of the revenue, from want of rain and other causes, has miserably declined, the nunjah revenue (under these channels) has not in the least diminished, the expense of keeping these works in repair being very insignificant."

17. If all the water which now runs waste down these rivers in favourable years was stored up and turned upon the land, there would be a sufficiency in moderate seasons (Captain Cotton estimates) to water at least a million cannies, or a tract double the extent of Tanjore, which would provide grain for about two and a half millions of people.

18. The positive importance to the cultivation of all the rivers which are fed by the south-west monsoon in the southern districts, and their relative importance, are clearly shown in the Report of the Collector of Coimbatore for Fusly 1248: "With respect to the wet cultivation" (he says) "the south-west monsoon afforded a very deficient supply to the tanks, and as the wet lands in the district cannot be cultivated to any extent unless a full supply is received in both monsoons, they were, therefore, left waste to a considerable extent. The freshes in the Noyel were unusually low; hence the greater part of the wet land dependent upon this river was left waste. In the Cauvery there was an average supply of water, and nearly so in the Bowany and Umbravutty. The wet cultivation of several villages dependent upon the latter river suffered from the lowness of the freshes; but with this exception, the wet lands irrigated by the channels were cultivated to the usual extent."

19. The tanks depend for their supply upon the local rains, it is therefore precarious; the rivers are filled from the rains which fall on the hills, and their relative supply depends upon the geographical position of these hills. The Cauvery has its source in Coorg, which is further west than the Neilgherry range in which the Bowany originates; this range again is nearer the western coast than the Delhi range in which the Umbravutty rises; and that range is further west than the range in which the Noyel has its source.

20. The same results as occurred in Coimbatore in 1248 will be found in every district. The nunjee revenue which depends upon tanks, fails with the poonjee in a bad season, because they depend for their supply upon the local rains; but the cultivation under the river channels is not affected, or only partially affected, when the local rains fail. Hence the pressing necessity of extending the reservoirs and cultivation from those sources.

21. The

* The average yearly revenue in the three periods was as follows: Rs.
 In the five years terminating with Fusly 1234 . - 202,60,000
 Ditto - ditto - 1239 - 198,30,000
 Ditto - ditto - 1244 - 189,50,000

Para. 30

21. The increase of revenue from such works Captain Cotton calculates would be, one rupee per annum for four rupees of outlay, or 25 per cent.; and judging from actual results, this estimate appears to be quite on the safe side, that is to say, for works which are to be supplied from rivers fed by the S. W. monsoon. In general the produce of wet is to that of dry land, as five to one at least, so that the increase of revenue from dry converted into wet, is from 1,600 to 5,000. If this conversion is effected merely by the extension of existing works, the outlay is trifling and the gain immense; the following is an example: In 1806 dry lands, which yielded an annual revenue of Rs. 9,641. 14. 5., were converted into wet, by the prolongation of the Calingaroy Channel of the Bhovany River in Coimbatore, and the revenue increased to Rs. 51,169.

Difference - - 41,527
which it has yielded ever since. The estimate for a further continuation of the channel is Rs. 41,000, and of increased revenue Rs. 21,000.

22. But if new works are to be constructed, anicuts for instance, for appropriating the rains of the N. E. monsoon, which are comparatively scanty and precarious, the outlay will be heavy and the profits proportionately reduced; it may be safe, therefore, to take 25 per cent. as the average return.

23. This increase, however, is but one item of the advantage of converting dry into wet land. It is the certainty of the revenue, where a perennial stream is carried over the land, that gives a peculiar value to such a change. It is not only the great increase that has taken place in Tanjore, and in parts of other districts which enjoy the benefits of river irrigation, but the steadiness of the revenue. While very large remissions of revenue, and dreadful losses to the people, have occurred upon the lands which depend for their produce upon the periodical rains, the wet lands of these districts have continued to yield their harvests; and have been the means of keeping the people alive.

24. It is remarkable, with the melancholy evidence which each year brings with it, more or less, that water, and water alone, is wanting to prevent those dreadful famines which periodically afflict us, that "attempts should have been made to throw a doubt on the policy of extending works of irrigation." It is the failure of the periodical rains that brings with it famine and pestilence; it is from that cause alone, and not from over-assessment, that the prosperity of the Madras Provinces is retarded. There is but one remedy, and that is, to store up the waters that are now permitted to run waste into the sea, and turn them upon the land.

25. For doing this we possess an advantage that has never belonged to any other Government. We have the command of the whole course of the rivers which intersect our Southern and Centre Provinces, and such a command of those that run through the Northern Districts as will enable us to turn them to the best account.

Para. 32

26. Captain Cotton proposes to begin by constructing large reservoirs in the hills in which the Southern rivers have their rise; "the fine basins, with narrow outlets, that are found on the hills, the certainty of the supply of water, and the extent of the cultivation in the low country, subject to occasional deficiency of water, offer peculiar advantages which might easily be secured; a great part of the crops are frequently in danger, from the supply of water being inadequate towards the time of the crops ripening on the land at present watered. This danger might be obviated if the surplus water which the S. W. monsoon affords could be stored on the hills for use in the dry season;"* new channels, or the lengthening of the old ones, might be executed with advantage, but without any new works below; an additional supply of water would increase the revenue, by enabling the Ryots to cultivate two crops where at present they only give one.

Para. 33

27. It would also enable the Government to restore ancient reservoirs in the low country, which have been suffered to go to decay; amongst others the "Ponary in Trichinopoly, a reservoir 30 miles in length, with a river channel 50 miles long, which filled, besides the Ponary, many smaller tanks. The advantages of this undertaking would be—

"1st. In the high freshes of the Cauvery, a large body of water, which at present runs to the sea, would be stored up in the Ponary and other tanks, against the time of the low freshes.

"2d. During the moderate freshes, when there is much more water than we can use for the present cultivation, a portion of it would be conveyed to a vast extent of lands, watered immediately from the channel, as well as those under the tanks for immediate use.

"3d. There would be a most complete water communication from the upper part of the Cauvery to Porto Novo, which would be navigable for about seven months in the year, and for boats drawing not more than one foot, for perhaps nine months.

"4th. A portion of water during the dangerous freshes would be led off from the river, and then what at present is worse than useless would become very valuable. Every tank that is constructed to be filled during the high freshes is a step towards relieving the country from damage by floods. The main branch of this channel might also be carried across the 'Vehar' into South Arcot, conveying the water of the high freshes

* Report from Captain A. Cotton, dated 4 December 1820.

freshes of July and August into innumerable tanks at present dependent upon the rains of the N. E. monsoon; nor is there any reason whatever why it should not terminate in the Coom at Madras, for it would have a fall of three quarters of a foot per mile, and there is no serious obstacle to the cutting a channel all along that line. The waters of the S. W. monsoon would thus be conveyed through the very heart of the Carnatic, and incalculable advantages derived from them."

Appendix (L)

28. Captain Cotton proposes to accomplish this great work by leading off a large channel from the upper anicut, carrying it on as high a level as possible, so as to take it through the middle of the Anakoor and the Woodiarpollam Talooks in Trichinopoly, cultivating much land immediately from the channel, filling almost every tank in those Talooks, which are now dependent upon the local rains, securing a great portion of the water of the various jungle streams crossed by it, and discharging itself into the Ponnary.

29. Such a channel would command the whole of the lands through which it ran, and render the two Talooks "almost as productive in proportion to their extent as Tanjore;" they contain, it is said, a great extent of excellent land for irrigation, population is pressing hard upon the present cultivation, and the people are represented as so anxious for the works, that the value of the land has already much increased in the prospect of their being executed.

30. The third great work which Captain Cotton points out as feasible is to convey water from the Coleroon across the River Vellaur, at the north end of the Veraunum Tank, into the Bowanaherry Talook, in South Arcot, filling the great tanks called Wallajah and Peroomalari (which if filled would yield a revenue of Rs. 20,000 a year) and others, and terminating at Cuddalore.

31. The fourth is the reconstruction of an unfinished or damaged anicut which crosses the River Cauvery at Nerinjapet in the Coimbatore District, and the excavation of a canal upon such a level as would admit of its waters being carried into the very heart of the Carnatic.

32. The fifth is the construction of an anicut across the Palnar, for turning its waters, which now run waste into the sea at the rate, it is supposed, of 200 million cubic yards a day, over the whole country between the mouth of the Amboor Valley to the coast, "filling the innumerable tanks which would lie in its course, and incalculably improving the whole country between the Ghauts and Madras."

33. It is estimated that the population of the 12 districts which form the Southern and Centre Divisions (Nellore included) is increasing at the rate of 1 per cent. per annum, so that at the end of 11 years there will be 1,000,000 additional mouths to be provided for.

34. To supply this number with food, 1,25,000 cauries of nunjee land would be required to be brought into cultivation, it appears that the cultivation of nunjee during that period has greatly declined in some districts, and has been nearly stationary in others. Every step that is taken to convert dry land into wet, "diminishes the danger of scarcities, and greatly increases the comforts of the people; for perhaps one-half the number of persons are required to raise a certain quantity of food in wet land, as required on dry, and the remainder will of necessity be employed in manufactures."

"By irrigation every species of produce is improved, and the labour of tillage reduced, while the amount of produce is increased on any given space, and if the extent of population does not keep pace with that increase, or new varieties of crop do not prevent a superabundance of the grains now commonly cultivated, the decrease of price must be followed by a corresponding decrease in the commutation at which the assessment is made, whereby both grower and consumer will be directly benefited, and the Government repaid by the extension of cultivation, and the improved means of the people."

Mr. C. Cotton's Report, para. 63.

35. No stronger proof can be given of the importance of this subject, or of the necessity for a vigorous effort to put the revenue from the land upon a permanent footing, than the fact that the demand against the five districts which compose the Northern Circars, during the last four years, was 2,50,02,390, and the collections only 1,74,93,763; difference, 75,17,627. This large defalcation arose in districts in which Government made great sacrifices when they formed the Zemindary settlement, in order to secure a steady revenue. The bad management of the Zemindars may have contributed to this result, but the main cause was undoubtedly failure in the periodical rains. This failure did not materially affect the large rivers which run through them, the "Kistnah" through Guntoor and Masulipatam, the "Godavery" through Rajahmundry, and within the reach of Vizagapatam, as branches of the "Mahandee" probably are of Ganjam.

36. It is no longer a speculation, the fact has been put beyond doubt by actual survey, that Masulipatam may be made more fertile than Tanjore, and the cultivation of large tracts in Guntoor put beyond the hazard of failure, by applying the waters of the Kistnah to purposes of irrigation; and there is every reason to believe that the same advantages might be obtained for the other districts, by making the same use of the rivers which either intersect them, or which might be turned into them.

"Though the country" (observes Captain Cotton) "cannot advance without good Judicial and Revenue management, yet it is indisputably certain that nothing can avail, unless the irrigation

Para. 55.

Appendix (L.)

irrigation and communications are attended to. While the population is mainly dependent upon the local rains of so precarious a climate for their cultivation, four-fifths of the population must be employed in merely raising food, and every five or six years we must witness the deaths of tens of thousands by famine, and the great body of the people must be without clothing, or anything but a bare subsistence even in fruitful seasons." If we want to promote the general health and comfort of the community, we must be sure to lay a good foundation by supplying them with plenty of food. The price of exportable produce of course depends entirely upon the facility with which food is raised, and upon the price of produce entirely depends its capability of competing in foreign markets. Thus, if food could be raised in this country with one-half of the labour that it has hitherto required, cotton, iron, &c., could be produced at greatly diminished prices, and the profits upon them in foreign markets proportionally increase.

"It is often remarked that there are so few manufactures in the country; how can it be otherwise, when almost all are required to raise food, and of the remainder such a number to carry it about; and when everything must be brought to where it is required at such an enormous price; a price which, if it existed in the same proportion in England, would at once destroy nine-tenths of the traffic of the country." With a healthy climate, abundance of fertile soil, unlimited mineral treasures (the first iron perhaps in the world), ample supplies of water if taken care of, an increasing population, a surface extraordinarily favourable for communications, internal and external peace, and almost any amount of capital at the disposal of Government, there can be no difficulty in raising abundance of food, and of raising it with more economy than in any other country in the world, there is really nothing wanting but action to produce such a change as cannot now be conceived.

38. We have seen that the average collections from the land,* for the first five years of the present century, viz., from Fusly 1210 to 1214, amounted to Rs. 2,40,30,000; and for the five ending with Fusly 1244, to Rs. 2,25,50,000; but if Tanjore be excluded, the result of the comparison will be still more discouraging.

	<i>Rs.</i>
Average collections from Fusly 1210 to 1214 - - - -	2,14,10,000
From 1240 to 1244 - - - -	1,89,50,000
In the first five years, the average produce of Tanjore was, Cullums	94,19,659
In the last - - - -	1,31,70,125
Increase - - - -	37,50,486
	39½ per cent.

The fluctuations in the produce during the first period were between 100 and 57; in the last, between 100 and 95½.†

39. It has been stated that the revenue in two of the talooks in South Arcot (Manargoody and Chillumbrum) was increased in six years from Rs. 1,81,180 to 2,90,605, in consequence of the attention paid to the irrigation works, principally by the construction of an annicut across the Coleroon. That work cost Rs. 1,64,756; it came partially into operation in Fusly 1245, and up to Fusly 1249 the increase attained in South Arcot alone has been 1,38,129, independently of the benefits derived in Tanjore; so that the work has already more than paid for itself.

40. It is clear from these facts, that whenever the Government are compelled, by want of an adequate establishment, to postpone the execution of any similar work, they lose hundreds in revenue for every rupee that is saved in charges. At present there are urgent applications from several Collectors for Engineers, to report upon important projects, which cannot be complied with; and if those which have been enumerated in this paper should be found feasible, and promise large and immediate returns, they cannot be undertaken for want of competent Superintendents.

41. When it is considered that the districts of this Presidency are, upon an average, from 100 to 120 miles in length, by 80 or 100 miles broad, that each of them contains from one to three thousand works of irrigation, scattered in different directions, independent of roads, bridges and public buildings, and undergoing an annual expenditure of a lac of rupees, it is evident that there can be nothing like effective superintendence of public works, unless there is an Engineer attached to each; and as this officer must make plans and prepare estimates for every work, and keep a diary of all his proceedings, which must be copied in duplicate or triplicate, either he must go through this mechanical labour himself, and neglect his own important duties, or he must be allowed a suitable establishment for them.

42. Under the present arrangement of the department, the Assistant to the Civil Engineer, a commissioned officer, who has had a costly education and receives a high salary, and a Surveyor, whose pay is Rs. 175 a month, are "employed in making two copies of their own diaries,

* That is, in the 12 irrigated Ryotwar districts; viz., Nellore, Bellary, Cuddapah, Chingleput, North Arcot, South Arcot, Salem, Tanjore, Trichinopoly, Tinnevely, Madura, Coimbatore.

† As the revenue of Tanjore fluctuates with prices, the produce has been taken as a test of the prosperity of the district, instead of the collections. The collections in that part of the district which is not influenced by prices have increased in nine years, viz., from Fusly 1210 to 1244, from Rs. 9,62,385 to Rs. 10,43,343.

diaries, which could be done by men on Rs. 20; and an experienced Surveyor, capable of planning works, is employed in copying plans of tunnels and cutcherries, which require no thought or ability, and for which men could be obtained at one-third of the cost;" all this is in violation of an acknowledged principle, that it is waste of money to employ any person in doing duties that can be done by others at a less cost; such a violation would never be thought of in any other department; no European assistant who receives a salary of some hundred rupees a month is ever employed either at the Presidency or in the provinces in copying papers.

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43. I have heard an opinion broached, that although the neglect of the works of irrigation is a cause, yet it is far from being the principal cause of the decline in the land revenue; that bad seasons, defective revenue arrangements and management, the ruin of the foreign trade, the corruption of the native revenue servants, and heavy assessments, have more to do with the defalcations than want of water.

44. But the conclusive answer to this is, that wherever there is abundance of water there is no want of revenue, that Tanjore and all those parts of the southern districts which are watered from the rivers of the S. W. monsoon, are in a most flourishing condition, the land saleable and the people comparatively wealthy.

45. How does it happen that Tanjore, which depends almost entirely for its food and its revenue upon artificial irrigation, is the only one of the 12 Carnatic districts that is in every respect steadily advancing in prosperity? Its assessment is not a jot lighter than that of other districts,* and it is open to all the evil influences which are supposed to retard the general prosperity. It is assuredly its never failing supplies of water that give it this advantage; an advantage which, when the revenue was levied in kind and absorbed one-half of the produce, enabled the Ryots to preserve their lands as a valuable private property.

46. I believe it will be found that "foreign trade" has reached its extreme point of depression, that the native manufacturers are beginning to lift up their heads, and, from the facility with which they imitate European patterns, it seems probable that, if machinery were introduced amongst them, India would again become an exporting nation: I am not aware that there is a single district in the Madras territory which is over assessed, though there may be some particular tracts which require reduction.

47. Of corruption and embezzlement there is, no doubt, abundance; but if the land was well watered instead of being parched by drought every five or six years, there might be as much corruption, but there would certainly be more revenue, and more left to the producers of revenue. People do not die of famine because European cloth is used instead of country, but simply because the land, for want of water, will not yield its produce.

48. It seems to me, therefore, advisable that the Board of Works should be called upon to report upon Captain Cotton's suggestions. The works which he has proposed will, if practicable, be of the highest benefit to the country; and the vast advantages which have been already derived from the upper and lower annicuts, works which were entirely planned by him, entitle his opinions on the subject to particular respect. It is satisfactory to know that, after some of the heaviest freshes that have ever been known in the Cauvery, no damage whatever has been done to the banks of either river; on the contrary, the Civil Engineer reports that Tanjore was never so free from breaches as it has been this year. Many things, he says, have now been proved which were before considered doubtful: "The fear that the beds of the rivers were rising by the influx of sand, caused by the upper annicut, is one of them, for had that been the case we must have found the embankments too low for such a flood as this, and breaches would have been the sure consequence. No alarm need now be entertained from the increased body of water thrown into the Cauvery by the annicut, for it is evidently more than counteracted by the sluices and calingulas of discharge; and I am fully satisfied that these minor works, acting in concert, regulate both the water and the sand, and give all the control necessary for the safety of the country in floods, and the supply of the irrigation, and that no further works whatever, for any general effect, are necessary."

See letter from
Civil Engineer,
Fifth Division, to
Board of Works,
10 August 1840.

49. One of the projects suggested by Captain Cotton has, I observe, been partially investigated, and the result is highly encouraging. A former Collector of Trichinopoly, Mr. Nelson, has the merit of having first drawn attention to the great reservoir, called the "Ponary." This was in 1832. He stated that 20,000 cawnies might be cultivated if that work was restored; no notice, however, appears to have been taken of this representation, and it was not until 1836 that the project was revived by Captain Cotton, in the report which is now under consideration.

50. In 1837, a partial survey of the old work was made, and its prosecution strongly recommended by the Engineer officer of the division, Lieutenant Ditmas, and the then Collector, Mr. Blair. Three years more, however, were suffered to elapse without any measures being taken to forward it, when the subject was again urged upon the Board of Works by the present Collector. He stated that the Ryots of the Woodiarpollim Talook alone "were

* This is a mistake; the revenue assessment in Tanjore is very much lighter than in almost all other districts.—P. W. Comrs.

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“ were willing to undertake the cultivation of 9,000 cawnies, which would yield a revenue of between 80 and 90,000 rupees, but that this did not at all approximate to the whole quantity which might be brought under cultivation. In Arinlore, there would be a great increase.”

51. The Board, upon this urgent representation, ordered the Engineer, as soon as his other duties would permit, personally to examine the project, which they said appeared to be of vast importance; but the other duties of the Engineer are so heavy as to make it impossible for him to give immediate attention to the work; and, unless he is assisted, there is no chance of anything being effectually done. Here is a striking instance of a project, allowed by all the authorities to be of great importance, being suffered to linger for years for the want of an efficient establishment. A tenth of the revenue that has been lost from the neglect of this project, in the eight years that have already elapsed since it was broached by Mr. Nelson, would have paid for such an increase in the establishment as is required. As another instance, I may mention that a survey was in progress for restoring works upon the Pennaar River, in South Arcot, upon which an increase of a lac of rupees to the revenue depended, when the Surveyor was taken away to survey some pasture lands in Mysore, which had been appropriated for the public cattle.

52. I think, therefore, that the Board of Works should be instructed to report without delay what addition will be required to the Civil Engineer's Department to enable it to carry out all the important works that have been suggested within the last few years, should they upon a careful investigation be considered feasible, viz.:

1st. The complete irrigation of the districts of Rajahmundry, Guntoor, and Masulipatam, from the Kistnah and Godavery, and a canal of communication from the latter river to the Pulicat Lake.

2d. The construction of an anicut across the “ Palar,” with all the necessary subordinate works. The restoration of the “ Poonairy,” upon the plan suggested by Captain Cotton.

3d. The restoration of the anicut across the Cauvery, at “ Nerinjepett,” and the execution of canals from that river, to be carried through the districts of Salem and Coimbatore, upon as high a level as possible.

4th. A canal from the lower anicut across the River Vellaur, for filling the great tanks of Wallajah and Peroomalairy, in South Arcot.

5th. The diversion of a stream, which now runs waste to the westward, into the River “ Noel,” in order to afford adequate supplies of water to the extensive cultivation under that river.

6th. The construction of a series of reservoirs on the hills, for storing up the surplus waters of the S. W. monsoon, which now run waste.

53. Many of these works are indicated in the accompanying skeleton map. It was long ago recommended by Colonel De Havilland, an officer of the highest talent and most extensive experience, that this Government should not cease in their efforts to improve the irrigation of the country until they had turned to account all the water which now rolls in volumes to the sea, by the rivers which intersect the Peninsula; and he proposed to effect this object by excavating extensive canals, which should serve at once for purposes of irrigation and communication.

54. This recommendation has its foundation in the fact, that our provinces prosper or decline, according to the supply of water which they receive. Tanjore, Malabar and Canara are liable to all the incidents which affect the welfare of the other districts, with the important exception of water, of which they have always abundance, the former by artificial works, the latter from the natural rains; in them, therefore, famine and all its concomitant evils are unknown, and in point of agricultural wealth they will bear comparison with many parts of Europe. No year passes without our having melancholy experience of that contrast which is afforded by the state of the other districts.

55. I must again recur to the fact, that the revenue in two talooks only, in South Arcot, last year, was Rs. 1,30,000 above the average revenue, before the lower anicut was constructed. As Tanjore has always been fully cultivated, the effects of the upper anicut upon the revenue of that province are not so easily made matter of account; that they are of the highest importance, however, is evident from the fact stated by the Civil Engineer, that the river in this season has been “ so exceedingly low ” as to require the retention of the whole quantity for cultivation. But for the anicut, a large portion of it would have run waste to the sea. All that came into the river has been kept up by the anicut, and turned upon the land, and lacs of revenue thereby saved.

56. It is plain from these facts, that an increased expenditure upon the Engineer Department would be the sure means of filling the public treasury. I am persuaded therefore, that the attention of the Government cannot be directed to a subject of greater importance, and that it would be wise, without delay, to investigate it thoroughly, with a view to the undertaking of all such works as promise results equal to what have followed from the construction of the anicuts in Tanjore.

5 September 1840.

(signed) J. Sullivan.

Since

Since the preceding sheets were written, the report of the Collector of Tinnevely upon the settlement of that district for Fusly 1248 has been submitted. It appears that the revenue lost in that year from deficiency of water in the Nunjah lands alone, was Rs. 1,58,471. This example is of itself sufficient to show how necessary it is to the finances of Government, that every effort should be made, and made without delay, to put the works of irrigation in the most efficient state; particularly that we should take measures for storing up the water which now runs waste at one season of the year, in order that we may have the means of making up for deficient supplies at other seasons.

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The Collector says, that the early part of the season was so favourable as to induce the Ryots greatly to extend their cultivation, but that a failure in the river supplies at a later period, destroyed their hopes and their property; so that instead of an increase in the revenue of Fusly 1248, over that of Fusly 1247, of Rs. 1,22,767, which would have been realized if the water had sufficed for the cultivation, there was a net decrease of Rs. 20,259.

In the worst years there are some days in which there is such a glut of water as would admit of a quantity being stored up in reservoirs on the hills for use, when the harvest is placed in jeopardy by drought below. In the Cauvery, this year, there was at one time so little water, that unless the new annicuts had turned all that there was upon the land, the crops in Tanjore, Trichinopoly and South Arcot would have been ruined; while at another period of the season there was such a flood as has not been known for many years. The construction of reservoirs on the hills (where the rivers have their sources), is a new feature in the irrigation system of India, although such works are made in parts of Russia for assisting the navigation of rivers. It will be seen from the accompanying papers, that reservoirs capable of containing many million cubic yards of water may be constructed on the hills at an expense from Rs. 4,000 to Rs. 5,000.

I find upon referring to the accounts, that I have greatly understated the financial benefits that have already been derived from the construction of the lower annicut. That work has cost Rs. 1,85,000, including repairs, and locks, &c., constructed for the improvement of navigation; the increase of revenue from the works in Fusly 1245, the first year that it came into operation, was reported by the Collector to be, Rs. 50,000; in the two following years it yielded an increase of Rs. 75,000 per annum; and in Fusly 1248, the increase upon the average revenue was, Rs. 1,38,128; the total increase therefore has been Rs. 3,50,000, or nearly double the amount of the expenditure.*

But a much larger increase is expected when all the channels of irrigation from the annicut are perfected, the embankments of the river completed, and a general system of drainage established. I am informed by the Civil Engineer of the division, that "the delay which has occurred in extending channels to distribute the water" has been a most serious loss; nearly all the waste land would have been cultivated this year had they been done. This comes from having an inefficient establishment, and is an additional proof of what I have stated, "that Government" lose thousands in revenue, when they save ten by keeping the Civil Engineer's Department below its proper level.

10 September 1840.

(signed) J. Sullivan.

Appendix (M.)

LETTER from the Madras Military Board to the Governor in Council of Fort St. George, recommending some changes in the official practice of the Board, with the view of expediting business, dated 29 September 1840.

Appendix (M.)

My Lord,

1. We have the honour to acknowledge the receipt of the extract from Minutes of Consultation, No. 3,244, dated the 25th ultimo, communicating a draft of a proposed General Order, for the purpose of our submitting any suggestions that may occur to us as calculated to promote the object of that order.

2. We are fully sensible of the advantages that would result in the transaction of public business, from such a modification of the existing course of procedure as would diminish the frequent and troublesome references to Government, without weakening the efficiency of that wholesome check and control which is necessary to prevent an unprofitable expenditure of the public funds, and the subject has often engaged our serious attention.

3. It appears to us, that the extremely desirable object contemplated by Government, will be only partially attained by the operation of the order which has been referred for our consideration; for it is not the correspondence connected with the submission and sanction of bills that chiefly occasions the endless references to Government, which consume so much time

* In the N. W. parts of this district (S. Arcot) there are 612 tanks; the assessment of the land under them which is capable of cultivation is - - - - - Rs. 2,64,960

Revenue - - - - - 1,07,974

Difference not cultivated for want of water - - - 1,56,986

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time and labour that might be more usefully employed, but the transmission of estimates and applications for the authority of Government required by the present regulations before disbursements can be incurred, even in cases where the necessity and expediency are acknowledged by all.

It is now the practice in the Building Department, to submit every estimate, and in other branches of the service to apply for the sanction of Government, previously to authorizing any disbursements, however small and indispensable they may be. In cases of emergency it is true, this Board is permitted to authorize the commencement of repairs and the expenditure of money, within a limited amount, when delay would be prejudicial to the public interests, but this in no way diminishes the correspondence, as the sanction of Government must still be applied for and obtained.

4. In the Building Department there are certain repairs required periodically, such as cleansing and white-washing, repairs to the roofs and floors of barracks, which are indispensably necessary for the preservation of the buildings, the comfort and health of the troops, or the security of public property. The necessity of such repairs being admitted, little good is likely to result from submitting the estimates to Government, who cannot effectually check them, while inconvenience and loss not unfrequently arise out of the delay of doing so. These repairs, to be executed efficiently and economically, must be commenced at the proper season, materials being previously prepared; and as delays often unavoidably occur in obtaining from subordinate departments and officers satisfactory explanations on doubtful points, which are farther prolonged by the required references to Government before even the preparation of the materials can be authorized, it often happens that the best part of the working season has passed before the repairs are undertaken, while much time and labour have been spent without any corresponding advantage.

5. In like manner in other departments, either the sanction of Government must be frequently anticipated, or the service suffer inconvenience and loss.

6. In Bengal the Military Board authorizes all ordinary repairs to public buildings, roads, and embankments, without any previous reference to Government, submitting only periodical statements of the number and amount of the estimates so authorized; and the Board of Revenue, in the Department of Public Works at Madras, sanctions in like manner, the ordinary repairs to Maramut works at this Presidency.

7. We would therefore beg to suggest that this Board, as in Bengal, be authorized to sanction all periodical and trifling repairs to public buildings, roads and bridges at the Presidency, and within the limits of military cantonments; submitting to Government at the end of each quarter, a statement of the number and amount of the estimates sanctioned during the quarter, and at the same time bills in detail of all the disbursements actually incurred during the same period, for the final sanction of Government.

8. We are of opinion that in the Building Department at least, Government should not in any case dispense with the submission of the bills of actual disbursements in detail for its final sanction, and it appears to us highly expedient that all expenditure should, in some stage of its progress, either before its commencement or on its termination, be submitted in detail to Government for its control and sanction; for it is a generally recognized fact, that disbursements which are to be laid before Government, are usually managed with more attention to regularity and economy than such as require only the sanction of subordinate authorities.

9. It is not intended by this modification to relax in any degree the scrutiny and check to which estimates and disbursements are now subjected before being authorized; but to transfer that check from Government, which cannot efficiently exercise it, to this Board; which has the means of doing so, and on which the responsibility will devolve, as it ought to do, that no repairs are sanctioned which are not in reality required. Estimates will, as at present, be called for from Superintending Engineers and Staff Officers, and be carefully examined in the office of the Chief Engineer; the buildings will be surveyed both before and after the execution of repairs, and precisely the same course of scrutiny and control followed, only they will not be submitted for the sanction of Government before being authorized.

10. Estimates for new buildings and for additions and alterations to existing buildings, as well as for extensive repairs, such as the renewal of roofs or floors, will continue to be submitted for the special approval and orders of Government; and if thought necessary, of ordinary repairs also, when they exceed Rs. 1,000, although no such restriction exists in Bengal.

11. Should your Lordship in Council deem it right to sanction the proposed extension of the Board's authority, the same system will exist at this Presidency as was established a short time ago in Bengal for reasons similar to those which we have now stated; but with the additional control that bills in detail of all disbursements, however trifling, will be laid before Government quarterly for its final sanction, which we are of opinion will prove a useful check on unprofitable expenditure. In Bengal, statements only of the authorized estimates are forwarded to Government, and the bills afterwards passed by the Military Board, if they do not exceed the amount of their estimates more than 10 per cent.

12. For the same reasons we are of opinion that it would prove advantageous were we
entusted

entrusted with the authority of sanctioning the entertainment of additional artificers in the Gun Carriage Manufactory to the extent of *Rs.* 150 per mensem, and in arsenals to the amount of *Rs.* 75, when extra work is required to be performed in these establishments; and advances for forage for mounted corps, when ordered to march, not exceeding *Rs.* 500; bills with explanatory remarks being submitted at the end of each quarter for the final sanction of Government. Appendix (M.)

13. As a further check on the tendency which all disbursements and establishments have to increase, annual statements of the expenditure in the Building and Ordnance Departments, arranged under the distinct heads of what has been incurred with the sanction of Government previously obtained, and what has been authorized by the Military Board, may be submitted to Government; who will thereby have the means of exercising a far more efficient control over the general disbursements than it now possesses, by comparing the expenditure of different years, and requiring explanation wherever an unaccounted for increase appears in any branch.

14. There is one other point to which we would wish to solicit the attention of your Lordship in Council. In cases of advances required for buildings and repairs sanctioned by Government; these are at present restricted by Regulation, when the estimate exceeds *Rs.* 800, to one-third of the amount when the work is sanctioned, another third, when the walls are raised, and the remaining third when the work is finished. A strict adherence to this rule is frequently attended with inconvenience, and leads to much correspondence, which would be obviated by this Board having the discretionary power when the estimate does not exceed *Rs.* 5,000, of authorizing the whole or such part of the amount as shall appear necessary, on a consideration of the season of the year or the distance of the station from the Presidency. On many accounts this authority would be attended with benefit to the service, and assist us in diminishing our clerical labour.

15. The modifications now suggested in conjunction with the proposed General Order which we have the honour to return, having added a few items to the list of subjects, comprise all the alterations which we feel justified in proposing at the present moment, for expediting and improving the transaction of public business.

Appendix (N.)

EXTRACT from a Letter from Mr. Norfor, Manager of the Porto Novo Iron Works of the Indian Iron Company, to the Public Works Commissioners, dated 27 September 1851. Appendix (N.)

3. THE canal running from the lower annicut to Porto Novo is of the utmost importance; and since the construction of the annicut, it is indispensable, as forming the communication between Porto Novo and the districts of Coimbatore, Salem, Trichinopoly and Tanjore. But I regret to say it has not answered the expectations that were formed of it. The Indian Iron Company having considerable traffic on this canal have, in consequence, been frequently forced to make representations to the authorities regarding it; and I fear have often been considered very troublesome. It has been remarked, that it is impossible that the Government can make any considerable improvements, as the traffic on the canal is not in general of sufficient importance beyond the interest of the Iron Company. I am ready to admit this argument, just now, as correct. The canal in question is principally used by the Iron Company; but the reason is that no private individual will take the risk of navigating it, and the Iron Company would not either do so, only that they are forced to do so as their ore and charcoal supplies all come from the banks of the Cauvery; it is therefore the only route they can take, since the construction of the lower annicut, which bars the passage of the boats in the direct line of the river to the sea coast.

4. The reason that this canal does not come into more general use is, because no dependence can be placed on it. Boats go up to fetch produce, but are by no means certain when they may be able to return.

5. The canals run through the richest talooks of South Arcot, yet every bag of rice or paddy is brought into Porto Novo on bandies; a few boats do attempt the passage, but from the great difficulty of the navigation of one part of it, the full development of its utility is entirely impeded.

Situated as Porto Novo is, and this canal in efficient order, it would be a large grain exporting port; which is not the case at present, solely because the communication with some of the richest rice grounds is almost impracticable.

6. The land is impassable, and the roads are not much better in wet weather; the consequence is, the Collector has much trouble in collecting the revenue, because the paddy is stored in the field, whereas, with a more easy mode of transit, it would be immediately forwarded to a market. You may perceive from what I have stated, that independently of the Iron Company, a very considerable extent of trade would pass by this canal if it was in efficient order.

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7. I will now point out the difficulties experienced in its navigation, and suggest some improvements that may be made. With regard to temporary repairs and assistance, I cannot avoid expressing my sense of the considerate attention we have always met with from Captains Lawford, Bean and Ludlow, who have always done everything in their power to assist the passage of our boats, and as they are well acquainted with the defects of this canal they will be better able to correct and improve on my remarks.

8. You are doubtless aware that the canal in question runs from the lower annicut into the Veeranum tank. On that tank at Lallpett are two locks for the purpose of letting the boats down into a cut called the "Vellikall" which joins the old canal about 2½ miles to the eastward. This old canal then runs on some 30 to 35 miles, to Porto Novo, where the boats are again let down into the Vellaur river by another lock.

9. There is abundance of water in all other parts of the canal except in this branch called the "Vellikall," and about two miles or so beyond it; that is, a boat can go through the Porto Novo lock laden to draw 2½ feet of water, and she will proceed without any considerable obstruction until she arrives in or near the "Vellikall" branch; on approaching that branch, she meets with shoals and banks, and after entering the "Vellikall" will ground, and probably in some places find only 10 inches of water as she approaches the locks. The same happens with boats laden and coming down; they get from the lower annicut to the Lallpett lock very well; but on arriving there, they find as before, only 10 inches of water in this end of the "Vellikall," although there is quite sufficient in the old canal below.

10. This usually causes a detention. Should a slight fresh occur, they pass through the lock gates and wait in the pond below, keeping ready; when, if the lock-keeper is willing, he watches his opportunity, opens the sluices and admitting a rush of water into the "Vellikall," the boats are regularly washed down into the old canal, and with them, of course, a plentiful deposit of mud to form shoals and banks. On very desperate occasions, we construct a dam across the "Vellikall" and float the boats down to it; then remove the dam and float on to another. All this, you must be aware, is attended with great trouble and expense, and no private traders would do it. When the boats are once in the old canal they get easily down to Porto Novo.

11. The conclusion I come to from this state of things is, that the difference of level of the bed of the old canal and the floor of the second lock on the Veeranum, is so great as absolutely to require one or two extra locks between these points. This done, and the lock at Porto Novo lengthened, I see no reason why the canal then should not be thoroughly efficient, and I am sure it will be extensively used.

12. Some regulations are required regarding the management of the calingulahs and sluices of the canal; as I have observed a most wanton and culpable waste of water, from the natives neglecting to shut them at proper times. I have repeatedly observed it, but it seems impossible to fix the responsibility on any party. I would suggest that a guard be placed over each sluice or calingulah, and that he should be well paid and severely punished on the slightest neglect.

 Appendix (O.)

Appendix (O.)

LETTER from Military Board, Calcutta, to Military Board, Madras, dated 22 June 1852; as to the mode of sanctioning Estimates for Repairs, and Bills for Work done.

I AM directed by the Military Board to acknowledge the receipt of your letter, No. 3305, dated the 1st current, and to submit the following replies to the questions put:—

Query 1st.—Are bills for works in the Engineer Department executed on Government sanctioned estimates, which do not exceed or only slightly so, and to about what extent their estimates passed by your Board without further reference to Government, and if so under what authority?

Estimates for new works in the Engineer Department are without exception submitted to Government for sanction. The Bills for the same, if less in amount than the authorized estimate, or not exceeding the estimate by more than 5 per cent, are passed by the Board under the orders cited in the margin,* of which copies are annexed, and sent to the office of the Accountant Military Department, for adjustment. Bills of more than 5 per cent. in excess of the estimates are submitted to Government for orders. Estimates for repairs in the Engineer Department are disposed of in the same way as estimates for repairs in other departments; see reply to 4th question.

Query 2d.—If bills are so passed, to whom do the Board report the transaction?

A quarterly report is made to Government of bills passed by the Board in excess of estimates, under the order noted in the margin.†

Query 3d.

* G. O. G. G. 17th July 1849, Secretary to Government, Military Department, Letter No. 9, dated 14 March 1842.
† Government Order, Military Department, dated 12 January 1830.

Query 3d.—Is any notification made to the Accountant-general of bills having been passed by the Board?

Appendix (O.)

When Bills are audited by the Board they are sent for adjustment to the respective offices of account. The Board make no further report, beyond informing these offices that the bills have been passed.

Query 4th.—Are ordinary repairs executed without the sanction of Government, and are bills of this nature passed by your Board without reference to Government?

Ordinary repairs are executed without requiring the sanction of Government; the bills are also passed by the Board without reference to Government.

Ordinary repairs in this Presidency are classed under two heads. Ordinary annual and ordinary petty or contingent. With regard to the former, at the commencement of the working season, Government places, on application, at the Board's disposal, an advance equal to the average expenditure of three years, to enable the Board to order advances on the passed estimates for the usual annual and quadrennial repairs; the office of account granting the requisite assignments on the orders of the Board. Petty repairs are usually charged in monthly current expense bills, and are executed from advances granted separately by Government.

EXTRACT from the Proceedings of the Right Honourable the Governor-General in Council in the General Department, under date the 12th January 1830, No. 265, referred to in the foregoing Letter.

READ an extract from the proceedings of Government in the Military Department, dated 1st instant.

Resolution.—The Governor-General in Council sees no objection whatever to the arrangement adopted in the Military Department being acted upon also in the General, Commercial, and other departments. But it will be necessary that registers or notices of the bills passed in each department should be submitted periodically for entry on the proceedings of Government and for notice in the general letters addressed to the Honourable the Court of Directors.

EXTRACT of Government Order, dated 17 July 1819, referred to in the foregoing Letter.

9. WHEN the repair or erection of any particular building shall have been completed, the Executive Officer is to send a bill for the same, through the Superintendent, to the Military Board for audit; and if the amount of the bill does not exceed the estimate, the Board is authorized to pass it without reference to Government.

EXTRACT from the Resolution of the Supreme Government, dated 14 March 1842, referred to in the foregoing Letter.

IN modification of the resolution in the General Department, dated the 12th January, 1830, his Lordship is further pleased to determine that 5 per cent. shall be the limit in future, instead of 10 per cent., up to which expenditure in excess of estimated cost may be passed by the Military Board, when such excess is satisfactorily accounted for to that authority.

Appendix (P.)

LETTER dated 10 April 1852, from Mr. G. W. Boothby, Superintendent of the Aska Sugar Works in the Ganjam District, respecting the very bad state of the Roads of the District, and the positive Injury thence accruing to Trade; addressed to Messrs. Binny and Co. of Madras, and communicated by them to the Public Work Commissioners.

Appendix (P.)

Dear Sirs,

As it is reported that Government objects to sanction the bridging of the rivers on the line which has lately been surveyed for a road in the Ganjam District, and as Commissioners have been appointed to inquire into the superintendence and execution of Public Works in the Madras Presidency, it appears to me that the time has now arrived when it is incumbent upon us to take some steps with the view of bringing prominently to the notice of Government our position in the Ganjam District, with reference to the impossibility of transporting our large and valuable stocks of produce to the coast during five months of the year, and the consequent very serious loss to which we are annually subjected; also the great difficulties we have had, and still experience, in procuring an adequate supply of raw material for our sugar works, owing in a great measure to the entire absence of roads throughout the district, and the consequent great impediment to the transport of produce from the various

Appendix (P.) parts of it to our works, which of course must act as a check to an extended cultivation of the sugar-cane.

2. In order that I may state facts that have actually occurred, I will now mention the leading circumstances of our operations last year.

The total sum expended by the Aska establishment in the purchase of raw material during the year 1851, though greatly in excess of what we had in any other year been able to expend, does not represent more than one-third of the quantity necessary for the full supply of our works, and yet for years past there has been on our part an urgent demand for the produce of the sugar-cane, at a rate allowed by the sellers to be highly remunerative to them. We having, four years ago, fixed the price, at a sacrifice of immediate gain, with the view of so greatly benefiting the producer as to induce an extended cultivation, and though since that time our sugar has fallen in price fully one-fourth, we have not made the slightest alteration in the favourable rate allowed to the producer of the raw material. In our neighbourhood this measure has been attended with the desired effect; but the entire want of roads prevents an extended cultivation of cane in parts distant from us.

3. For the full yearly supply of our sugar-works six lacs of rupees worth of raw material are required, and to this must be added another lac of rupees for current expenditure in connexion with manufacture, &c. which would bring the amount distributed in the district from our sugar-works alone, independently of our large purchases in other articles, to seven lacs of rupees; more than half the total amount of revenue collected in the Ganjam District. Roads and irrigation works would speedily bring about this state of matters so desirable both for ourselves and the Government. Even with these necessary aids to commerce it may be doubted, looking to the great competition that is now arrayed against India from the Brazils, Cuba, and especially the beet-root sugar of Europe, whether the sugar trade of India can continue to exist; but without such aids it cannot be expected that we can compete with countries in which all advantages that can be derived from facilities of communication are enjoyed.

4. I now come to the most important point in connexion with the subject under consideration; namely, the question as to the necessity of bridging the rivers along the extended line of road in the Ganjam District. I will in reference to this matter also, again state facts that occurred last year.

We commenced manufacturing sugar early in March 1851, and finished in September. We carted to the coast before the setting in of the rains 700 tons of sugar and 150 tons of rum. During the early part of the rains, that is, from the middle of June till the middle of July, we were able, owing to the heavy rains setting in unusually late, to send to the coast 300 tons more of sugar and 50 tons of rum. It was accomplished with great difficulty and expense, and at great risk; but having a vessel waiting for cargo at the time, I was compelled to make the attempt. From that period to the end of November the country was quite impassable for carts laden with produce perishable by contact with water, we were therefore unable to get the remainder of our produce (nearly half of the whole year's manufacture) to the coast before the end of December, as we could not commence sending it off until late in November; and from there being no road, though the distance is only 34 miles, the process of transporting a large quantity of produce is exceedingly tedious. Under the most favourable circumstances, a cart carrying half a ton of sugar takes three days to perform the journey to the coast, at a charge of rupees 2½; but the average time occupied is about six days, and often eight or ten days. So that taking the year throughout, that is, the seven months during which it is possible to send our produce to the coast, carts occupy an average period of at least 12 days in performing the journey to and from the coast, the entire distance traversed being under 70 miles.

5. It must, therefore, be apparent that at the best of times the difficulty and delay in getting our large quantities of produce to the coast are very great. A road even without bridges would, of course, remedy this evil during the seven months mentioned; but unless every river and nullah is bridged, a road will be utterly ineffectual in removing the great obstacle of which we have to complain, namely, our valuable produce being shut up for five months of the year. When our sugar-works are at full work, the value of the property on the spot thus locked up would reach four lacs of rupees; and considering the great and direct aid which our operations afford in the collection of revenue in the district, in proof of which I will only mention that at the commencement of last month our advances on the cane crop of the present year amounted to Rs. 3,50,000, for which no return had been received, the whole amount having been advanced from time to time since October last to enable the Ryots to pay their kists as they became due; considering this, I say, it is surely not expecting too much to seek for the removal of the serious obstacles to the commercial prosperity of the district under which it has so long laboured.

6. To argue that there is no necessity for bridging the rivers, because there is no traffic during the rains, when it is well known that traffic at that period is impossible, on account of those rivers, is surely a strange mode of reasoning. It is true that the rice crop, which for many years constituted the principal article of export, is gathered in during the months of December and January, at which time carts can traverse the country, and once a year, during the months of April and May, a few dhonies have come to take rice and other articles away; but it cannot be supposed that no other than so primitive a method of trading would exist, if facilities of communication with the coast at all seasons of the year were afforded.

afforded. At all events, we can safely answer for the great benefit that would be conferred on by far the most important branch of trade in the district, by a road from the interior to the coast, traversable all the year round.

Appendix (P.)

7. I have, in the foregoing observations, confined myself to our transactions in the district in connexion solely with our sugar-works; but it must not be forgotten, when urging our claims for the consideration of Government, on the plea of the extent of our transactions being highly beneficial to the district, and having a tendency to ameliorate the condition of the people, that we have every year been large purchasers in various other articles, such as rice, oil-seeds, turmeric, hides and horns, &c., in all of which you are well aware how our transactions have been impeded and restricted by the difficulty and cost of transport to the coast. It cannot, therefore, be doubted, that with facilities of communication, all branches of trade would greatly increase, and that new ones would spring up. Cotton and indigo, for instance, to the former of which we have already turned our attention, might, I believe, be cultivated with advantage, if facilities for exporting the produce were afforded. Indeed, the district is rich in natural resources, but sadly poor in the means for their development.

I am, &c.

(signed) *G. W. Boothby.*

P. S.—Since writing the above, your Mr. Bell's letter of the 6th has come to hand, enclosing a letter from Messrs. Scott, Bell & Co., of London, in which those friends state that the sugars ex "Phoebe Dunbar," the vessel mentioned in this letter as having been waiting for cargo in the month of July 1851, and on board which the 300 tons of sugar, dispatched to the coast with so much difficulty during the early part of the rainy season of last year, were shipped, have turned out very badly, being valued at 2s. 6d. per cwt. less than those of the same description ex "Ramillies;" which, allowing 1s. per cwt. for fall of price since sale of sugars ex that vessel, shows a lower valuation by 1s. 6d. per cwt. Now, as far as my knowledge goes, this can only be accounted for by the circumstances under which I was obliged to send this sugar to the coast; the carts taking it were often 12 or 15 days on the road; they had to be carried across rivers, one by one, on small canoes, and had frequently to wait beside nullahs for days (exposed, of course, at times to heavy rain) until the water ran off; so that it can hardly be wondered at that the sugar should have received damage. We are, therefore, not only subjected, from the want of means of communication with the coast, to heavy loss from the locking up of our produce, but also to having it damaged, when obliged, as may often be the case, to send it to the coast just before the country becomes quite impassable for carts, in order to save ourselves the payment of heavy demurrage for keeping a vessel waiting on the coast beyond the time stipulated. This year, again, and the year following also, unless such measures are very speedily carried out as will give us the means of communication at all seasons with the coast, we must make up our minds to a continuance of the serious impediments and losses in our commercial operations in the Ganjam District, of which, I think, it must be allowed we have just cause to complain.

(signed) *G. W. B.*

Appendix (Q.)

STATEMENT, showing the REVENUE from IRRIGATED LAND in the *Tinnevely* District, for the Twenty-nine Fuslies, 1232 to 1260, and the EXPENDITURE on IRRIGATION WORKS in the same District for the Thirty Years, 1821 to 1850.

NUNJAH REVENUE.				EXPENDITURE ON IRRIGATION WORKS.					
Fuslies.	Total Net Irrigated Revenue.	Average of each Five Years.	Amount of Arisars struck off in each Year as irrevocable.	Years.	Ordinary.	Occasional.	Emergent.	TOTAL.	Average of each Five Years.
	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>		<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>	<i>Rs.</i>
1232 -	11,92,522	11,54,217	9,196	1821 -	11,187	-	433	11,620	23,199
1233 -	11,79,333		21,373	1822 -	12,305	-	2,445	14,750	
1234 -	11,02,772		11,481	1823 -	15,332	-	4,530	19,862	
1235 -	11,51,253		21,211	1824 -	15,364	-	4,018	19,382	
1236 -	10,24,361		27,418	1825 -	44,967	3,814	1,604	50,385	
1237 -	9,00,465	9,67,766	17,546	1826 -	31,613	2,087	1,960	35,660	41,357
1238 -	10,09,456		16,249	1827 -	51,666	308	17,126	69,100	
1239 -	9,74,482		25,445	1828 -	37,996	129	2,885	41,010	
1240 -	9,30,036		24,032	1829 -	22,037	7	1,771	22,815	
1241* -	5,79,956		22,300	1830 -	35,019	329	1,595	37,153	
1242 -	9,01,383	10,03,088	14,208	1831 -	42,024	421	693	43,138	45,884
1243 -	10,59,716		10,016	1832 -	45,229	449	2,170	47,848	
1244 -	10,65,294		18,337	1833 -	41,117	28,676	1,691	71,484	
1245 -	9,83,948		14,317	1834 -	23,407	483	1,168	25,058	
1246 -	10,30,915		8,260	1835 -	26,903	2,599	2,389	31,891	
1247 -	11,55,184	11,21,921	5,482	1836 -	33,812	-	4,457	38,269	56,279
1248 -	11,32,555		10,958	1837 -	36,286	10,252	4,893	51,431	
1249 -	12,58,502		5,966	1838 -	34,239	25,108	3,344	62,691	
1250 -	10,52,450		7,267	1839 -	39,837	19,101	2,560	61,498	
1251 -	9,63,585		4,894	1840 -	48,432	14,217	4,859	67,508	
1252 -	9,73,212	11,32,475	4,550	1841 -	31,271	10,351	6,747	48,369	41,033
1253 -	11,18,322		1,931	1842 -	32,603	5,251	6,458	44,312	
1254 -	12,11,007		1,214	1843 -	33,329	2,159	2,540	38,019	
1255 -	13,06,259		1,943	1844 -	38,993	4,030	837	43,860	
1256 -	13,42,396		1,577	1845 -	27,639	567	2,209	30,406	
1257 -	15,63,725	12,92,599	897	1846 -	36,452	8,925	1,607	46,984	61,252
1258 -	12,06,365		-	1847 -	40,843	11,764	6,859	59,466	
1259 -	12,05,265		-	1848 -	66,857	15,083	3,379	85,319	
1260 -	11,44,247		-	1849 -	51,179	13,662	3,113	67,954	
			-	1850 -	52,013	7,765	1,760	61,538	

Note.—There are no accounts for Fusly 1251, as the district was under the Decennial Village Rent.

* Fusly 1241 is omitted in taking the average, because the failure of the north-east monsoon in that year was such as to reduce the irrigated cultivation and revenue in this and neighbouring districts to little more than half its usual amount.

During the Decennial Village Lease, which terminated in 1821, the Government outlay in repairs was small; but the renters in many instances spent a good deal on the tanks and channels.

Appendix (S.)

STATEMENT showing the MARAMUT EXPENDITURE in the Tanjore District for the Thirty Years from 1821 to 1850, as well as the Revenue from IRRIGATED LAND in the same District for the Thirty Fuzies from 1231 to 1260.

YEARS.	MARAMUT EXPENDITURE.			Fuzies.	WET CULTIVATION.					
	In each	Five Year	Ten Year		In each Year.		Five Year Averages.		Ten Year Averages.	
	Year.	Averages.	Averages.		Extent.	Revenue.	Extent.	Revenue.	Extent.	Revenue.
	Rs.	Rs.	Rs.		Acres.	Rs.	Acres.	Rs.	Acres.	Rs.
1821	52,512			1231	5,31,081	25,12,988				
1822	54,306			1232	5,32,580	27,26,998				
1823	66,376	58,038		1233*	5,40,879	36,58,258	5,38,899	32,56,795		
1824	57,903			1234*	5,40,469	44,22,748				
1825	59,196		49,194	1235	5,49,170	29,62,992			5,57,556	29,44,685
1826	32,983			1236	5,66,909	24,11,294				
1827	25,268			1237	5,66,156	22,11,245				
1828	28,637	40,350		1238	5,74,942	30,62,105	5,76,214	26,32,575		
1829	32,881			1239	5,80,973	27,24,832				
1830	61,982			1240	5,92,093	27,53,300				
1831	98,649			1241	5,94,027	28,53,999				
1832	1,04,497			1242	6,08,517	31,20,057				
1833	98,279	94,643		1243	5,95,557	32,39,164	6,04,447	29,93,315		
1834	1,13,736			1244	6,14,460	29,62,462				
1835	59,063		96,824	1245	6,09,667	27,90,996			4,12,312	30,11,973
1836	1,49,992			1246	5,82,269	29,91,361				
1837	85,620			1247	6,22,162	30,12,321				
1838	86,617	98,806		1248	6,23,769	30,05,019	6,20,178	30,30,681		
1839	91,703			1249	6,33,276	31,13,631				
1840	78,098			1250	6,39,418	29,30,637				
1841	81,239			1251	6,51,709	27,10,389				
1842	97,100			1252	6,47,722	29,30,932				
1843	93,667	1,00,917		1253	6,47,772	30,77,911	6,49,682	30,78,678		
1844	97,868			1254	6,43,881	31,84,590				
1845	1,34,723		91,923	1255	6,57,316	35,40,366			6,60,538	31,54,922
1846	93,306			1256	6,66,089	35,10,359				
1847	63,656			1257	6,65,868	32,09,515				
1848	91,456	82,129		1258	6,74,261	30,59,991	6,71,394	32,30,967		
1849	62,027			1259	6,76,079	31,66,739				
1850	1,00,198			1260	6,74,684	32,08,233				

* Owing to the dearth in other districts in the Fuzies 1233 and 1234, the ordinary produce of grain in Tanjore, saved by the ample supply of water from the river, rose in price; and the revenue in those Fuzies exceeded the amounts obtained in any succeeding years, by reason of the revenue being at that time dependent on the selling price of grain.

Appendix (T.)

STATEMENT showing the Total Number of ESTIMATES above and below Rs. 1,000, sanctioned in 1850, for Repairs and Improvements to WORKS of IRRIGATION.

DISTRICTS.	ORDINARY ESTIMATES.						OCCASIONAL ESTIMATES.						TOTAL of Ordinary and Occasional Estimates.	
	Above 1,000 Rupees.		Below 1,000 Rupees.		TOTAL.		Above 1,000 Rupees.		Below 1,000 Rupees.		TOTAL.			
	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.		
Bellary	7	11,868	148	18,838	155	30,691			15	2,782	15	2,782	169	33,473
Cuddapah			65	12,638	65	12,638			21	4,896	21	4,896	106	17,534
Coimbatore	5	7,247	149	33,950	147	31,197			4	1,927	4	1,927	151	33,124
Chingleput	5	6,964	308	30,931	310	39,895	3	7,210	31	7,329	34	14,539	344	54,434
Ganjam			302	11,347	302	11,347			3	1,120	3	1,120	205	12,467
Guntur	5		232		235				73	13,382	75	13,382	310	13,382
Kurnool	1	1,569	88	5,502	89	7,060	3	4,534	12	1,790	15	6,304	74	13,364
Masripatam	12	21,871	230	27,968	232	49,139			4	1,449	4	1,449	236	50,588
Madura	2	2,447	103	31,690	105	24,137			6	920	6	920	111	25,067
North Arcot	5	11,603	160	24,093	165	40,896	2	8,313	21	3,604	23	11,717	186	52,413
Nellore			196	17,229	196	17,229			16	2,684	16	2,684	214	19,913
Rajahmundry	12	27,224	270	20,974	282	78,198							282	78,198
Salem			159	10,327	159	10,327			28	4,353	28	4,353	187	14,680
South Arcot	4	6,108	207	18,634	211	23,732	2	7,906	13	2,280	15	10,186	226	33,918
Tanjore	4	7,346	828	59,406	832	66,752	2	11,533			2	11,533	834	78,285
Tiruchinopoly	7	11,926	379	43,321	386	57,447			22	4,257	22	4,257	408	61,704
Tiruvallur	7	10,228	307	49,022	314	59,250	2	2,195	32	6,947	34	9,142	348	68,466
Vinayapatam			44	4,767	44	4,767			1	477	1	477	45	5,244
TOTAL	78	1,27,645	3,943	4,37,130	4,020	5,64,575	15	43,806	304	39,907	319	1,01,713	4,339	6,163,548

Appendix (U.)

STATEMENT showing the COLLECTIONS from all Sources of REVENUE of the Guntoor District, from Fusly 1236 to 1260.

FUSLYS.	Tax and Revenue.	SOL.	Sayer and Frontier Duties.	Motorpha.	Abkarry.	Sundry Small Farms.	Sea Custom.	Stamps.	TOTAL.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1236 - - -	14,67,918	2,46,269	96,641	67,059	14,804	14,131	4,409	16,755	19,28,676
1237 - - -	14,72,875	2,39,447	1,11,394	61,956	14,891	13,547	5,897	14,748	19,34,755
1238 - - -	14,11,637	2,62,857	1,05,636	61,990	15,366	14,432	6,603	15,202	18,92,926
1239 - - -	14,54,127	4,28,136	1,03,511	61,712	15,306	13,637	5,859	14,770	20,89,088
1240 - - -	12,08,719	3,14,706	96,861	62,466	15,216	12,954	2,887	13,090	18,26,890
1241 - - -	12,49,733	3,85,212	92,586	62,709	15,233	13,780	1,957	12,169	18,33,529
Average of the Six Years - }	13,94,168	3,12,642	1,01,438	62,982	15,151	13,746	4,602	14,455	19,19,178
1242 - - -	6,58,500	1,50,886	64,555	40,891	12,340	9,557	3,142	6,019	9,56,890
1243 - - -	6,71,654	2,08,138	43,707	23,222	4,809	4,484	2,001	6,367	10,56,382
1244 - - -	5,11,593	2,29,243	48,756	25,841	10,029	7,006	3,328	6,438	8,42,834
1245 - - -	8,84,413	2,49,229	59,848	32,310	11,130	8,771	4,050	7,349	12,57,091
1246 - - -	7,82,622	2,38,244	60,699	32,088	11,634	9,614	2,333	7,753	11,44,887
1247 - - -	7,85,197	2,92,487	59,283	51,085	12,193	9,638	3,015	8,283	12,21,181
Average of the Six Years - }	7,15,663	2,44,537	56,474	34,239	10,355	8,278	2,961	7,366	10,76,877
1248 - - -	8,48,968	3,38,791	59,142	51,863	12,600	11,562	2,468	7,815	13,33,109
1249 - - -	9,36,647	3,53,955	62,381	37,724	12,764	9,597	2,778	8,421	14,24,267
1250 - - -	9,09,138	2,91,940	64,385	42,102	12,869	9,977	2,457	14,398	14,37,266
1251 - - -	6,65,180	3,03,621	50,331	41,317	13,720	9,878	2,978	7,024	13,49,449
1252 - - -	8,44,881	2,76,886	57,406	36,252	14,569	9,398	3,591	6,875	12,49,658
1253 - - -	6,87,832	3,46,178	43,422	37,822	14,922	7,297	4,940	7,031	11,49,444
Average of the Six Years - }	8,70,440	3,13,560	57,177	41,180	13,574	9,618	3,202	8,560	13,22,313
1254 - - -	8,42,872	3,55,330	10,980	34,149	15,566	11,436	7,275	5,296	12,82,609
1255 - - -	12,84,203	3,45,133	5,958	42,212	18,073	7,780	7,622	3,236	17,14,217
1256 - - -	14,28,818	3,10,754	4,769	46,400	17,016	11,718	4,194	4,652	18,28,821
1257 - - -	14,65,290	3,87,023	3,923	47,439	19,373	9,533	4,021	3,414	19,40,016
1258 - - -	14,89,754	4,09,730	3,005	48,392	22,538	11,344	7,420	8,710	19,97,929
1259 - - -	14,11,117	3,84,655	3,439	48,492	22,538	11,168	7,55	7,860	18,90,024
1260 - - -	13,01,938	4,12,919	3,746	45,969	22,250	11,133	1,924	8,479	18,07,458
Average of the Seven Years - }	13,17,541	3,71,792	5,118	44,721	19,622	10,587	4,744	5,953	17,80,652
Average of the Nine (ten) Years - }	9,56,385	3,14,706	87,775	40,293	14,785	9,362	3,694	7,235	14,14,406

Note.—In Fusly 1243 a further sum of 5,02,798 was realized by the sale of Government bonds belonging to the Vaidyanath estate; and so also, in the Fuslies 1256 to 1260, various sums, amounting on the whole to 2,10,000 rupees, were gradually realized and credited to the old balances long outstanding against the estate. These sums are omitted from this statement, which is intended as a comparison of the resources of the district in the several years contained in it.

Appendix (V.)

STATEMENT showing the EXPENDITURE of IRRIGATION in

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
YEARS.	Ganjam.	Vizagapatam.	Rajahmandry.	Mamulipatam.	Guntur.	Nellore.	Chingleput.	Madras.	Northern Division of Arcot.	Southern Division of Arcot.	Kurnool.	Bellary.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1916-17 -	1,462	520	-	-	385	33,859	24,192	3,234	46,556	846	-	23,026
1917-18 -	1,794	525	2,723	-	12,766	11,850	45,918	1,942	24,238	63,645	-	45,925
1918-19 -	1,635	525	13,220	-	3,549	22,254	86,163	1,209	29,056	25,015	-	63,390
1919-20 -	-	525	7,109	-	3,675	17,174	74,393	1,301	22,450	1,01,650	-	33,952
1920-21 -	3,467	-	3,330	-	1,338	23,865	75,990	154	16,415	57,594	-	1,63,950
Average -	2,095	524	7,896	-	4,343	21,800	61,191	1,568	27,743	49,750	-	69,049
1921-22 -	4,664	525	7,644	1,433	940	32,256	1,75,639	3,180	18,899	63,107	-	15,021
1922-23 -	4,609	-	8,555	-	4,538	37,183	1,44,686	337	87,352	44,763	-	1,50,109
1923-24 -	6,499	1,055	17,908	-	-	1,04,089	1,70,932	1,840	71,964	78,492	-	1,36,282
1924-25 -	7,454	1,665	13,827	2,433	5,122	41,972	90,728	684	42,275	50,878	-	41,651
1925-26 -	6,171	100	10,711	4,520	2,625	59,560	32,644	20,396	22,953	47,721	-	1,62,693
Average -	5,379	643	11,937	2,795	3,306	55,012	1,22,966	5,279	48,687	57,192	-	1,00,151
1926-27 -	6,943	835	3,690	193	8,078	61,353	1,31,539	211	1,27,937	1,12,986	-	1,91,941
1927-28 -	5,609	3,234	7,216	300	5,936	33,303	1,29,295	5,115	1,59,647	1,72,976	-	2,49,421
1928-29 -	4,981	-	3,841	150	5,594	30,334	75,544	2,001	76,277	96,798	-	1,66,456
1929-30 -	4,733	-	6,236	200	4,126	27,066	71,423	6,710	63,781	56,955	-	1,42,301
1930-31 -	8,542	398	5,532	-	2,730	35,992	92,609	3,735	46,542	59,164	-	1,41,091
Average -	6,042	1,489	5,342	193	5,293	37,590	1,00,642	3,554	95,837	99,596	-	1,73,340
1931-32 -	-	-	3,358	132	1,300	35,977	72,997	871	45,545	97,697	-	90,412
1932-33 -	3,710	2,919	7,099	260	800	33,725	31,916	731	46,918	92,189	-	92,633
1933-34 -	3,518	-	14,675	10	1,600	73,955	69,156	68	37,900	25,204	-	70,168
1934-35 -	4,440	-	4,860	55	1,406	37,358	41,975	23	32,642	91,167	-	74,317
1935-36 -	1,360	3,310	5,121	173	1,524	23,905	63,054	1,074	51,796	1,79,719	-	58,536
Average -	3,253	6,560	6,764	126	1,796	46,764	55,690	453	36,960	97,901	-	77,199
1936-37 -	11,979	2,286	8,079	400	1,836	36,641	87,463	940	45,212	1,43,896	-	87,359
1937-38 -	17,492	3,679	7,034	900	-	24,077	62,189	2,363	92,009	59,776	-	87,015
1938-39 -	16,553	894	12,640	327	2,510	39,701	54,534	707	72,749	46,847	-	66,866
1939-40 -	9,355	1,340	10,833	703	-	39,404	61,245	498	59,642	42,112	-	50,835
1940-41 -	7,594	10,980	36,831	787	3,904	42,614	61,998	1,109	64,635	1,07,935	-	84,947
Average -	12,580	3,610	13,080	603	2,750	34,467	59,466	1,103	66,389	80,113	-	59,404
1941-42 -	9,567	8,016	21,000	1,364	2,500	44,263	73,000	1,100	64,635	90,648	-	65,000
1942-43 -	7,947	2,600	18,000	1,866	2,000	30,763	55,000	700	45,890	73,636	15,000	61,150
1943-44 -	8,813	4,104	30,172	12,751	2,400	15,359	34,791	189	32,067	35,396	1,789	69,776
1944-45 -	5,592	9,166	31,008	4,944	2,060	36,459	30,593	381	19,373	43,227	8,119	43,500
1945-46 -	3,739	6,584	53,859	2,481	1,643	27,734	17,894	85	23,114	90,456	8,583	81,671
Average -	6,532	5,882	31,007	4,681	2,139	40,690	40,239	451	38,962	67,101	6,674	64,419
1946-47 -	617	694	1,48,076	7,993	39,774	36,652	51,804	4,622	50,582	1,10,397	6,313	73,770
1947-48 -	3,884	4,378	4,43,963	11,672	43,722	36,353	1,40,788	2,594	87,928	79,931	6,496	46,839
1948-49 -	4,438	11,099	1,94,948	17,928	40,181	54,338	92,916	5,753	79,936	68,361	4,853	44,275
1949-50 -	2,454	11,148	2,79,068	37,802	43,847	33,318	52,379	2,053	54,318	42,545	9,443	44,191
1950-51 -	16,368	6,206	2,33,093	39,318	49,757	31,053	49,765	1,341	52,655	52,334	9,747	55,382
Average -	8,620	6,708	2,08,229	22,932	42,052	40,746	77,523	3,235	63,242	70,734	7,373	82,695
General Average for the 35 Years -	6,202	3,752	50,635	5,597	9,289	38,763	73,961	2,247	34,046	74,842	7,151	67,311

Appendix (V.)

the Madras Presidency from 1816-17 to 1850-51.

14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.
Coimbatore.	Salem.	Coimbatore.	Tanjore.	Trichinopoly.	Madurai.	Tinnevely.	Melabar.	Canara.	Serangapatam.	TOTAL.	YEARS.
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
42,934	-	64,400	1,24,984	16,765	23,462	2,163	-	-	697	4,19,921	1816-17.
32,722	22,116	19,849	74,892	15,912	1,05,842	1,179	-	-	860	5,03,243	1817-18.
47,227	165	65,771	1,24,439	60,084	20,002	5,647	-	-	680	5,80,255	1818-19.
44,973	8,361	44,331	1,60,513	91,936	71,797	6,528	-	-	635	6,91,183	1819-20.
47,679	40,213	33,639	65,199	72,063	85,632	2,949	2,475	629	655	7,07,497	1820-21.
47,452	17,774	43,558	1,09,948	51,352	61,347	3,693	2,475	629	702	5,81,610	Average.
35,500	65,522	58,252	69,586	53,767	52,174	2,779	5,564	-	495	6,75,767	1821-22.
50,148	38,211	49,481	63,882	41,173	29,158	3,417	2,773	-	58	7,45,933	1822-23.
16,521	1,30,196	51,736	81,918	33,232	36,068	3,482	3,705	-	-	9,49,249	1823-24.
47,266	48,978	31,097	65,943	31,075	33,531	11,215	4,010	800	-	5,75,554	1824-25.
27,593	96,661	35,193	61,856	36,002	56,063	44,727	3,536	-	-	7,38,265	1825-26.
31,534	76,434	45,752	70,937	39,050	41,397	13,124	3,918	800	277	7,36,556	Average.
37,616	64,537	30,312	55,540	20,188	1,14,245	73,579	3,776	-	-	10,49,807	1826-27.
62,092	76,453	29,727	79,575	1,39,101	60,073	77,982	3,200	-	-	13,34,247	1827-28.
40,405	38,724	35,824	64,756	47,157	64,423	72,052	-	-	-	8,28,203	1828-29.
37,781	24,837	16,440	83,539	63,653	67,153	45,695	-	-	-	7,28,574	1829-30.
19,997	23,159	13,752	1,09,301	39,142	73,362	-	45,987	-	-	7,22,975	1830-31.
40,141	45,780	23,433	78,552	65,844	75,852	68,577	17,654	-	-	9,30,762	Average.
11,637	27,550	24,639	1,36,204	23,822	88,256	74,291	-	-	-	7,25,393	1831-32.
13,710	49,066	22,476	1,15,933	31,980	85,569	53,514	-	-	-	6,90,679	1832-33.
51,016	27,648	19,383	1,10,122	40,956	46,480	45,022	-	-	-	6,10,221	1833-34.
39,910	37,434	21,329	1,93,427	42,222	19,534	44,818	-	-	-	5,68,890	1834-35.
22,484	51,211	16,504	1,47,642	36,797	18,812	39,761	-	-	-	6,95,691	1835-36.
20,341	31,450	20,978	1,20,696	35,737	51,860	52,501	-	-	-	6,56,194	Average.
16,669	29,424	20,051	1,10,491	54,182	35,707	61,497	-	-	-	6,80,970	1836-37.
13,718	20,977	45,289	80,811	49,383	26,782	66,113	-	-	-	6,35,917	1837-38.
27,379	14,993	28,111	1,42,289	27,865	31,859	76,289	-	110	-	6,62,712	1838-39.
45,510	15,607	23,028	1,31,468	45,008	39,268	76,859	-	80	-	6,52,877	1839-40.
25,323	16,972	16,569	93,298	48,434	40,766	77,144	-	-	-	7,11,165	1840-41.
26,529	18,216	25,693	1,11,676	45,174	34,876	71,536	-	95	-	6,69,932	Average.
22,380	16,000	29,496	1,04,539	40,099	50,090	65,411	-	-	-	6,90,330	1841-42.
23,179	18,766	21,590	85,609	50,514	20,000	51,988	-	-	-	6,76,110	1842-43.
24,761	10,604	20,689	1,12,534	51,172	13,606	49,813	-	220	-	6,10,539	1843-44.
30,824	13,046	21,516	1,40,578	60,746	26,530	46,442	-	-	-	5,77,063	1844-45.
26,916	13,592	18,929	1,14,696	64,473	41,378	60,686	-	117	-	6,13,476	1845-46.
26,254	15,388	22,346	1,12,130	53,787	26,333	32,868	-	174	-	6,05,307	Average.
29,518	23,333	27,356	84,591	63,992	23,709	65,176	-	-	-	8,42,059	1846-47.
23,447	21,333	18,306	94,199	84,534	29,021	34,646	2	-	-	12,05,569	1847-48.
21,226	2,021	29,431	1,21,119	75,932	34,795	91,021	-	-	-	9,97,251	1848-49.
17,309	18,331	36,359	1,15,845	59,821	37,677	75,735	-	-	-	9,79,192	1849-50.
24,009	17,492	23,184	1,22,535	89,381	34,194	87,436	-	-	-	10,50,397	1850-51.
23,215	20,268	24,891	1,17,692	74,186	32,777	81,407	2	-	-	10,37,353	Average.
29,882	25,635	50,215	1,05,755	52,127	46,592	48,526	7,903	325	380	7,45,293	General Average for the 35 Years.

Appendix (W.)

STATEMENT of Charges incurred in the Repair and Construction of ROADS, BRIDGES, and GHATS,

1. YEARS.	DISTRICTS.													
	2. Bellary.	3. Chingleput.	4. Canna.	5. Coimbatore.	6. Cuddapah.	7. Ganjam.	8. Guntur.	9. Madrass.	10. Malabar.	11. Masulipatam.	12. Nellore.	13. North Arcot.	14. Rajahmundry.	15. Salem.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1826 -	-	16,214	1,551	230	887	3,707	18,528	-	1,610	1,622	44,520	-	3,663	2,000
1827 -	239	10,564	1,777	535	-	32,008	11,520	58	48,322	-	33,173	-	109	10,093
1828 -	2,366	8,268	1,737	90	-	21,569	917	2,944	5,211	18,271	16,390	-	-	550
1829 -	172	2,332	1,207	443	-	4,457	1,339	2,910	9,172	39	3,244	-	-	567
1830 -	796	3,478	39,602	1,567	2,350	2,456	1,164	-	3,150	13	926	-	287	6,424
Average	893	8,171	9,235	573	1,369	12,839	6,514	1,971	13,493	4936	19,645	-	1,353	5,939
1831 -	520	1,373	1,923	458	1,667	1,572	3,558	127	1,150	-	6,663	-	-	8,641
1832 -	278	351	1,159	2,817	19	265	2,736	2,595	8,670	-	4,390	3,179	-	6,316
1833 -	3,854	1,044	9,367	8,944	1,154	20	38,298	1,624	15,594	677	21,648	-	-	7,686
1834 -	21	860	2,775	566	1,033	5	45,982	3,001	12,381	-	17,728	9,030	-	6,575
1835 -	316	95	1,726	280	93	-	567	1,287	1,509	-	3,647	-	-	10,281
Average	997	745	3,390	2,613	794	466	18,228	1,727	7,861	677	11,213	6,105	-	7,849
1836 -	693	544	2,800	626	18	1,212	1,585	4,305	14,057	217	6,481	-	-	9,316
1837 -	981	1,137	3,880	16,133	59	4,890	11,872	18,390	19,361	464	1,594	-	78	7,166
1838 -	1,101	1,137,990	3,740	10,003	1,000	295	373	12,675	34,713	2,110	23,940	255	60	8,189
1839 -	5,944	49,967	2,451	16,474	606	1,396	483	8,503	39,285	-	4,553	605	18	13,812
1840 -	909	1,40,287	24,316	24,737	506	17,527	1,126	15,223	13,649	1,439	33,650	19,046	1,369	2,433
Average	1,827	61,149	7,441	15,595	426	5,046	1,088	10,820	21,213	1,058	14,104	6,629	871	8,023
1841 -	80	15,180	1,604	1,270	2,223	20,151	1,736	17,880	24,473	392	1,262	59,227	1,044	2,587
1842 -	1,729	6,159	1,871,85	1,630	2,103	7,177	21,729	16,044	24,016	296	3,727	58,662	30	4,881
1843 -	424	4,177	2,541	7,608	791	5,700	1,043	3,270	19,923	324	4,959	12,336	20	5,053
1844 -	2,006	2,217	4,234	1,477	317	1,512	1,426	7,371	9,739	409	3,296	16,787	51	3,873
1845 -	10,128	1,597	3,126	11,608	327	2,627	2,622	5,483	23,705	5,419	1,515	8,535	893	78
Average	3,029	5,873	39,998	4,795	1,152	7,439	5,711	10,010	20,431	1,378	2,951	20,165	569	3,241
1846 -	874	2,561	5,219	7,275	2,227	7,932	803	11,142	1,774	664	1,356	1,367	3,298	5,313
1847 -	6,790	2,544	31,635	1,500	500	2,894	795	13,270	10,286	488	88	817	7,120	3,117
1848 -	1,111	6,544	1,05,446	27,517	802	739	8,076	9,081	31,260	5,312	408	1,458	1,977	1,950
1849 -	4,778	431	61,777	13,892	8,109	4,798	1,614	11,052	56,151	4,199	495	492	3,083	2,494
1850 -	5,906	711	49,372	9,298	1,144	6,269	3,812	3,346	13,989	1,863	2,358	4,537	20	10,799
Average	5,893	2,579	50,690	11,812	2,566	4,502	3,096	10,178	25,406	2,499	941	1,634	3,126	11,921
General Average for the 50 years	2,180	15,703	22,139	9,698	1,247	6,232	6,969	7,373	1,825	2,328	9,778	12,730	1,410	7,003

Appendix (W.)

in the Territories under the Presidency of Fort St. George, from 1826 to 1850.

DISTRICTS.								24.	25.	26.	27.	28.	29.
16.	17.	18.	19.	20.	21.	22.	23.	High Western and other Trunk Roads.	Cost of Convict Labour employed on the Trunk Roads.	Red Hill Railroad.	Grand Total.	Grand Total, exclusive of the Cost of Convict Labour employed on the Trunk Road in Column 25.	YEARS.
South Arcot.	Tanjore.	Tinnevely.	Trichinopoly.	Vizagapatam.	Madras.	Kurnool.	TOTAL.						
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
1,668	17,752	2,908	-	8,803	-	-	1,25,853	-	-	-	1,25,853	1,25,853	1826
8,446	7,527	5,720	893	1,330	-	-	1,72,414	-	-	-	1,72,414	1,72,414	1827
1,117	3,675	1,490	432	-	-	-	85,017	-	-	-	85,017	85,017	1828
240	4,381	848	1,170	3,235	-	-	35,745	-	-	-	35,745	35,745	1829
-	9,775	700	-	106	-	-	72,864	-	-	-	72,864	72,864	1830
2,875	8,623	2,333	765	3,380	-	-	98,370	-	-	-	98,370	98,370	Average.
2,778	9,559	1,774	-	405	-	-	44,258	-	-	-	44,258	44,258	1831
3,113	1,202	332	-	-	-	-	37,404	-	-	-	37,404	37,404	1832
8,151	7,893	-	6,080	4,769	-	-	1,33,803	-	-	-	1,33,803	1,33,803	1833
3,435	342	763	890	504	-	-	1,05,916	-	-	-	1,05,916	1,05,916	1834
5,117	3,761	437	-	2,645	-	-	31,761	-	-	-	31,761	31,761	1835
3,923	4,551	827	3,485	213	-	-	70,628	-	-	-	70,628	70,628	Average.
1,094	4,135	297	274	-	-	-	48,170	-	-	-	48,170	48,170	1836
2,609	22,287	3,047	9,699	-	-	-	1,08,312	-	-	8,704	1,17,016	1,17,316	1837
1,759	11,531	1,033	3,903	24	-	-	2,30,424	-	85,855	84,387	3,90,666	3,14,811	1838
168	26,937	5,334	455	583	-	-	1,76,928	-	1,18,387	6,244	3,01,559	1,83,172	1839
3,332	1,010	15,620	1,587	-	-	-	3,17,909	-	98,569	3,044	4,19,412	3,20,853	1840
1,916	13,136	5,108	3,004	279	-	-	1,76,429	-	1,00,934	25,595	2,97,465	1,90,904	Average.
3,093	2,236	6,741	4,717	-	-	-	1,66,747	4,917	93,659	5,232	2,69,655	1,76,196	1841
6	8,195	4,292	2,628	-	-	-	3,52,116	5,294	98,755	368	4,56,263	3,57,778	1842
9	2,080	5,301	1,066	263	-	-	77,289	4,927	61,180	-	1,43,296	82,166	1843
7,089	3,094	13,269	3,053	1,395	-	-	81,923	3,726	60,386	-	1,46,035	85,649	1844
12,592	1,432	5,599	9,115	5,335	-	-	1,07,173	-	9,497	-	1,16,670	1,07,173	1845
4,563	3,410	6,540	4,174	2,397	-	-	1,57,040	4,541	64,685	2,800	2,26,478	1,61,792	Average.
2,883	13,543	11,086	5,336	280	6,030	-	1,08,125	67,874	10,378	-	1,86,377	1,75,909	1846
9,734	8,549	4,998	6,529	300	781	-	1,42,777	1,64,710	9,444	-	3,06,931	2,97,487	1847
10,890	16,185	7,142	19,497	265	-	-	2,57,935	1,93,556	7,685	-	4,59,176	4,51,491	1848
20,535	12,280	12,600	36,054	300	692	2,958	2,58,894	3,23,080	-	-	5,81,974	5,81,974	1849
11,877	500	5,362	9,093	2,572	-	-	1,50,604	4,46,236	-	-	5,96,860	5,96,860	1850
11,176	10,611	8,836	15,301	743	2,584	2,958	1,83,667	2,37,095	9,189	-	4,26,264	4,26,762	Average.
4,375	8,996	4,964	6,093	1,857	2,584	2,958	1,77,223	1,35,737	69,430	17,096	2,15,846	1,89,693	General Average for the 25 years.

Note.—The entries in Column 24, for the years 1846 to 1850, include the cost of Establishment and Superintendence.

Appendix (X.)

STATEMENT OF EXPENDITURE ON BUILDINGS AND REPAIRS UNDER THE

I. YEARS.	MILITARY													
	Presidency Division.		Mysore Division.		Southern Division.		Centre Division.		Northern Division.		Ceded Districts.		Malabar and Canara.	
	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
	New Buildings.	Repairs.	New Buildings.	Repairs.	New Buildings.	Repairs.	New Buildings.	Repairs.	New Buildings.	Repairs.	New Buildings.	Repairs.	New Buildings.	Repairs.
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1871	39,726	44,790	3,448	19,909	86,587	27,846	7,804	11,445	1,791	9,515	31,248	3,044	59,625	8,694
1872	12,100	51,263	3,928	7,706	14,865	6,890	6,294	6,550	292	6,232	1,653	12,860	1,076	1,547
1873	69,102	88,773	1,040	9,980	4,061	26,042	2,248	16,328	268	6,460	971	9,389	16,254	5,799
1874	9,534	18,150	3,230	4,472	7,360	7,511	4,400	3,409	1,527	16,784	1,288	3,141	-	5,725
1875	38,847	39,241	2,259	3,645	429	52,23	214	694	1,488	1,703	1,951	3,026	1,285	2,884
Average	32,074	52,570	3,383	9,543	22,829	14,782	4,312	7,691	1,089	8,260	7,422	6,470	15,779	4,900
1876	67,761	66,911	2,225	2,942	2,420	7,004	785	2,333	1,757	2,435	4,563	1,628	11,914	1,183
1877	95,649	57,161	3,823	3,142	7,975	15,198	5,173	5,125	7,211	2,132	3,261	7,205	3,483	954
1878	21,284	55,776	3,805	5,000	8,293	4,135	10,089	6,426	2,626	6,026	3,134	3,552	6,846	2,925
1879	115,579	162,325	12,987	3,851	9,141	4,715	6,366	3,701	27,261	3,590	5,951	5,536	3,882	3,57
1880	87,107	1,01,657	12,568	17,281	11,756	8,192	1,078	3,983	6,355	4,346	3,115	5,244	2,604	5,709
Average	77,594	84,354	7,081	6,903	7,914	8,009	4,671	4,214	8,648	3,686	3,973	4,235	5,646	2,180
1841	75,189	57,154	9,409	12,888	22,24	6,673	2,765	4,878	4,572	3,172	3,178	2,574	17,582	6,800
1842	150,881	79,484	29,823	6,047	11,791	6,740	100	1,266	238	2,105	9,878	6,429	3,754	6,245
1843	3,212	69,037	11,292	8,347	2,437	3,290	79	1,645	7,830	2,125	17,366	6,346	21,486	3,770
1844	39,988	36,714	8,761	2,467	15,954	7,229	4,432	3,786	1,357	882	1,778	3,087	1,851	1,942
1845	1,04,175	34,127	2,143	4,456	23,922	6,667	4,454	1,599	2,180	2,698	7,048	1,102	3,561	5,057
Average	82,139	64,761	19,692	6,971	11,690	5,264	2,766	3,929	3,141	2,171	7,569	3,906	9,893	4,789
1846	57,108	16,211	8,996	17,522	4,094	3,431	2,466	5,272	1,564	4,758	1,06,639	4,243	17,987	1,680
1847	52,507	43,226	17,041	2,933	13,427	9,118	13,208	12,134	14,720	7,885	3,197	7,391	47,000	21,888
1848	129,088	87,339	3,713	3,391	9,293	6,788	1,336	3,230	19,830	3,208	3,873	3,736	22,080	14,772
1849	1,03,156	8,026	13,213	8,882	3,179	2,672	1,700	2,311	3,056	1,847	3,705	1,723	4,039	2,373
1850	10,707	38,132	30,749	8,097	9,638	9,000	634	1,197	1,582	2,137	4,652	4,092	13,788	3,126
Average	79,700	57,668	12,576	11,497	8,791	6,315	3,783	4,519	6,111	3,941	25,048	4,636	21,433	5,230
General Average for the 10 years.	63,312	64,919	9,214	8,725	12,516	8,353	3,508	4,888	5,360	4,515	11,101	4,827	13,189	4,287

Appendix (X.)

Presidency of Fort Saint George, from 1831 to 1850.

DEPARTMENT.							General Department.			Grand TOTAL.			29. YEARS.
Nagapore Subsidiary Force.		Hyderabad Subsidiary Force including Jaulah.		TOTAL.			23.	24.	25.	26.	27.	28.	
16. New Buildings.	17. Repairs.	18. New Buildings.	19. Repairs.	20. New Buildings.	21. Repairs.	22. TOTAL.	New Buildings.	Repairs.	TOTAL.	New Buildings.	Repairs.	TOTAL.	
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
35,269	10,183	1,961	5,465	2,60,762	1,40,911	4,01,673	1,07,650	50,324	1,57,974	3,68,412	91,235	5,59,647	1831.
17,062	7,024	13,328	2,414	72,101	1,03,416	1,75,517	97,069	17,257	1,14,326	1,69,170	20,673	2,89,843	1832.
44,716	4,852	3,060	3,530	1,42,510	1,71,136	3,13,646	1,38,056	45,304	1,83,360	2,80,566	16,440	4,97,006	1833.
15,353	5,303	7,682	11,500	52,833	70,079	1,22,912	77,134	32,975	1,10,109	1,29,967	29,064	2,59,021	1834.
12,360	9,625	3,160	2,807	61,947	92,518	1,54,465	10,341	21,438	31,779	72,288	13,951	1,86,239	1835.
25,051	7,397	5,876	5,147	1,16,029	1,16,810	2,34,839	86,050	37,460	1,23,510	2,04,079	1,54,270	3,58,349	Average.
13,303	292	7,425	1,304	1,13,379	86,042	1,99,421	22,452	39,469	61,921	1,35,831	1,25,511	2,61,342	1836.
18,936	2,079	18,859	9,041	1,84,315	1,00,777	2,85,092	65,099	46,694	1,11,793	2,29,414	1,47,471	3,76,885	1837.
47,417	8,111	9,588	1,646	1,13,004	1,34,100	2,47,104	1,12,162	45,162	1,57,324	2,25,166	1,79,262	4,04,428	1838.
41,846	9,211	899	256	2,23,352	1,35,422	3,58,774	57,467	82,398	1,39,865	2,80,819	2,17,818	4,98,637	1839.
21,024	7,425	14,451	2,817	1,58,331	1,54,254	3,12,585	1,03,398	64,947	1,68,345	2,61,729	2,19,201	4,80,930	1840.
28,605	5,424	10,244	3,012	1,54,476	1,22,119	2,76,595	72,116	55,734	1,27,850	2,26,592	1,77,353	4,04,445	Average.
5,302	1,859	10,413	1,092	1,30,874	1,34,410	2,65,284	84,619	37,551	1,22,170	2,15,493	1,71,961	3,87,454	1841.
42,065	9,108	1,73,975	909	4,15,590	1,09,367	5,24,957	55,705	32,916	88,621	4,71,295	1,42,283	6,13,578	1842.
10,088	4,273	56,390	3,201	1,57,280	98,244	2,55,524	96,067	58,620	1,54,687	2,53,347	1,36,864	4,10,211	1843.
8,872	4,002	1,395	1,556	85,808	63,462	1,49,270	24,513	12,795	37,308	1,10,321	76,257	1,86,578	1844.
17,395	6,312	3,542	2,617	1,75,192	84,210	2,59,402	39,138	61,664	1,00,802	2,14,330	1,45,874	3,60,204	1845.
16,744	5,111	49,143	1,875	1,92,949	97,939	2,90,888	60,008	40,709	1,00,717	2,52,957	1,38,648	3,91,605	Average.
18,750	4,968	9,582	3,596	2,27,386	75,475	3,02,861	1,29,318	47,820	1,77,138	3,56,704	1,23,295	4,79,999	1846.
4,725	4,692	27,727	1,334	1,77,630	1,11,521	2,89,151	55,034	41,388	96,422	2,32,664	1,62,909	3,95,573	1847.
8,446	5,986	24,937	6,776	2,18,570	1,37,046	3,55,616	83,781	64,094	1,47,875	3,02,351	2,01,140	5,03,491	1848.
8,125	3,734	25,383	3,264	1,98,437	1,11,808	3,10,245	1,11,492	73,217	1,84,709	3,09,929	1,85,025	4,94,954	1849.
14,003	3,247	913	2,076	88,706	73,784	1,62,490	53,213	67,729	1,20,942	1,41,919	1,41,013	2,83,432	1850.
10,931	4,389	17,708	3,408	1,82,147	1,01,926	2,84,073	86,568	58,850	1,45,418	2,68,715	1,60,776	4,29,491	Average.
20,308	5,580	20,744	3,361	1,61,902	1,09,698	2,71,600	76,166	48,168	1,24,374	2,38,088	1,67,866	3,95,974	General Average for the 20 years.

Appendix (Y.)

STATEMENT showing the various Items of EXPENDITURE in the DEPARTMENT of PUBLIC WORKS, with their Amount for Eleven Years.

	1810-41.	1841-42.	1842-43.	1843-44.	1844-45.	1845-46.	1846-47.	1847-48.	1848-49.	1849-50.	1850-51.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Repairs of tanks, channels, rivers, &c.	7,11,219	6,11,242	5,43,340	5,10,916	5,77,008	6,16,048	8,48,294	13,01,423	9,97,710	9,71,999	10,84,092
Repairs of buildings in the Revenue, Judicial, Military, &c., Departments	2,09,509	1,62,155	3,38,234	1,62,951	1,16,621	1,59,650	32,617	2,43,565	2,17,666	1,46,431	2,02,253
Erection of buildings in the Revenue, Judicial, Military, &c., Departments	1,40,513	43,912	1,53,131	90,965	79,531	2,17,415	1,64,511	2,28,192	1,78,117	1,19,751	93,319
Repairs and construction of public bungalows, choultries, hospitals, &c., including superintendence	26,516	24,944	24,416	26,608	27,358	32,402	28,772	26,109	29,746	28,715	28,804
Repairs of roads, bridges, ghauts, and passes	1,66,417	89,700	1,30,358	1,26,521	25,416	1,86,282	3,11,040	1,43,738	3,54,061	5,44,675	4,93,901
Construction of roads, bridges, ghauts and passes	62,062	71,538	1,08,025	44,101	10,200	49,770	1,95,867	2,17,827	1,65,254	70,406	97,691
Railroad, including establishment	15,750	4,317	869	3,925	-	-	-	-	-	-	5,747
Construction, purchase, repair and hire of ferry-boats	4,002	3,771	5,639	6,005	7,112	5,983	4,110	8,449	10,705	6,422	3,199
Wages of boat people, &c. employed in rivers	381	355	3,870	234	216	379	644	1,058	256	660	-
Repairs of forts and fortifications	1,765	828	1,497	905	2,229	3,155	-	-	-	1,670	900
Expenses on account of burial-grounds, tombs, and Sir Thomas Munro's Statue	1,718	398	283	378	491	400	378	378	378	436	441
Expenses on account of Paumben Channel	19,663	6,404	11,877	9,581	64,509	13,893	12,787	17,355	9,888	8,851	8,291
Repairs of the Office furniture of the Government	420	-	-	420	420	750	420	433	478	405	647
Allowance and medical allowance for the convicts at Guindy, and for Europeans and Natives at the Godavery	2,444	-	-	599	431	502	-	-	1,679	2,978	2,792
Assessment on the Honourable Company's Buildings	9,408	7,384	7,399	7,663	14,276	7,022	7,114	-	14,389	-	7,219
Pay and establishment of Civil Engineer, Chief Engineer, Civil Architect, and Barrack-master, debited to the several Departments	1,65,596	1,58,414	1,69,435	1,43,006	1,78,341	1,83,927	1,94,874	2,31,584	2,47,356	2,48,157	2,53,637
Establishment of Civil Surveys	2,868	3,288	2,868	2,868	3,094	12,806	2,913	3,077	2,868	2,868	2,868
Expenses on account of Marine Surveys	13,935	22,880	-	13,278	15,491	20,813	7,362	700	-	-	-
Bricklayer Masters to superintend the Public Works at different stations	2,239	2,484	2,105	3,341	3,158	3,138	3,629	3,548	2,356	2,827	2,760
Public and Magnetic Observatory, &c.	15,820	12,391	44,689	39,941	35,661	80,573	31,285	29,478	23,287	18,319	21,749
Survey Department	75,319	459	68,647	59,405	46,603	41,387	36,273	32,279	33,102	-	30,743
Trigonometrical Survey of India at Hyderabad	37,520	-	-	-	-	-	-	-	-	-	-
House-rent allowance to different persons, and rent of Public Offices	-	38,675	37,437	-	40,136	-	-	-	40,423	-	37,133
Expenses on account of forests and jungles, cutting and conveying timber	166	643	187	958	964	907	962	959	1,448	6,149	61,380
Constructing an experimental pier	-	-	-	-	350	-	-	-	-	-	-
Purchase of buildings	-	-	-	-	-	-	-	-	-	-	10,776
TOTAL	16,75,336	12,66,188	17,13,896	12,54,929	12,50,495	15,87,271	18,83,852	24,00,152	23,31,173	21,81,719	24,50,342

Appendix (Z.)

STATEMENT of the Results obtained from EXPENDITURE for extending IRRIGATION in the Districts under the Madras Presidency, from 1836 to 1840.

Number.	W O R K.	2. First Cost.	3. Subsequent Repairs.	Aggregate Net Increase of Revenue since Improvement.		Average Amount Profit or Loss after deducting Repair.		Aggregate Net Profit or Loss by the Work.		Annual Per Centage on the First Cost after deducting the Amount of Repairs.	
				4. In how many Years.	5. Revenue.	6. Profit.	7. Loss.	8. Profit.	9. Loss.	10. Profit.	11. Loss.
				Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
<i>Rajahmundry :</i>											
1.	Tholiah Bagah - -	8,204	27,647	5	45,684	3,607	- -	9,833	- -	44	-
2.	Samulcota Channel -	13,472	14,200	5	66,446	10,449	- -	38,774	- -	77 ¹ / ₁₆	-
3.	Boopiah Calwah - -										
4.	Gosta Nuddee - -										
5.	Apparow Calwah - -	19,259	13,626	10	1,89,765	17,613	- -	1,56,870	- -	91 ⁷ / ₁₆	-
6.	Woosalamurroo Calwah, and other minor Channels connected with these four - -										
<i>Maruliyatum :</i>											
7.	Pullairoo Channel -	13,713	24,634	14	3,86,410	25,841	- -	3,48,063	- -	188	-
8.	Bodemair Channel -	8,099	2,677	12	5,802	260	- -	- -	4,974	3 ¹ / ₈	-
9.	Apparow Channel -	8,756	5,770	10	2,32,867	22,710	- -	2,18,341	- -	259 ¹ / ₈	-
<i>Guntoor :</i>											
10.	Toongabudra Channel -	34,214	39,709	7	1,53,820	16,302	- -	79,897	- -	47 ¹ / ₈	-
11.	Coochenapooddy Tank supplying Channel -	366	1,837	4	4,725	722	- -	2,522	- -	197 ¹ / ₄	-
12.	Vellatoor Chappel from the Kistna - -	7,087	9,400	13	91,165	6,290	- -	74,678	- -	88 ¹ / ₄	-
13.	Moomunghy Channel from the Kistna - -	11,858	- -	- -	- -	- -	- -	- -	11,858	-	-
14.	Ivany Tank - -	3,306	6,670	12	6,338	- -	28	- -	4,133	-	- ¹ / ₄
<i>Nellore :</i>											
15.	Veroor River Channel -	1,751	385	4	9,575	2,310	- -	7,489	- -	132	-
<i>Cuddapah :</i>											
16.	Tungatoor Dyke - -	3,954	318	5	5,037	944	- -	765	- -	24	-
<i>Belary :</i>											
17.	Numbulgherry Tank -	3,201	- -	7	4,304	615	- -	1,103	- -	19	-
<i>Chingleput :</i>											
18.	Spring Channel for the supply of Poosevakum Tank - -	1,602	- -	3	493	164	- -	- -	1,109	10	-
19.	Re-opening a River Channel for the supply of the Manupaukum Tank - -	1,494	421	3	2,061	527	- -	146	- -	35	-
20.	Porel Tank supply Channel - -	10,686	5,089	13	43,119	3,929	- -	27,387	- -	27 ¹ / ₈	-
<i>South Arcot :</i>											
21.	Lower Anicut and dependent Works - -	74,234	89,973	14	14,32,971	93,786	- -	13,08,765	- -	133 ¹ / ₁₆	-
22.	Vellar Anicut - -	82,919	8,037	5	92,661	16,928	- -	1,695	- -	20 ¹ / ₈	-
23.	Ragavien's Channel -	13,603	285	4	10,391	2,527	- -	- -	3,497	18 ¹ / ₁₆	-
	Carried forward -	3,22,278	2,00,277	- -	27,73,607	2,29,519	28	22,76,328	25,576	-	-

Appendix (Z.)—continued.

STATEMENT of the Results obtained from Expenditure for extending Irrigation, &c.—continued.

Number.	1. W O R K.	2. First Cost.	3. Subsequent Repairs.	Aggregate Net Increase of Revenue since Improvement.		Average Amount Profit or Loss after deducting Repair.		Aggregate Net Profit or Loss by the Work.		Annual Per Centage on the First Cost after deducting the Amount of Repairs.	
				4.	5.	6.	7.	8.	9.	10.	11.
				In how many Years.	Revenue.	Profit.	Loss.	Profit.	Loss.	Profit.	Loss.
	Brought forward -	Rs. 3,22,278	Rs. 2,00,577	-	Rs. 27,73,607	Rs. 2,29,519	Rs. 28	Rs. 22,76,328	Rs. 25,576	-	-
	<i>Salem:</i>										
24.	Extending Mahadevy Tank	1,803	32	5	1,173	229	-	-	662	12½	-
	<i>Tanjore:</i>										
25.	Upper Coleroon Aicut -	83,401	2,72,381	15	20,82,910	1,20,702	-	17,27,128	-	144½	-
26.	South Rajah Voykal -	60,754	66,124	14	1,89,157	8,788	-	62,279	-	14½	-
	<i>Trichinopoly:</i>				Decrease.						
27.	New Iyen Voykal -	11,328	12,837	14	5,180	-	1,287	-	29,345	-	11½
28.	Ruttinagoody Aicut and Nuttad Nullah -	10,949	3,156	3	4,396	413	-	-	9,709	3½	-
	<i>Coimbatore:</i>										
29.	Extension of Poolavalungal Channel -	2,483	1,455	8	4,936	435	-	998	-	17½	-
30.	Nunjah Pagalore Channel Improvement -	4,984	3,206	13	17,687	1,114	-	9,597	-	22½	-
31.	Wall in front of Caling- aroyen Aicut, and widening Kunnandoray Aqueduct -	4,532	14,998	13	35,913	1,609	-	16,383	-	35½	-
32.	Pillyoor Tandinary and Sanapareddy Auxiliary Tanks and Coymbully Channels -	6,511	3,226	13	76,206	5,614	-	66,409	-	86½	-
	<i>Madura:</i>										
33.	Under sluice and wall to an Aicut across Vigay River -	2,466	6,113	13	34,863	2,211	-	26,284	-	89½	-
	<i>Tinnevely:</i>										
34.	Adacherry Channel -	6,552	962	7	11,341	1,483	-	3,827	-	22½	-
35.	Valathacolam Tank -	1,453	67	5	1,794	345	-	274	-	23½	-
36.	Teroovengadanathapooram Tank -	643	-	4	4,190	1,048	-	3,547	-	163	-
37.	Autoor Tank Improve- ments -	3,242	6,857	11	40,532	3,061	-	30,433	-	94½	-
38.	Maranthly New Channel	10,400	722	14	13,245	894	-	2,123	-	6½	-
39.	Thirteen Small Works -	7,437	55	4	2,408	588	-	-	5,084	7½	-
	Grand Total -	5,41,116	5,92,768	-	52,94,358	3,78,052	1,315	42,25,670	70,376	-	-
	Deduct decrease -	-	-	-	8,180	1,315	-	70,376	-	-	-
	Net Profit -	-	-	-	52,86,178	3,76,737	-	41,55,294	-	69½	-

Appendix (A A.)

STATEMENT, showing the CHARGES incurred in the Repair and Construction of PUBLIC WORKS under the Board of Revenue, in the Ten years 1841 to 1850, with the cost of Superintendence.

YEARS.	Total Expenditure on Works of Irrigation, Roads, Civil Buildings, &c.	Superintendence.										TOTAL.	Per Centage.
		Department of Public Works at the Presidency.		Civil Engineers.		Assistant Civil Engineers.		Surveyors.	Overseers.	Officers Superintending Roads, &c.	Maramut Sibbendy Establishments.		
		Officers.	Establishment.	Officers.	Establishment.								
1841	8,86,378	24,597	76,334	12,928	19,266	1,015	25,825	-	-	11,314	49,550	2,20,829	24½
1842	8,96,041	19,815	75,194	13,085	20,130	1,910	28,307	-	-	11,667	50,412	2,21,120	24½
1843	7,98,064	20,573	77,122	13,712	23,953	3,693	32,428	-	-	10,215	49,533	2,31,229	29
1844	9,32,216	19,691	77,817	13,748	18,320	3,975	29,942	-	-	7,989	51,039	2,22,522	28½
1845	7,63,040	20,366	75,011	13,437	20,856	5,202	35,214	-	-	13,343	51,791	2,35,220	30½
1846	7,26,376	20,824	79,096	13,811	24,576	6,660	35,669	-	-	14,700	53,777	2,49,114	34½
1847	9,54,763	24,066	77,867	13,985	36,731	9,689	38,542	7,760	16,553	54,833	2,80,027	29½	
1848	12,61,941	23,008	79,196	14,599	49,297	14,991	39,421	13,597	20,196	55,407	3,09,712	24½	
1849	9,73,345	22,622	80,975	14,018	49,586	15,806	37,587	13,975	20,376	57,953	3,12,897	32½	
1850	12,10,861	22,028	82,554	14,633	46,931	16,264	36,360	13,489	16,625	58,904	3,07,789	25½	
Average for the 10 Years	9,40,502	21,759	78,117	13,856	30,965	7,920	33,929	12,205	14,297	53,320	2,58,046	27½	

* Approximate expenditure.

Appendix (B B.)

STATEMENT, showing the REVENUE from the WORKS connected with the Anicut in the District of Trichinopoly, for the Twenty Fuslies from 1240 to 1259, as well as the Annual Average Price of Paddy in the Town of Trichinopoly for the Forty-two Fuslies from 1219 to 1260.

FUSLIES.	Part of Conaud Talook, watered by Channels taken off from the Cauvery below the Anicut.		Lalgoody Talook, watered by Channels taken off at the Anicut.		Average Annual Price of Paddy per Garce.			
	Cultivation.	Revenue.	Cultivation.	Revenue.	Fuslies.	Price.	Fuslies.	Price.
1240	3,646	32,752	26,492	2,14,648	1219	84 13	1240	76 6
1241	3,678	32,733	26,474	2,14,727	1220	77 7	1241	75 1
1242	3,575	32,563	26,229	2,13,339	1221	94 15	1242	98 -
1243	3,595	31,864	26,484	2,16,217	1222	111 1	1243	142 13
1244	3,576	29,426	26,686	2,17,251	1223	97 11	1244	114 18
1245	3,409	27,785	26,690	2,16,028	1224	90 15	1245	84 6
1246	3,236	25,415	26,554	2,12,347	1225	69 1	1246	116 11
1247	3,452	28,425	26,789	2,12,061	1226	70 -	1247	119 12
1248	3,393	27,921	27,017	2,14,255	1227	69 6	1248	103 1
1249	3,447	28,292	27,177	2,14,540	1228	76 12	1249	86 7
1250	3,498	28,500	27,350	2,15,153	1229	77 7	1250	69 12
1251	3,463	27,914	27,264	2,13,836	1230	80 12	1251	67 15
1252	3,422	26,796	26,661	2,07,297	1231	88 1	1252	71 3
1253	3,329	26,311	25,867	1,99,146	1232	93 7	1253	82 1
1254	3,339	25,801	25,656	1,97,315	1233	111 13	1254	90 4
1255	3,363	25,973	25,716	1,99,068	1234	134 11	1255	107 3
1256	3,456	27,123	26,489	2,07,166	1235	116 14	1256	134 14
1257	3,583	27,360	27,037	2,12,430	1236	102 5	1257	104 15
1258	3,507	27,458	27,377	2,15,324	1237	74 13	1258	77 13
1259	3,486	27,277	27,487	2,14,674	1238	92 1	1259	80 7
					1239	93 5	1260	74 14

Appendix (C C.)

STATEMENT, showing the Quantity and Value of SALT sold for Home and Inland Consumption, in

Fuslies.	Ganjam.		Vizsgapatam.		Rajahmundry.		Masulipatam.		Guntoor.		Nellore.		Chingleput.		Madras.	
	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.
	<i>Garce.</i>	<i>Rs.</i>	<i>Garce.</i>	<i>Rs.</i>	<i>Garce.</i>	<i>Rs.</i>	<i>Garce.</i>	<i>Rs.</i>	<i>Garce.</i>	<i>Rs.</i>	<i>Garce.</i>	<i>Rs.</i>	<i>Garce.</i>	<i>Rs.</i>	<i>Garce.</i>	<i>Rs.</i>
1241 -	2,427	2,54,816	946	99,359	1,815	1,90,537	1,944	2,04,162	3,669	3,85,212	3,798	3,98,773	4,283	4,49,665	785	82,358
1242 -	2,409	2,52,953	827	86,846	1,291	1,35,543	1,289	1,35,307	1,523	1,59,885	3,118	3,27,429	4,051	4,25,383	767	80,510
1243 -	3,151	3,30,903	1,110	1,16,565	1,011	1,06,171	1,949	2,04,603	2,839	2,98,138	3,942	4,13,881	5,340	5,60,677	823	86,442
1244 -	2,741	2,87,754	1,188	1,24,712	1,882	1,45,103	2,481	2,60,462	2,183	2,29,243	3,349	3,51,607	4,765	5,00,377	751	78,900
1245 -	2,389	2,50,865	830	87,136	1,252	1,31,429	2,041	2,14,283	2,374	2,49,224	3,184	3,34,350	4,078	4,28,223	734	77,107
Average	2,623	2,75,468	980	1,02,904	1,350	1,41,757	1,941	2,03,763	2,518	2,64,340	3,478	3,65,208	4,503	4,72,865	772	81,069
1246 -	2,493	2,61,790	804	84,463	1,279	1,34,287	2,476	2,55,800	2,269	2,38,220	3,466	3,63,975	4,322	4,53,726	733	77,014
1247 -	2,721	2,85,654	1,475	1,54,833	1,433	1,50,439	2,263	2,37,603	2,786	2,92,485	3,436	3,60,792	4,039	4,22,932	847	87,954
1248 -	3,095	3,24,951	1,297	1,36,145	1,278	1,34,171	2,205	2,31,548	3,197	3,35,495	3,706	3,89,178	4,372	4,58,434	908	95,304
1249 -	2,752	2,88,913	1,435	1,50,709	1,231	1,29,305	2,628	2,75,937	3,450	3,53,573	3,823	4,01,462	3,861	4,04,509	1,008	1,05,806
1250 -	2,269	2,38,254	1,432	1,50,326	1,119	1,17,537	2,368	2,48,628	2,842	2,91,900	3,401	3,57,154	3,758	3,93,679	914	96,002
Average	2,660	2,79,914	1,269	1,35,295	1,268	1,33,148	2,388	2,49,903	2,909	3,02,335	3,566	3,74,512	4,070	4,26,656	882	92,416
1251 -	2,499	2,62,437	1,299	1,36,358	1,529	1,60,503	2,501	2,62,590	2,891	3,03,525	4,076	4,27,896	3,702	3,87,613	893	93,794
1252 -	2,807	2,94,785	906	95,180	1,279	1,34,311	3,117	3,27,268	2,636	2,76,821	3,675	3,85,375	3,096	3,24,109	928	97,467
1253 -	2,211	2,34,551	975	1,12,617	1,044	1,15,042	2,454	2,70,312	2,903	3,46,141	3,583	4,19,098	3,476	3,74,503	1,016	1,26,733
1254 -	2,497	3,02,755	884	1,08,765	1,873	1,64,643	2,725	3,29,963	2,912	3,35,142	3,514	4,30,559	3,257	4,00,154	984	1,22,062
1255 -	2,300	2,76,987	909	1,09,130	1,168	1,40,211	3,355	4,02,548	2,376	3,45,132	4,877	5,85,265	3,828	4,59,388	866	1,03,926
Average	2,463	2,76,103	995	1,12,408	1,369	1,54,942	2,830	3,16,536	2,844	3,25,352	3,945	4,49,639	3,472	3,89,153	937	1,05,600
1256 -	2,278	2,73,319	1,022	1,22,613	1,660	1,99,178	2,315	2,77,769	2,589	3,10,730	4,152	4,98,183	3,316	3,97,942	2,198	2,62,253
1257 -	2,402	2,98,257	868	1,04,162	1,028	1,83,390	2,384	2,86,094	3,270	3,87,006	4,543	5,42,841	2,982	3,57,892	2,280	2,73,600
1258 -	2,293	2,73,130	1,038	1,24,623	1,479	1,77,429	2,555	3,10,586	3,467	4,06,734	4,042	4,82,293	1,942	2,33,129	3,131	3,74,360
1259 -	2,401	2,89,060	1,180	1,41,653	1,816	1,93,907	2,165	2,69,831	3,279	3,84,632	4,009	4,77,171	2,539	3,04,891	3,355	4,02,908
1260 -	2,399	2,96,660	1,162	1,39,429	1,577	1,89,210	2,335	2,80,171	3,545	4,12,917	3,073	4,57,074	2,091	2,50,471	4,156	4,98,711
Average	2,355	2,92,275	1,054	1,26,408	1,372	1,88,623	2,357	2,82,990	3,230	3,80,404	4,084	4,87,512	2,574	3,08,825	3,023	3,62,357

Appendix (C.C.)

the several Maritime Districts of the Madras Presidency, from Fusly 1241 to 1260.

North Arcot.		South Arcot.		Tanjore.		Madura.		Tinnevely.		Canara.		Malabar.		TOTAL.		Fuslies.
Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	Quantity.	Price.	
Garce.	Ra.	Garce.	Ra.	Garce.	Ra.	Garce.	Ra.	Garce.	Ra.	Garce.	Ra.	Garce.	Ra.	Garce.	Ra.	
214	22,509	1,826	1,91,924	3,592	3,77,154	2,410	2,53,026	1,868	1,96,191	2,362	2,48,831	2,369	2,48,325	34,309	36,02,771	1241
127	13,311	1,734	1,83,055	3,584	3,76,322	2,158	2,26,033	1,719	1,80,516	2,438	2,56,977	2,385	2,49,820	29,415	30,38,890	1242
85	8,980	1,696	1,78,043	3,848	4,04,064	2,037	2,15,567	1,782	1,87,096	2,777	2,92,545	2,725	2,85,715	35,135	36,89,290	1243
106	11,135	1,749	1,83,668	3,873	4,06,618	2,352	2,46,204	1,978	2,07,705	2,597	2,73,471	2,632	2,75,867	34,129	35,52,826	1244
137	13,302	1,342	1,40,893	3,886	4,06,900	2,246	2,35,090	2,201	2,31,076	2,605	2,74,438	2,863	2,99,808	32,152	33,74,223	1245
132	13,827	1,670	1,75,316	3,757	3,94,212	2,244	2,35,184	1,910	2,00,517	2,556	2,69,252	2,595	2,71,927	38,028	34,67,000	Average.
177	18,620	1,067	1,12,066	3,737	3,91,165	2,352	2,46,388	2,285	2,39,959	2,423	2,54,401	2,663	2,79,198	32,546	34,11,072	1246
280	29,413	2,572	2,70,028	4,061	4,25,568	2,381	2,49,593	2,320	2,43,858	2,786	2,92,573	3,266	3,43,132	36,665	38,45,867	1247
306	32,142	2,089	2,19,358	4,049	4,24,321	2,489	2,66,272	2,350	2,46,713	2,812	2,95,227	3,292	3,45,104	37,895	39,23,363	1248
204	21,373	1,853	1,94,806	4,139	4,33,754	2,497	2,61,243	2,266	2,37,951	3,109	3,26,459	3,305	3,46,535	37,561	39,32,134	1249
348	36,491	1,450	1,52,301	3,741	3,91,431	2,644	2,76,736	2,447	2,56,895	2,989	3,13,876	3,340	3,49,985	35,062	36,71,175	1250
263	27,608	1,806	1,89,672	3,945	4,13,248	2,463	2,57,846	2,334	2,45,075	2,824	2,96,507	3,173	3,32,587	35,846	37,56,722	Average.
191	20,039	1,402	1,47,244	3,716	3,88,741	2,566	2,68,572	2,331	2,44,776	3,038	3,19,086	3,043	3,18,866	35,677	37,41,990	1251
306	32,156	1,830	1,92,119	3,591	3,78,849	2,613	2,73,440	2,395	2,56,022	3,126	3,28,283	3,248	3,39,991	36,548	37,83,176	1252
185	19,540	1,706	1,76,569	3,414	4,04,095	2,255	2,69,176	2,269	2,59,169	2,905	3,28,767	2,658	3,07,714	35,554	38,44,027	1253
229	27,712	2,011	2,08,058	3,674	4,04,995	2,770	3,50,577	2,390	3,10,490	3,409	4,13,792	3,206	3,90,660	35,735	44,30,337	1254
250	29,998	2,151	2,58,122	3,795	4,55,409	2,764	3,31,726	2,437	2,96,685	3,550	4,25,974	2,537	3,02,298	37,663	45,20,799	1255
232	25,889	1,820	2,08,422	3,638	4,17,818	2,594	2,98,898	2,364	2,73,228	3,206	3,63,170	2,937	3,31,906	35,635	40,54,066	Average.
87	10,492	2,089	2,40,927	4,131	4,36,708	3,274	3,92,874	2,572	3,08,693	3,660	4,39,203	2,891	3,46,182	38,232	45,76,097	1256
126	15,138	1,682	2,01,794	4,000	4,80,052	2,651	3,18,078	2,355	2,82,624	4,169	4,99,570	3,055	3,65,687	38,295	46,86,180	1257
99	11,937	1,544	1,86,268	3,854	4,62,535	2,893	3,28,136	2,517	3,01,992	3,717	4,45,503	3,025	3,62,387	37,429	44,77,538	1258
158	16,970	1,809	2,17,080	4,010	4,91,994	2,924	3,50,826	2,592	3,10,985	3,790	4,54,175	2,811	3,36,574	38,636	46,32,654	1259
152	15,283	2,345	2,81,428	4,263	5,11,156	2,455	2,94,639	2,925	3,50,973	3,860	4,62,429	2,833	3,39,463	39,771	47,53,015	1260
134	14,964	1,894	2,25,299	4,052	4,83,289	2,799	3,35,908	2,592	3,11,059	3,839	4,60,176	2,923	3,50,069	38,473	46,05,137	Average.

Appendix (D D.)

DETAILED STATEMENT, showing the Distribution of the proposed ESTABLISHMENT of all Grades in the PUBLIC WORKS DEPARTMENT.

	COMMISSIONED OFFICERS.							Warrant and Non-Commissioned.		NATIVE.				OFFICE ESTABLISHMENT.										GRAND TOTAL.					
	Chief Engineer, &c.	Inspecting Engineers.	District Engineers.	Assistant District Engineers.	Special Assistant Deputy Engineers.	Permanent Executive Officers.	Occasional Executive Officers.	TOTAL.	Sub-Engineers.	Overseers and Sub-Overseers.	TOTAL.	Superintendents of Maramut.	Deputy-Superintendents of Maramut.	Foremen and Sub-Foremen.	Surveyors.	TOTAL.	Managers.	Draughtsmen, with Printer and Pressman.	Estimate Makers.	Writers.	Accountants.	Gomastahs.	Moochies and Dufferbunds.		Lascars.	Peons.	Sweeper and Toly.	TOTAL.	
GENERAL DEPARTMENT:																													
Chief Engineer, Adjutant, and Department, with Lithographic Press.	2	-	-	-	-	-	2	-	2	2	-	-	2	-	2	1	15	3	11	2	-	2	-	-	-	7	2	43	49
Two Members of Board of Public Works and a Secretary	3	-	-	-	-	-	3	-	-	-	-	-	-	-	-	2	2	7	23	-	-	-	3	2	2	2	43	46	
TOTAL - - -	5	-	-	-	-	-	5	-	2	2	-	-	2	-	2	3	17	10	34	2	-	5	2	9	4	86	95		
INSPECTING DEPARTMENT:																													
1.—1st Division; Ganjam, Vizagapatam and Rajahmundry.	-	1	-	-	-	-	1	-	-	-	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	13	16		
2.—2d Ditto - Masulipatam and Guntour with the Hyderabad Military Division.	-	1	-	-	-	-	1	-	-	-	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	13	16		
3.—3d Ditto - Cuddapah, Nellore and Kurnool	-	1	-	-	-	-	1	-	-	-	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	13	16		
4.—4th Ditto - Bellary and Canara	-	1	-	-	-	-	1	-	-	-	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	13	16		
5.—5th Ditto - North Arcot, Chingleput and Madras	-	1	-	-	-	-	1	-	-	-	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	13	16		
6.—6th Ditto - Salem and South Arcot	-	1	-	-	-	-	1	-	-	-	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	13	16		
7.—7th Ditto - Tanjore and Trichinopoly	-	1	-	-	-	-	1	-	-	-	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	13	16		
8.—8th Ditto - Coimbatore and Malabar	-	1	-	-	-	-	1	-	-	-	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	13	16		
9.—9th Ditto - Madura and Tinnevely	-	1	-	-	-	-	1	-	-	-	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	13	16		
10.—Presidency Division	-	1	-	-	-	-	1	-	1	2	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	12	16		
11.—Mysore Division and Territories	-	1	-	-	-	-	1	-	1	1	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	12	15		
12.—Saugor Division with Nagpore	-	1	-	-	-	-	1	-	1	1	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	12	15		
13.—Inspector of Railways	-	1	-	-	-	-	1	-	1	1	-	-	1	1	2	-	2	1	3	2	-	1	4	-	-	12	15		
TOTAL - - -	-	13	-	-	-	-	13	1	3	4	-	-	12	9	21	-	24	12	36	24	-	12	36	9	-	153	191		
COLLECTORATES:																													
Ganjam	-	-	1	1	-	-	2	2	2	4	1	-	14	4	19	-	2	5	3	2	11	-	10	2	-	35	60		
Vizagapatam	-	-	1	1	-	-	2	2	2	4	1	-	16	4	21	-	2	5	3	2	13	-	10	2	-	37	64		
Rajahmundry	-	-	1	1	-	-	2	3	3	6	1	1	22	5	29	-	2	6	3	2	19	-	12	3	-	46	83		

Masulipatam	1	1					2	2	2	4	1	1	16	4	22		2	5	8	2	14		16	3		39	67	
Guntur	1	1					2	2	4	1	1	20	4	26	2	2	5	3	2	18	10	3				43	75	
Nellore	1	1					2	2	4	1	1	21	4	27	2	2	5	3	2	19	10	3				44	77	
Bellary	1	1					2	2	3	6	1	25	5	32	2	2	6	3	2	21	12	3				49	89	
Chidambur	1	1					2	3	3	6	1	25	5	32	2	2	6	3	2	21	12	3				49	89	
Chingleput	1	1					2	1	2	3	1	16	3	20	2	2	4	3	2	14	8	2				35	60	
North Arcot	1	1					2	2	3	5	1	16	4	22	2	2	5	3	2	13	10	3				38	67	
South Arcot	1	1					2	2	3	5	1	16	4	22	2	2	5	3	2	13	10	3				38	67	
Salem	1	1					2	2	3	5	1	16	4	22	2	2	5	3	2	13	10	3				38	67	
Tanjore	1	1					2	2	2	4	1	16	4	22	2	2	5	3	2	14	10	3				39	67	
Tiruchinopoly	1	1					2	3	2	6	1	23	5	30	2	2	6	3	2	19	12	3				47	85	
Madurai	1	1					2	2	2	4	1	19	4	25	2	2	5	3	2	16	10	2				40	71	
Tinnevely	1	1					2	2	3	5	1	23	4	28	2	2	5	3	2	20	10	3				45	80	
Coimbatore	1	1					2	2	2	4	1	14	4	20	2	2	5	3	2	12	10	3				37	63	
Canara	1	1					2	2	2	4	1	24	4	30	2	2	5	3	2	22	10	3				47	83	
Malabar	1	1					2	2	2	4	1	21	4	27	2	2	5	3	2	19	10	3				44	77	
Kurnool	1	1					2	2	2	4	1	14	4	20	2	2	5	3	2	19	10	3				44	77	
Midias	1	1					2	1	1	2	1	17	3	21	2	2	4	2	1	15	8	2				34	59	
							1			1		1	1	2			1		1	1	1		2			7	10	
TOTAL		20	20				40	43	46	89	20	15	385	83	503		40	103	60	40	331		206	56		836	1,468	
MILITARY EXECUTIVE DEPARTMENT:																												
1. For the Four Districts in Mysore		4					4		4	4																	8	
2. Presidency Executive Department									3	3			6		6		3	2	5	6		1				17	27	
3. Saugor Division and Nerbudda Territories							4		6	6																24	42	
4. Bangalore							1		1	1			2		2		1	1	2						6	10		
5. Straits of Malacca							1		1	1			2		2		1	1	2						6	10		
6. Peninsular Coast							1		1	1			2		2		1	1	2						6	10		
7. Hyderabad Subsidiary Force							1		1	2			2		2		1	1	2						6	11		
8. Nalgonda Subsidiary Force							1		2	2			2		2		1	1	2						6	11		
9. Cannanore							1		2	2			2		2		1	1	2						6	11		
10. Neigherry Hills Works							1		2	2			2		2		1	1	2						6	11		
11. Head Quarters Mysore Division of the Army									1	1			2		2		1	1	2						4	7		
12. Head Quarters Centre Division of the Army									1	1			2		2		1	1	2						4	7		
13. Head Quarters Ceded Districts									1	1			2		2		1	1	2						4	7		
14. Head Quarters Malabar and Canara									1	1			2		2		1	1	2						4	7		
15. Head Quarters of the Southern Division of the Army									1	1			2		2		1	1	2						4	7		
16. Presidency Roads									1	1			2		2		1	1	2						4	7		
17. Military Cantonment Roads									5	5			3		3											4	6	
TOTAL		4			12		16		35	35		41		41		19	13	27	11		1		32		103	195		
ROADS AND COMMUNICATIONS:																												
District Roads and other Works						14	14					14		14			14									14	42	
Main Roads						16	16		16	18	34		50	16	66		16	16					32			64	180	
Special Projects					9	9	20	20	40			49	29	78		9	29	9				76				123	250	
TOTAL			9	12	30	39	36	38	74			113	45	158		9	45	39				108				201	472	
GRAND TOTAL	5	13	24	20	9	12	30	113	80	124	204	20	15	553	137	725	3	109	183	196	77	331	18	352	106	4	1,379	2,421

Appendix (E.E.)

MEMORANDUM, showing the Numbers and Grades of SUBORDINATES and OFFICE ESTABLISHMENT allotted to each Officer, &c., being the Scale by which the Number and Distribution of the various Inferior Grades, as shown in the foregoing Table, have been determined.

No.	OFFICERS, &c.	For one of each Officer, &c. or Department.											Total for the whole Number of Officers, &c.	Total for each description of Officers, &c.	Grand Total, including Officers, &c.				
		Foremen and Sub-Foremen.	Surveyors.	Managers.	Draftsmen, with Printer and Pressmen.	Estimate Makers.	Writers.	Accountants.	Constables.	Moochies and Dufferbunds.	Lascars.	Peons.				Sweepers and Toly.	TOTAL.		
<i>Chief Engineer, &c.:</i>																			
1	Chief Engineer - - - - -	2	-	1	12	3	11	2	-	2	-	6	2	41	41	45	47		
-	Lithographic Department - - - - -	-	-	-	3	-	-	-	-	-	-	-	1	4	4				
1	Adjutant of Engineers - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
2	<i>Two Members of Board of Works and Secretary:</i>																		
3	(Civil Branch - - - - -	-	-	2	2	7	20	-	-	3	2	2	2	39	39	43	46		
	(Military Branch - - - - -	-	-	-	-	-	3	-	-	-	-	-	-	-	5				
<i>Inspecting Engineers:</i>																			
9	Nine Divisions, Nos. 1 to 9 - - - - -	1	1	-	2	1	3	2	-	1	4	-	-	15	135	174	187		
3	Three Divisions, Nos. 10 to 12 - - - - -	1	-	-	2	1	3	2	-	-	-	3	-	13	39				
1	Inspector of Railways, No. 13 - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
13	<i>District Engineers:</i>																		
20	Twenty Collectories - - - - -	1	1	-	2	2	1	-	-	-	3	-	-	10	200	200	224		
4	Four Districts in Mysore - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
24	<i>Assistant District Engineers:</i>																		
20	Twenty Collectories - - - - -	1	1	-	-	1	-	-	-	-	3	-	-	6	120	120	140		
<i>Special Assistant District Engineers:</i>																			
9	Special Projects - - - - -	1	1	-	1	1	1	-	-	-	4	-	-	9	81	81	90		
<i>Permanent Executive Officers:</i>																			
1	Presidency, in the Military Executive Department	6	-	-	3	2	5	6	-	1	-	-	-	23	23	111	128		
4	Saugor Division and Nerbudda Territories in ditto	2	-	-	1	1	2	-	-	-	-	2	-	6	32				
7	Seven Stations, Nos. 4 to 10 in ditto - - - - -	2	-	-	1	1	2	-	-	-	-	2	-	6	56				
12	<i>Occasional Executive Officers:</i>																		
14	Roads and other works - - - - -	1	-	-	-	-	1	-	-	-	-	-	-	2	28	124	154		
16	Main Roads - - - - -	1	1	-	-	1	1	-	-	-	2	-	10	6	96				
50	<i>Sub Engineers:</i>																		
1	Presidency Division in the Inspecting Department	-	-	-	-	-	-	-	-	-	-	-	-	-	-	311	391		
43	Twenty-one Collectories - - - - -	1	1	-	-	1	-	-	-	-	2	-	-	5	215				
16	Main Roads - - - - -	1	-	-	-	-	-	-	-	-	-	-	-	1	16				
20	Special Projects - - - - -	1	1	-	-	1	-	-	-	-	1	-	-	4	80				
50	<i>Overseers:</i>																		
2	Chief Engineer - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	137	261		
3	Divisions Nos. 10 to 12 in the Inspecting Department	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
46	Twenty Collectories - - - - -	1	-	-	-	-	-	-	-	-	-	-	-	1	46				
24	Ten Stations in the Military Executive Department, from Nos. 1 to 10 - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
5	Five Stations in the Military Executive Department, from Nos. 11 to 15 - - - - -	2	-	-	1	-	-	1	-	-	2	-	-	6	30				
1	Presidency Roads in the Military Executive Department, No. 16 - - - - -	3	-	-	-	-	-	-	-	-	-	-	-	-	3				
5	Military Cantonment Roads, No. 17 - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
18	Main Roads - - - - -	1	-	-	-	-	-	-	-	-	-	-	-	1	18				
20	Special Projects - - - - -	1	-	-	-	-	-	-	-	-	1	-	-	2	40				
24	<i>Superintendents of Maramut:</i>																		
20	Superintendents of Maramut - - - - -	-	-	-	-	-	-	-	-	-	1	-	1	2	40			40	60
15	Deputy Superintendents of Maramut - - - - -	-	-	-	-	-	-	-	-	-	1	-	1	2	30			30	45
-	Twenty Collectories - - - - -	-	-	-	-	-	2	2	2	2	1	-	1	7	140	140	140		
-	218 Taluaks of those Collectories - - - - -	1	-	-	-	-	-	-	-	-	-	-	-	2	512	512	512		
-	The Madras Collectory - - - - -	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1		
12	TOTAL - - - - -											2,069	2,421						

Appendix (F F.)

SYNOPSIS of the proposed ESTABLISHMENT of all Grades in the PUBLIC WORKS DEPARTMENT.

	Class.	Number in each Class.	Number in each Grade.	Monthly.				Annual.			
				For One of each Class.		For each Class.		For One of each Class.		For each Class.	
				Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.
Chief Engineer	-	-	1	-	-	-	-	-	-	-	-
Adjutant of Engineers	-	-	1	-	-	-	-	-	-	-	-
Members of the Board	-	-	2	1,100	-	2,200	-	13,200	-	26,400	-
Secretary to the Board	-	-	1	500	-	500	-	6,000	-	6,000	-
Inspecting Engineers	1st	1	-	1,000	-	1,000	-	12,000	-	12,000	-
	2d	12	13	821	10 8	9,860	-	9,860	-	1,18,320	-
District Engineers	1st	8	-	591	4	4,730	-	7,095	-	56,760	-
	2d	6	-	491	4	3,930	-	5,895	-	47,160	-
	3d	8	24	391	4	3,130	-	4,695	-	37,560	-
Assistant District Engineers	-	-	20	160	13 4	3,216	10 8	1,930	-	38,600	-
Special Assistant District Engineers	1st	1	-	600	-	600	-	7,200	-	7,200	-
	2d	8	-	491	4	3,930	-	5,895	-	47,160	-
Permanent Exec. Officers	12	3d	18	341	4	6,142	8	4,095	-	73,710	-
Occasional Exec. Officers	30	-	-	-	-	-	-	-	-	-	-
Total	51	4th	24	210	13 4	5,060	-	2,530	-	60,720	-
Total Commissioned	-	-	113	6,699	9 4	44,299	2 8	80,395	-	5,31,590	-
Sub-Engineers	1st	10	-	431	12	4,317	8	5,181	-	51,810	-
	2d	30	-	301	5	9,089	6	3,615	12	1,08,472	8
	3d	40	80	176	5	7,052	8	2,115	12	84,630	-
Overseers	1st	30	-	145	14	4,376	4	1,750	8	52,515	-
	2d	30	60	105	10 6	3,160	11	1,267	14	38,936	4
Sub-Overseers	1st	32	-	76	11 9	2,455	8	920	13	29,466	-
	2d	32	64	52	12 8	1,689	5 4	633	8	20,272	-
Total Warrant and Non-Commissioned	-	-	204	1,290	6 11	32,109	2 4	16,485	3	3,85,201	12
Superintendents of Maramut	1st	10	-	120	-	1,200	-	1,440	-	14,400	-
	2d	10	20	90	-	900	-	1,080	-	10,800	-
Deputy Superintendents of Maramut	-	-	15	60	-	900	-	720	-	10,800	-
	1st	65	-	40	-	2,600	-	480	-	31,200	-
Foremen	2d	85	-	35	-	2,975	-	420	-	35,700	-
	3d	101	251	30	-	3,030	-	360	-	36,360	-
	1st	100	-	25	-	2,500	-	300	-	30,000	-
Sub-Foremen	2d	100	-	20	-	2,000	-	240	-	24,000	-
	3d	102	302	15	-	1,530	-	180	-	18,360	-
	1st	40	-	20	-	800	-	240	-	9,600	-
Surveyors	2d	45	-	15	-	675	-	180	-	8,100	-
	3d	52	187	10	-	520	-	120	-	6,240	-
	-	-	725	480	-	19,830	-	5,760	-	2,85,560	-
Total Native	-	-	725	480	-	19,830	-	5,760	-	2,85,560	-
Total Professional	-	-	1,042	8,470	- 3	96,029	5	1,01,040	3	11,52,351	12
OFFICE ESTABLISHMENTS.											
Managers	1st	1	-	150	-	150	-	1,800	-	1,800	-
	2d	1	-	130	-	130	-	1,500	-	1,500	-
	3d	1	3	105	-	105	-	1,200	-	1,200	-
Draughtsmen, including Printers and Pressmen	1st	1	-	140	-	140	-	1,680	-	1,680	-
	2d	1	-	100	-	100	-	1,200	-	1,200	-
	3d	2	-	65	-	130	-	780	-	1,560	-
	4th	10	-	55	-	550	-	660	-	6,600	-
	5th	20	-	35	-	700	-	420	-	8,400	-
	6th	25	-	25	-	625	-	300	-	7,500	-
	7th	50	109	15	-	750	-	180	-	9,000	-
Carried forward	-	112	112	820	-	3,880	-	9,840	-	40,560	-

Appendix (F.F.)—continued.

Synopsis of the proposed Establishment of all Grades in the Public Works Department—continued.

	Class.	Number in each Class.	Number in each Grade.	Monthly.				Annual.					
				For One of each Class.		For each Class.		For One of each Class.		For each Class.			
				Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.		
Brought forward	-	112	112	820	-	3,380	-	9,840	-	40,560	-		
Estimate Makers	1st	1	-	100	-	100	-	1,200	-	1,200	-		
	2d	2	-	70	-	140	-	840	-	1,680	-		
	3d	4	-	50	-	200	-	600	-	2,400	-		
	4th	20	-	30	-	600	-	360	-	7,200	-		
	5th	50	-	20	-	1,000	-	240	-	12,000	-		
	6th	106	183	14	-	1,484	-	168	-	17,808	-		
Writers	1st	5	-	70	-	350	-	840	-	4,200	-		
	2d	21	-	50	-	1,050	-	600	-	12,600	-		
	3d	40	-	35	-	1,400	-	420	-	16,800	-		
	4th	75	-	28	-	2,100	-	336	-	25,200	-		
	5th	55	196	16	-	880	-	192	-	10,560	-		
Accountants	1st	2	-	50	-	100	-	600	-	1,200	-		
	2d	5	-	40	-	200	-	480	-	2,400	-		
	3d	10	-	24	-	240	-	288	-	2,880	-		
	4th	20	-	18	-	360	-	216	-	4,320	-		
	5th	40	77	12	-	480	-	144	-	5,760	-		
Constables	1st	21	-	30	-	630	-	360	-	7,560	-		
	2d	260	-	15	-	3,900	-	180	-	46,800	-		
	3d	50	331	10	-	500	-	120	-	6,000	-		
Moochees and Dufferbunds	1st	4	-	15	-	60	-	180	-	720	-		
	2d	4	-	10	-	40	-	120	-	480	-		
	3d	10	18	7	-	70	-	84	-	840	-		
Lascars	1st	50	-	8	-	400	-	96	-	4,800	-		
	2d	150	-	7	-	1,050	-	84	-	12,600	-		
	3d	152	352	6	-	912	-	72	-	10,944	-		
Peons	1st	6	-	10	-	60	-	120	-	720	-		
	2d	20	-	7	-	140	-	84	-	1,680	-		
	3d	20	-	6	-	120	-	72	-	1,440	-		
	4th	30	-	5	-	150	-	60	-	1,800	-		
	5th	30	106	4	-	120	-	48	-	1,440	-		
Sweepers and Toty	1st	2	-	3	-	6	-	36	9	72	-		
	2d	2	4	2	8	5	-	30	-	60	-		
Total Office Establishments	-	-	1,379	1,592	8	22,227	-	19,110	-	2,66,724	-		
Probable cost of the College of Civil Engineering	-	-	-	-	-	-	-	-	-	50,000	-		
GRAND TOTAL	-	-	2,421	10,062	8	3	1,18,256	5	3	1,20,750	3	14,69,075	12

Note.—The amounts set down in the above Table as the salaries of the Commissioned and Non-Commissioned Officers consist of various items; the following Memo, gives the particulars.

OFFICERS.	Class.	Pay.	Staff Pay.	Tentage.	House Rent.	Batta.	Compensation in lieu of Rations.	Total Monthly for each.
		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs.	Rs. a. p.	Rs. a. p.	Rs. p. a.
COMMISSIONED:								
Member of the Board	-	-	1,100	-	-	-	-	1,100
Secretary to the Board	-	-	500	-	-	-	-	500
Inspecting Engineer	1st	-	1,000	-	-	-	-	1,000
	2d	-	700	121	10	8	-	821 10 8
District Engineer	1st	-	500	91	4	-	-	591 4 -
	2d	-	400	91	4	-	-	491 4 -
	3d	-	300	91	4	-	-	391 4 -
Assistant District Engineer	-	-	100	60	13	4	-	160 13 4
	1st	-	600	-	-	-	-	600
Special Assistant District Engineer and Executive Officer	2d	-	400	91	4	-	-	491 4 -
	3d	-	250	91	4	-	-	341 4 -
	4th	-	150	60	13	4	-	210 13 4
WARANT AND NON-COMMISSIONED:								
Sub-Engineer	1st	-	250	-	60	121	13	431 13 -
	2d	-	150	-	60	91	5	301 5 -
	3d	50	-	-	35	91	5	176 5 -
Overseer	1st	50	-	-	35	60	14	145 14 -
	2d	50	-	-	30	45	10	105 10 6
Sub-Overseer	1st	26	7	4	43	15	1	76 11 9
	2d	26	7	4	20	-	-	52 12 8

Appendix (G.G.)

STATEMENT of the POPULATION of the TERRITORIES of the *Madras* Presidency, according to the Census taken in the Revenue Year 1850-51.

DISTRICTS.	A D U L T S.								
	M A L E S.			F E M A L E S.			T O T A L.		
	Hindoos.	Mahomedans and others.	TOTAL.	Hindoos.	Mahomedans and others.	TOTAL.	Hindoos.	Mahomedans and others.	TOTAL.
1. Ganjam - -	282,650	1,616	284,266	203,110	1,984	207,093	577,760	3,600	581,360
2. Vizagapatam -	397,463	4,815	402,278	411,715	5,425	417,140	809,178	10,240	819,418
3. Rajahmundry -	322,316	6,726	329,042	339,613	7,171	346,784	661,929	13,897	675,826
4. Masulipatam -	176,167	7,323	183,490	166,497	7,639	174,136	342,664	14,962	357,626
5. Guntoor - -	168,461	10,578	179,039	168,061	10,586	178,647	336,522	21,164	357,686
6. Nellore - -	312,213	14,060	326,273	294,920	13,946	307,866	607,133	27,006	634,139
7. Bellary - -	394,108	20,404	423,512	374,459	28,619	403,078	768,567	58,023	826,590
8. Cuddapah -	147,959	20,762	177,721	430,263	28,773	459,036	678,242	58,535	736,777
9. Chingleput -	191,239	6,144	197,383	183,947	5,928	189,875	375,186	12,072	387,258
10. North Arcot -	465,620	22,361	487,981	450,896	24,159	475,055	916,516	46,520	963,036
11. South Arcot -	359,431	13,637	373,068	327,598	12,742	340,340	686,939	26,370	713,318
12. Salem - -	380,945	9,965	390,910	383,418	9,662	393,080	764,363	119,927	884,290
13. Tanjore - -	523,970	44,036	568,006	542,731	50,407	593,138	1,066,701	94,443	1,161,144
14. Trichinopoly -	184,741	57,390	242,131	188,027	57,418	245,445	373,768	114,808	488,576
15. Madura - -	532,214	53,705	585,919	552,737	56,304	609,041	1,084,951	110,009	1,194,960
16. Tinnevely -	361,046	39,785	401,731	387,630	45,001	432,631	749,576	84,736	834,312
17. Coimbatore -	357,473	8,207	365,680	381,239	8,637	389,876	738,712	16,844	755,556
18. Canara - -	314,921	34,775	349,696	313,363	34,856	350,219	630,304	69,631	699,935
19. Malabar - -	358,361	125,432	483,793	371,933	128,683	500,616	730,294	254,115	984,409
20. Kurnool - -	74,525	14,019	88,544	73,679	14,674	88,353	148,204	28,693	176,897
TOTAL - -	6,006,723	533,740	7,140,463	6,630,786	551,914	7,191,700	13,246,509	1,185,654	14,432,163
21. Madras - -	—	—	—	—	—	—	—	—	—
GRAND TOTAL	6,006,723	533,740	7,140,463	6,630,786	551,914	7,191,700	13,246,509	1,185,654	14,432,163

Appendix (G G.)—continued.

STATEMENT of the Population of the Territories of the Madras Presidency.

DISTRICTS.	CHILDREN.								
	MALES.			FEMALES.			TOTAL.		
	Hindoos.	Mahomedans and others.	TOTAL.	Hindoos.	Mahomedans and others.	TOTAL.	Hindoos.	Mahomedans and others.	TOTAL.
1. Ganjam - -	190,334	845	191,179	153,738	653	154,391	344,072	1,498	345,570
2. Vizagapatam -	240,019	3,026	243,045	189,303	2,416	191,809	429,412	5,442	434,854
3. Rajahmundry -	181,872	3,789	185,661	147,409	3,140	150,549	329,281	6,929	336,210
4. Masulipatam -	91,049	4,665	95,714	64,083	3,443	67,526	155,132	8,108	163,240
5. Guntoor - -	103,893	7,531	111,424	94,227	6,631	100,858	198,120	14,162	212,282
6. Nellore - -	151,425	7,720	159,145	135,476	6,930	142,406	286,901	14,650	301,551
7. Bellary - -	202,446	17,413	219,859	168,203	14,947	183,150	370,649	32,360	403,009
8. Cuddapah -	261,011	20,389	281,400	216,551	17,193	233,744	477,562	37,582	515,144
9. Chingleput -	102,049	3,673	106,322	86,740	3,142	89,882	189,389	6,815	196,204
10. North Arcot -	261,060	13,674	274,734	236,262	11,841	248,103	497,322	25,515	522,837
11. South Arcot -	152,293	6,726	159,019	127,766	5,902	133,668	280,059	12,628	292,687
12. Salem - -	212,700	6,262	218,962	187,013	5,102	192,115	399,713	11,364	411,077
13. Tanjore - -	249,934	23,180	273,114	221,556	20,272	241,828	471,490	43,452	514,942
14. Trichinopoly -	88,425	29,709	118,134	76,861	26,565	103,426	165,286	56,694	221,980
15. Madura - -	268,998	28,200	297,204	239,982	24,645	264,627	508,980	52,851	561,831
16. Tinnevely -	207,188	27,804	234,992	176,884	22,078	199,862	384,072	50,782	434,854
17. Coimbatore -	200,504	4,941	211,448	182,698	4,100	186,858	389,202	9,104	398,306
18. Canara - -	171,715	21,358	193,073	145,063	18,262	163,325	316,778	39,620	356,398
19. Malabar - -	200,823	70,316	280,139	181,095	69,266	250,361	321,918	148,582	500,500
20. Kurnool - -	43,037	8,948	51,985	36,841	7,467	44,308	79,878	16,415	96,293
TOTAL - -	3,587,375	319,238	3,906,613	3,067,841	274,955	3,342,796	6,655,216	594,193	7,249,409
21. Madras - -	-	-	-	-	-	-	-	-	-
GRAND TOTAL	3,587,375	319,238	3,906,613	3,067,841	274,955	3,342,796	6,655,216	594,193	7,249,409

Appendix (G.G.)—continued.

according to the Census taken in the Revenue Year 1850-51—continued.

TOTAL OF ADULTS AND CHILDREN.						GRAND TOTAL.			Area in Square Miles.	No. of Persons to each Square Mile.
H I N D O O S.			MAHOMEDANS AND OTHERS.			Males.	Females.	TOTAL.		
Males.	Females.	TOTAL.	Males.	Females.	TOTAL.					
472,084	448,848	921,932	2,461	2,637	5,098	475,445	451,485	926,930	6,400	145
637,482	601,108	1,238,590	7,841	7,841	15,682	645,323	608,949	1,254,272	7,650	164
504,188	487,022	991,210	10,515	10,311	20,826	514,703	497,333	1,012,036	6,050	167
267,216	230,580	497,796	11,988	11,082	23,070	279,204	241,662	520,866	5,000	104
272,354	262,288	534,642	18,109	17,217	35,326	290,463	279,505	569,968	4,960	115
463,628	430,396	894,024	21,780	19,876	41,656	485,418	450,272	935,690	7,930	118
596,554	542,662	1,139,216	46,817	43,566	90,383	643,371	586,228	1,229,599	13,056	94
708,970	646,834	1,355,804	50,151	45,966	96,117	759,121	692,800	1,451,921	12,070	112
293,858	270,687	564,545	9,817	9,070	18,887	303,705	279,757	583,462	3,020	193
726,680	687,158	1,413,838	36,035	36,000	72,035	762,715	723,158	1,485,873	6,800	218
511,724	455,274	966,998	20,363	18,644	39,007	532,087	473,918	1,006,005	7,610	132
593,645	570,431	1,164,076	16,227	15,064	31,291	609,872	585,495	1,195,367	8,200	146
773,904	764,287	1,538,191	67,216	70,679	137,895	841,120	884,966	1,676,086	3,000	430
273,166	264,888	538,054	87,159	83,983	171,142	360,325	348,871	709,196	3,000	236
801,212	792,710	1,593,921	81,911	80,949	162,860	883,133	873,668	1,756,791	10,700	164
569,134	564,514	1,133,648	67,589	67,979	135,568	636,723	632,493	1,269,216	5,700	223
563,977	563,937	1,127,914	13,151	12,797	25,948	577,128	576,734	1,153,862	8,280	139
486,636	460,446	947,082	56,133	53,118	109,251	542,769	513,564	1,056,333	7,720	137
559,184	533,028	1,112,212	204,748	197,949	402,697	763,932	750,977	1,514,909	6,060	250
117,562	110,520	228,082	22,967	22,141	45,108	140,520	132,661	273,190	3,243	84
10,194,098	9,707,627	19,901,725	852,978	826,869	1,679,847	11,047,076	10,534,496	21,581,572	138,249	156
-	-	-	-	-	-	-	-	700,000	30	23,333
10,194,098	9,707,627	19,901,725	852,978	826,869	1,679,847	11,047,076	10,534,496	22,281,572	138,279	161

Appendix (II H.)

ABSTRACT of the present ESTABLISHMENT of the MARAMUT DEPARTMENT in all its Branches.

No.		Rs. a. p.	Rs. a. p.
<i>Board of Works :</i>			
1	Secretary - - - - -	9,600 - -	
2	Overseer and Assistant Overseers - - - - -	1,234 10 -	
39	Office Establishment - - - - -	15,164 - -	25,998 10 -
<i>Civil Engineer's Department :</i>			
6	Civil Engineers - - - - -	78,720 - -	
22	1st and 2d Assistant Civil Engineers - - - - -	60,960 - -	
25	Revenue Surveyors, Assistant and Sub-Assistant Revenue Surveyors - - - - -	55,583 - -	
22	Assistant Overseers - - - - -	11,600 14 -	
227	Native Establishment - - - - -	38,724 8 -	2,25,588 6 -
<i>Collector's Establishment :</i>			
18	Maramut Superintendents and Deputies - - - - -	11,340 - -	
97	1st, 2d and 3d Class Maistries - - - - -	22,035 - -	
107	Talook Maramut Gomastahs - - - - -	11,967 - -	
26	District Establishment - - - - -	7,227 - -	
		52,569 - -	
	Local and variable Establishment in 13 Districts -	8,158 10 2	60,727 10 2
<i>Military Department :</i>			
11	Chief Engineer and Officers - - - - -	1,24,212 6 -	
18	Warrant and Non-Commissioned Officers - - - - -	12,856 13 -	
105	Office Establishment for Chief Engineer, &c. and Cantonment Roads - - - - -	49,834 - -	
	Watering and Scavengers' Carts - - - - -	2,555 15 -	
103	Lascars' Establishment - - - - -	6,151 - -	
120	Establishment of Artificers - - - - -	6,720 - -	
		2,02,830 2 -	
	Deduct Regimental Pay and Allowances - - - - -	62,724 15 -	
		1,39,595 3 -	
5	Office Establishment in the Engineering Department of the Military Board Office - - - - -	2,464 - -	
19	Establishment of the Government Road Department -	1,482 - -	1,44,541 3 -
<i>Road Department :</i>			
2	Superintendent and Assistant Superintendent of Roads -	22,804 8 -	
17	Overseers and Assistant Overseers and Supervisors -	9,327 12 -	
37	Native Establishment - - - - -	5,947 1 -	
		38,079 5 -	
14	Officers in charge of Roads and Ghauts, including Railway Commissioner - - - - -	63,545 - -	1,01,624 5 -
<i>Saugor and Mhow Range for Military and Civil Works, exclusive of Agra, and Bombay Road, Bangalore or Mail Road, the Great Deccan Road, and District Roads :</i>			
3	Executive Officers (exclusive of Inspecting Engineers) -	14,400 - -	
3	Overseers and Assistant Overseers - - - - -	1,020 - -	
40	Native Establishment - - - - -	4,074 - -	
	Maintaining Mhow Cantonment Roads - - - - -	600 - -	
			20,094 - 9
TOTAL per Annum - - - - -		Rs.	5,79,472 2 2

Appendix (II.)

Appendix (II.)

MEMORANDUM ON THE COCHRANE CANAL.

1. THE Pulicat Lake is a backwater or lagoon to the northward of Madras. It is about 50 miles in length north and south, by 15 miles broad, east and west, in the widest part, and its southern extremity is about 20 miles from Madras. The Ennore Backwater is a similar lagoon of smaller dimensions, lying between the Pulicat Lake and Madras, and about 12 miles in length. In 1801, the Government of Madras planned a canal to connect Madras with the Ennore Backwater, and invited tenders for the execution of the work. A Mr. J. L. Heefke made an offer, which was accepted; Mr. Basil Cochrane being surety for the performance of the stipulated conditions. The terms were the exclusive possession of the canal by the contractor for 45 years, with right to levy toll on all goods carried upon it, at certain rates laid down; while the work was in progress, it occurred to the contractor that it would be a great improvement to cut a second canal, to join the Ennore Backwater to the Pulicat Lake; and he obtained a contract for that also, on terms similar to the former.

Description of the canal.

The work was completed in 1806; and on the 14th October of that year, formal articles of agreement were executed between the Government of Madras and Mr. Heefke, embodying the points above detailed, stipulating that the canals should be maintained in efficient working condition by the lessees during the currency of the lease, and be entirely surrendered to Government in good order at its close; and providing that the term of 45 years should commence from the 1st November 1802.

It was formed by private capital.

2. Although Mr. Cochrane was ostensibly only the surety, he was, in fact, the principal contractor, Mr. Heefke's interest in the contract, if any, being very small; and not long after the completion of the work, whatever rights were possessed by the latter, appear to have been conveyed to Mr. Cochrane, who thus became the sole proprietor. After the departure of this gentleman from Madras, the management of the canal was entrusted to his agents, Messrs. Arbuthnot & Co.; and the canal having been allowed to fall somewhat into disrepair, so as to diminish its usefulness, a negotiation was opened, in 1836, with the object of transferring to Government the remainder of the lessee's interest in it. The transfer of possession was made on the 1st April 1837; Government engaging, pending the final arrangement of the terms of the purchase, to pay annually the amount of the average yearly net profits from the canal during the preceding 11 years. The equivalent ultimately agreed on was the value of an annuity of this amount for the remaining period of the lease.

How and when it came into the hands of the Government.

3. As soon as the canal came into the hands of Government, a member of the Board of Revenue, Mr. Charles Cotton, was deputed to examine the canal and the lakes, with the view of ascertaining what improvements could be made in it, or in the mode of working it. Mr. Cotton recommended a number of improvements; some of which were adopted, and carried into effect. The most important of those adopted were as follows:—

Measures then adopted.

1st. Deepening shallow parts of the canal and lakes.

2d. Reducing the number of Government demands on goods carried on the canal from four to one.

3d. Establishing a fixed tariff for goods, the old one being incomplete and uncertain; and abolishing the toll of three fanams or about four annas, previously paid by every passenger on the canal, which appears to have been felt as a great hardship.

Other recommendations of still more importance, having in view the improvement of the canal, were not acted on.

The tariff of tolls then established has remained in force down to the present time, with a few trifling modifications and reductions made in 1846.

4. The water communication by the canal and the Pulicat Lake extends to Sooloorpett, a place on the great Northern Road, near the western shore of the lake, and 50 miles from Madras. But though the road from that place to the Presidency is very bad, so bad in parts as not to deserve the name of road at all,* the canal is but little used for goods or travellers coming or going on that line; and by far the greater part of the traffic on it is the transport to Madras of firewood from the jungles on the eastern side of the lake, and of cockle-shells, which are found in beds near its southern and south-western shores, and which are carried to Madras to be converted into fine plaister. Government salt is also brought by the canal to Madras for sale from the pans at Ennore; a small quantity of grain comes from the northern parts of the lake; and a variety of trifling articles of daily consumption are brought from places near the canal, between Pulicat and Madras.

The use of the canal is limited at present.

5. All the boats in use on the canal are private property, and the mode in which Government derives income from the canal is by means of toll levied on the goods conveyed. The boats

Description and number of the boats in use.

* For a great part of the distance, and even to within a few miles of Madras, this road is not practicable for carts, except in very fine weather. Piece goods coming to Madras from Nellore, 110 miles distant, and situated on the Northern road, are carried all the way by men.

Appendix (II.) boats are of various kinds and sizes; those plying between Madras and the northern parts of the Pulicat Lake are called northern boats; the largest of these are 50 feet long, 12½ broad, draw about 2½ feet water when loaded, and carry 15 tons; and the smallest are of such a size as to carry about five tons. These boats are about 270 in number.

There is also a smaller class of boat built and owned at Pulicat, and called top boats; these are used chiefly for the conveyance of passengers, being furnished, as their name implies, with a top or awning. There are now above 50 of these boats in constant use, though in 1837, before the abolition of the passenger toll, there were only three. There are also a few boats called budgerows, provided with cabins for the accommodation of passengers of the more wealthy class.

Canal management. 6. The canal is immediately managed, under the Collector of Madras, by a superintendent and a few other servants for collecting the toll at the Madras Basin. And there is also an European Assistant Overseer in charge of a dredge on the lake; but the dredge was damaged in the gale in May 1851, and has since been useless.

The receipts and charges. The following statement shows the receipts and charges of the canal since it came into the possession of Government.

Fuslies.	Annual Receipts.		CHARGES.				Net Receipts.					
			Establishment and Salarward.	Repairs.	Amount paid to the Lessee.	TOTAL.						
	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.		
1246 - -	5,916	9 5	559	15 2	574	1 -	-	-	1,134	- 2	4,782	9 3
1247 - -	26,234	6 11	2,519	8 8	1,228	0 6	9,374	7 8	13,122	6 10	13,112	- 1
1248 - -	24,371	2 -	2,708	- 9	1,356	5 4	14,061	11 7	18,186	1 8	6,185	- 4
1249 - -	31,893	13 -	2,815	12 3	883	10 9	14,061	11 7	17,761	2 7	14,132	10 5
1250 - -	30,623	- 6	2,722	15 2	4,638	7 -	14,061	11 7	21,423	1 9	9,199	14 9
1251 - -	27,539	12 4	2,731	1 3	-	-	14,061	11 7	16,792	12 10	10,746	15 6
1252 - -	25,337	15 2	2,778	5 1	505	9 -	14,061	11 7	17,345	9 8	7,992	5 6
1253 - -	33,773	1 8	2,728	9 -	826	13 -	14,061	11 7	17,617	1 7	16,156	- 1
1254 - -	32,084	10 3	2,711	5 7	1,035	15 6	14,061	11 7	17,809	- 8	14,275	9 7
1255 - -	23,484	11 11	2,751	4 4	230	8 -	36,047	- 6	39,028	12 10	8,248	8 11
1256 - -	31,642	- 2	2,262	11 -	5,586	11 4	-	-	7,849	6 4	30,721	4 6
1257 - -	33,169	7 11	2,164	15 1	283	4 4	-	-	2,448	3 5	29,110	15 5
1258 - -	31,473	11 6	2,145	4 0	211	7 7	-	-	2,356	12 1	28,899	7 10
1259 - -	31,635	1 3	2,159	10 -	575	15 5	-	-	2,735	9 5	29,346	1 11
1260 - -	32,515	11 8	2,147	- -	1,622	9 9	-	-	3,169	9 9		
TOTAL - C. Rs.	1,21,695	3 8	35,966	5 10	18,959	12 6	1,43,853	9 3	1,98,779	11 7	3,22,915	8 1

Note. The canal was only in possession of Government three months and 11 days in Fusly 1246.

The comparatively limited use made of the canal appears to be owing to two causes; the uncertainty and delay of the navigation, which is often altogether interrupted through the shallowness of the channel, and the complicated system of tolls. The great variation in the receipts from year to year appears to be owing entirely to the former cause; the canal being navigable for a longer period in some years than in others. We shall notice, 1st. The improvement of the canal and navigation; and 2d. The improvement of the management, and especially of the system of levying the tolls.

Defective state of Navigation. 7. The largest boats used on the canal draw only two-and-a-half feet of water, as already said; yet there are many shallow places, both in the lakes and in the canals, where it often happens that there is not sufficient depth of water for boats. At such times either the boats are of necessity laid up and not used at all, or they take only a half or a quarter of a cargo; or if it is in the canal, part of the cargo is taken out and deposited on the bank, and the boat after carrying the remainder to Madras, comes back for what has been thus left behind.

The canal was originally made 20 yards wide, and it is now wider from the gradual washing in of the sides, yet it is only in the centre generally that a laden boat can float, and even an empty boat has some difficulty in passing a laden one. It is very desirable that the navigable channel should be made broader. Again, the canal is wholly unprovided with towing-paths. When there is a fair wind, sails are used, but at other times the boats are painfully towed by men who make their way as they best can along the rugged bank, or the muddy edges of the canal; the use of ponies or cattle for towing is unknown. In the lake, either oars or poles are used generally, in the absence of a favourable breeze; but in the shallow parts the boatmen are often obliged to tow the boat walking in the water, and in many places, between Pulicat and Madras, the natural channel through the backwater, winds a great deal, in consequence of sand-banks, which it would cost but little to cut through. The lake and canal are chiefly supplied with water by the Pulicat Bar, when that is open; and if it is opened by a good monsoon it does not close for a year or more. But when two or three successive monsoons are scanty, there is not water enough to force the bar; and then, being fed only by the occasional rains, the lake becomes very shallow. But even

even when the lake is at the lowest, the additional depth required for navigation does not exceed from one to two feet in any part, and not more than one foot, except for short distances. There would be no difficulty in deepening the shallower parts of the canals, and of the channels in the lake to that extent. Major Smith, of the Engineers, in his report on the project of permanently closing the Pulicat Bar,* points out how easily and cheaply and securely the navigation may be improved in this way.

Appendix (II.)

8. We are of opinion that this ought certainly to be done, and without delay. The canal should be deepened, wherever required, to such an extent as to have always a depth of at least three feet of water, and that of sufficient width for two laden boats easily to pass; the deepened channel through the shallow parts of the lake should be straightened where necessary, and should be marked out with stakes or beacons; and towing-paths should be formed along the canals, as well as along the edge of the lake and backwater, wherever the navigation channel is sufficiently near the shore.

Repairs required.

The basin at Madras is furnished with convenient wharfs; but it is confined in extent even for the present traffic, and the shells, which are brought in vast quantities, are therefore landed outside the basin, being carried from the boats through the shallow and muddy sides of the canal. It is very desirable that the canal should be widened for some little distance, and a wharf formed along one side of it, thus in effect enlarging the basin, and greatly assisting trade.

The small river, about four miles in length, by which boats pass from the lake to Sooloorpett, is in the same defective condition as the canal, but there are some difficulties in the way of improvement here, because it belongs to the Vencatagherry Rajah; we shall speak of this, however, when treating of the system of tolls.

9. This navigation certainly requires more and better engineering superintendence than it now has. Geographically, it lies within three jurisdictions; the southern end of the canal is in the Madras Collectorate; thence to Pulicat, and somewhat beyond, it is in the 4th division; and the part of the lake near Sooloorpett is in the 2d division. The Civil Engineers of these two divisions, however, appear to have nothing to do with it; nominally it is under the control of the Secretary to the Board of Revenue in the department of Public Works, but as he is fully occupied by his proper office duties, the only officer of the department really connected with it is the Assistant Revenue Surveyor belonging to the establishment of the Collector of Madras. It is a part of the duty of this officer to go once a month to Ennore, in order to ascertain and report on the condition of the bar at that place; he also reports, at the same time, the "average"† depth of water in the Cochrane Canal, but it does not appear that he ever visits the Cauttoopully Canal or the Pulicat lake, except on some very special occasion. When the water is fallen so low in any part of the navigation as to impede the passage of boats, the Surveyor is sent to make an estimate for clearing out the obstruction. After this estimate has been made, has been submitted to the Board of Revenue through the Collector, and has received their sanction, the execution of the work is ordered; but meanwhile, and until the work is done, traffic on the canal is more or less interrupted.

More Engineering superintendence wanted.

We think that the canal and its connected works, forming as they do a navigation of 50 miles in length, require the whole attention of one officer, and are of sufficient importance to claim it. And we would recommend that the whole line of the navigation should be made a part of the 4th division, within which by far the greater part of it actually lies; and further, that a Revenue Surveyor or European Overseer‡ should be specially appointed to the exclusive charge, under the Civil Engineer. While the improvements which we have recommended are in progress, even more than this amount of superintendence will be required; and if the works are to be maintained in that efficient condition in which we are anxious to see them, they will require constant attention, and will fully employ an officer of the class we have specified.

10. We have next to speak of the mode of levying toll on the canal; and the present system is extremely inquisitorial, complicated and unequal.

The mode of levying the toll on the Cochrane Canal;

The tariff appears to include all articles whatever that are carried on the canal; it contains 42 separate articles by name, besides the following two very comprehensive items: "Provisions of wines, furniture, trunks, vegetables, curry stuffs, &c.," and "furniture and sundries of all kinds." There are nine different sorts of firewood, liable to different rates of toll, besides three sorts of faggots, liable to different rates; some things, as grain and chunam, are tolled by measurement; some, as straw, and "long sticks," by the bundle, without definition of size; some, as chillies, tamarinds, &c., by the bag, with equal vagueness; some by the cooly load, some by the cart load, and some by tale.

It is obvious that this multiplicity of denominations, and the distinction of so many sorts, throws much power into the hands of the toll collector, and at the same time gives facilities for fraud to the dishonest trader. The present intelligent Superintendent represented this circumstance to the Collector, so long ago as December 1846, being very soon after

* To Board of Revenue D. P. W., 30 March 1839, Para. 11.

† Such is the term used in his reports; but as that information would be totally useless, it is to be supposed that he, in fact, reports the depth at the shallowest parts.

‡ We here use the terms applicable to the present state of the department; if the changes in it recommended by us are made, the officer to be appointed to the canal will be a Sub-Engineer.

Appendix (II.)

after the new tariff was promulgated; and recommended that the proper weights or dimensions of the several indefinite denominations of articles should be determined, according to a scale which he submitted at the same time. This has not been done; but in 1849, on a further application from the Superintendent, the Collector furnished him with scales to weigh the commodities.

Again, we have failed to trace any principle in the amount of toll on the various articles. Properly it ought to vary with the weight or displacement of the goods; but on comparing it with the boat-hire of the articles respectively (and that may be assumed as approximately representing the displacement), we find that it varies from the full amount of the boat-hire to only one-third of it. And it is even bulk for bulk less on some high-priced commodities, as chillies, than on such cheap articles as firewood and chunam shells.

And on the Cauttoopully Canal;

11. The foregoing remarks apply to the toll on the Cochrane Canal only; a totally different system obtains on the Cauttoopully Canal. There the rule is indeed simple, but at the expense of fairness; the toll is 7 annas 6 pice per boat-load, on boats of all sizes and goods of all descriptions, provided only that the goods amount to a cart-load; a smaller quantity passes free. A boat coming from Pulicat, or the northward, pays these two tolls; but if, after passing the Cauttoopully Canal, it lands goods at Ennore, or other place short of Madras, the Cochrane Canal toll is not demanded, but only one-fifth of it, in addition to the Cauttoopully toll of 7 annas 6 pice a boat-load.

And on goods landed at Ennore.

The course observed in cases of this latter kind, which, however, are unfrequent, viz., where goods are to be landed between Cauttoopully and Madras, is not a little troublesome to traders and boatmen. There is a Conocopyllay or Clerk stationed at Cauttoopully, the southern end of the Cauttoopully Canal, and a second at Sadiencoopum, the northern end of the Cochrane Canal. When goods brought by Cauttoopully are to be landed at Ennore, the boatmen obtain from the Clerk at the former place a ticket specifying the nature and the quantity of the goods. On arriving at Ennore, one of them leaves the boat, and proceeds on foot to the toll office at Madras, a distance of 12 miles, and delivers the ticket to the Superintendent of the canal; who thereupon sends a written order to the Conocopyllay at Sadiencoopum, directing him to go to Ennore (six miles from his post) to inspect and measure the goods and receive the toll. Thus, in order to the levying of this toll, two persons walk a joint distance of 36 miles, and the boat and the cargo are detained probably two days. And after all, what does the toll amount to? We learn from the Superintendent that the principal article landed from the northward at Ennore is faggots, and that only in small quantities. The value of a second-size boat-load of faggots is Rs. 90, and the full toll Rs. 10. 12. 6.; for such a quantity, then, the toll leviable at Ennore (being one-fifth the full toll) will be Rs. 2. 2. 6.; and only Rs. 2. 10., with the Cauttoopully toll.

Simplification of the system.

12. The vexatious and tedious and complicated system of levying the toll, is no doubt among the causes why so little use is made of the canal. This cause it is highly desirable to remove, by simplifying the system; and we would effect this simplification by levying the toll in one sum as one charge at the Madras Basin, and there only; and by taking it in a mode as little interfering and annoying as possible.

The Toll at Ennore to be abolished;

Year.	Rs.	a.	p.
1856	32	6	4
1857	30	15	6
1858	48	2	11
1859	72	3	7
1860	38	10	11

Total - 222 7 10

Average 44 7 10

And the separate toll for the Cauttoopully Canal.

We have already explained that by far the greater part of the total collections are even now received at Madras, only an extremely small amount being received at Ennore. The total annual collections at the latter place, on the average of the last five years,* is under Rs. 41½; and not to insist on the inconvenience to parties concerned, at which this trifling sum is collected, it does not appear that when the toll at Madras is consolidated into one sum, the Conocopyllay at Cauttoopully (whose salary alone is Rs. 84 a year) will be required for any other purpose than to secure that very insignificant amount. There seems no reason to suppose that the demand of Ennore for articles brought by the canal will materially increase; and when the toll is reduced, as we shall recommend, there need be no fear that goods will be landed there, and taken by land to Madras to evade the toll, as the advantage will be very greatly in favour of the water carriage, as it is indeed already; we propose, therefore, to discontinue altogether the practice of tolling goods landed at Ennore.

As to the toll levied at Madras, we propose that the separate toll now levied for using the Cauttoopully Canal should be discontinued. In point of fact, almost all the boats which arrive at or leave Madras pass through both canals, and in the case of such the separation is simply troublesome, without any advantage whatever; and as respects the small remainder which pass between Ennore and other nearer places, and Madras, and so use the Cochrane Canal only, the toll which we shall propose will be so much lighter than what is now paid for passing that canal alone, that the change will still be a great boon to them; and it is of much importance that the tolls should be as simple and intelligible as possible.

New mode of taking the toll at Madras.

13. With regard to the mode of levying the toll, various plans suggested themselves to us; but that which, on the whole, appears to us the best, is to register all the boats plying on the canal, with their measurement and tonnage, and levy a toll of so much a ton on each boat according to its registered tonnage, every time it enters the Madras Basin with a cargo. The advantages of this plan are, that it takes away all plea for the inspection of goods, or the detention of boats in transit; and that it tolls all goods equally, according to their displacement, including passengers who have no good claim to exemption from toll, provided it can be taken, as this plan will take it, without direct or personal interference. The only material objection to which it is open, so far as we are aware, is, that it transfers the demand from the owner of the goods carried to the boat-owner; and that many of the latter class, being men possessed of little property besides their boats, might possibly be driven off the canal

canal by the fear of such liability; but this objection is applicable only to the poorer boatmen; it does not concern the numerous class who own both boat and cargo; and we think that, even with regard to the poorer class, it will be held to be without foundation, when it is considered that the demand will come just at the time that the boat-hire is received, or at least when a part of it may be received.

A minor objection is, that the toll will be the same on half a boat-load of goods as on a whole one; but, practically, we believe that boats are generally fully laden, except when there is too little water; and at those times, if this is ever allowed to happen hereafter, a remission may be allowed; and we shall propose so to lighten the toll, that it will be very light when the boat is only partially filled.

14. It may be asked why we propose to toll only boats arriving, and to exempt those leaving; the reason is, that the trade consists almost wholly of imports. In the two Fuslies 1259 and 1260 (the only years in which we have the Imports and Exports separately), the total import toll amounted to Rs. 62,638, the export to only Rs. 1,513, or less than 2½ per cent. The goods exported are not only small in quantity, in the aggregate, but they are distributed in small portions over a great number of boats; thus the above sum of Rs. 1,513 was collected from 3,671 boats. A toll per boat would, therefore, fall very heavily on these goods; or, to avoid that, the mode of transport found most convenient to the traders, must be altered; and further, a toll on exports would expose all boats leaving the basin to examination. Hereafter, when the canal shall have become the great channel of communication with the North, the system now proposed will perhaps need modification; but for the present it seems to us to be decidedly the best.

15. A more perfect plan would, indeed, be to levy a monthly toll from all boats, according to tonnage: this would render the payment certain and invariable; would make the collection easy and simple; and would not only give perfect freedom to the boatman to employ his boat in the most convenient way, but would in a slight degree act as a premium on industry. This plan may be fitly adopted hereafter, when the boatmen shall have become habituated, under our proposed plan, to the payment of toll; at present, we fear that the prospect of periodical demands of toll, irrespectively of the receipts of boat-hire, would have the effects which we have supposed to be objected to the first-mentioned plan; viz., that it would drive the poorer owners off the canal, and would give a monopoly of the business to the more wealthy owners. Further, in the existing uncertain and precarious state of the navigation, a periodical demand would be very unfair, as the parties liable would often be deprived of the means of paying, through the neglect of the parties receiving the toll, viz., the Government, to repair the canal.

A third plan, which came under our discussion, was to toll a few of the principal articles of traffic, and allow all others to go free; but we could devise no simple and compendious method of taking the toll on such commodities; and we were of opinion that no article carried on the canal (not excepting passengers) could fairly claim exemption from toll, provided it could be levied without interference or detention; and this consideration deserves the more weight, because there are several articles, now yielding but little toll, the conveyance of which seems likely to be greatly increased, if the canal is improved.

16. It remains to consider what the rate of toll per ton should be; and in order to determine that, it is necessary to decide what shall be the total amount to be levied annually.

Hitherto the canal has been regarded as one of the ordinary sources of revenue; the whole amount collected has been carried to the credit of the Government, and the sums expended on charges and repairs have in like manner been paid out of the general revenue. From the statement given above, in para. 6, it appears that even during the 10 years when the compensation to the lessee was in course of payment, there was a clear gain of Rs. 10,005 annually; the average yearly receipts being Rs. 28,698, and the average outgoings Rs. 18,693. During the last four years, when there was no compensation to pay, the receipts have been on the average Rs. 32,198, the charges Rs. 2,677, and the net gain Rs. 29,521 annually. It further appears that, on the whole, even allowing for the compensation paid to the lessee, Government have derived a clear profit from the canal to the amount of Rs. 2,22,915 in little more than 14 years.

17. Now it appears to us, as stated in our Report, that the instructions of the Honourable Court on the subject of ferries, are equally applicable in principle to canals; and both with reference to those orders, and from general considerations, we think that Government ought not to stoop to derive a revenue from works of this kind, any more than they would wish to do so from a road. We think that the tolls should be fixed at a low rate, in order to afford the greatest amount of facility to traffic; and that the collections should form a separate and distinct fund, to be available, 1st, for the current expenses and repairs; 2d, for the improvement and extension of the work; 3d, for the formation of new similar works in the same district or vicinity; 4th, for making or improving roads or bridges, or otherwise facilitating traffic on the branch roads feeding the canal; and 5th, for aiding such works of the same kind in the same district or vicinity, as may not produce sufficient return for their current expenses, and repairs and necessary improvements. Many lines of canal might now be formed at very moderate cost, which would immediately pay all current expenses, and leave a surplus; and those would thus afford valuable aid to the contributions of Government for improving the internal communications of the country.

18. Applying these principles to the case now before us, we find, in the first place, that the capital sunk by Government in the purchase of the canal has been much more

Appendix (II.)

Reason for tolling arrivals only.

Other plans noticed.

Rate of toll.

The collections and profit hitherto.

The legitimate objects of the toll.

Proper cost of establishment.

Appendix (II.) than replaced, having been in fact paid out of the receipts from the canal. Further, it appears that the total charges of the canal, including repairs, have averaged only Rs. 3,854, but it is certain that far too little has been expended on repairs. This item, therefore, must be increased, and a warrant officer of the Public Works Department, with a small establishment, must be maintained; but, on the other hand, the Toll Office establishment may be reduced, because, under the new arrangements proposed by us, both the work devolving on that establishment, and the amount of the collections, will be diminished. The annexed statement shows in comparison the existing establishment and that which might probably be sufficient if the proposed measures are adopted; the saving amounts to Rs. 46 monthly, or Rs. 552 on the whole year.

PRESENT ESTABLISHMENT.		PROPOSED ESTABLISHMENT.		Reduction of Salary.
Officer.	Salary.	Officer.	Salary.	
	<i>R. a. p.</i>		<i>R. a. p.</i>	<i>R. a. p.</i>
One Superintendent -	70 - -	Superintendent -	70 - -	- - -
One Assistant ditto -	24 8 -	- - - - -	- - - - -	24 8 -
One Shroff -	17 8 -	Shroff - - - -	17 8 -	- - -
Conacapillay at the Basin -	10 8 -	Conacapillay at the Basin -	10 8 -	- - -
Conacapillay at Cauttoopully -	7 - -	- - - - -	- - - - -	7 - -
Conacapillay at Sadiencoopum -	10 8 -	Conacapillay at Sadiencoopum -	7 - -	3 8 -
5 Peons, at Rs. 7 each	35 - -	4 Peons, Rs. 6 each -	24 - -	11 - -
Sweeper - - -	1 8 -	Sweeper - - - -	1 8 -	- - -
Toty - - - - -	1 - -	Toty - - - - -	1 - -	- - -
Total for a Month -	177 8 -	- - - - -	131 8 -	46 - -
Total for a Year -	2,130 - -	- - - - -	1,578 8 -	552 - -

We propose to continue the present salary to the Superintendent, as it is important to have a steady and respectable man at the head of the office. The duty of the Conacapillay at Sadiencoopum is to give chits or passes to boats entering the canal from the northward, and to keep a register of them, to prevent their landing their goods on the bank of the canal, and so avoiding the toll. There will be very little inducement to this sort of evasion under the new system as respects goods, and but little more in regard to passengers; it may be well, however, to continue the officer in question for the present.

Total amount required.

19. The following, then, is our estimate of the annual requirements of this canal. Toll establishment, Rs. 1,578; probable cost of one Warrant Officer of the Civil Engineer's Department, with the necessary establishment, Rs. 2,600; and we judge that if the improvements and repairs now obviously necessary are effected, of which we shall say more presently, and the canal is thus placed in good working order, the annual outlay necessary to keep it so may probably amount to Rs. 6,000. These sums make a total of Rs. 9,578. We would propose then to fix Rs. 20,000 as the gross amount to be raised from the canal annually, being less than two-thirds of the gross collections in late years.

Number and tonnage of boats;

20. The next question is, what rate of toll per ton will be sufficient to afford that income; and in computing this, we shall take only the actual traffic on the canal as far as we can ascertain it, without any allowance for the increase which will certainly follow that improvement of the navigation and reduction of toll which we recommend. And when that increase shall show itself in an excess of the total collection materially above that which we have fixed, we recommend that the rate of toll be somewhat lowered.

Mr. Rozario, the Superintendent of the canal, has prepared for us a statement of the number of boats plying on the canal, and their tonnage, which is as follows:—

Class of Boats.	Number of Boats.	Probable Average Tonnage.	Probable Total Tonnage.
		<i>Tons.</i>	
1st Class - - - -	30	15	1,200
2d Class - - - -	120	12	1,440
3d Class - - - -	70	7	490
4th Class - - - -	90	2	180
5th Class - - - -	60	1	60
TOTAL - - - -	420	- - -	3,370

The statement appears to have been drawn up with much care; and having ourselves gone to the Basin, and taken the measurement of several boats, we are of opinion that in that particular it is rather under than over the truth. Appendix (11.)

With regard to the number of trips made by each boat, Mr. Cotton states it at three a month; but this seems much too high, and at all events the average number made is much smaller. The average number of boats that paid toll in each of the three Fuslies 1258 to 1260 was 7,165, of which 1830 were departures from the Basin, leaving 5,335 arrivals. The boats in question were of the first three classes, as those of the 4th and 5th classes seldom carry goods, but passengers only. The boats of those three classes are 270, and the average number of trips in the year, to each boat, was therefore only 19. As the smaller boats, no doubt, go more frequently than the larger, it is probable that the latter do not make more than 10 or 12 trips a year, and, considering the time necessary for loading and unloading, this number agrees much better with the dilatory working habits of the people of this country than the larger number stated by Mr. Cotton. We may add, that it agrees better also with the moderate number of boats which we found at the Basin. And number of trips made.

We think we may safely assume, that every ton of the whole comes to the Basin with a cargo 12 times in the course of the year; and thus we have 37,560 tons in the year. We have also 150 passenger-boats with a united tonnage of 240 tons, each of which probably makes at least 24 trips in the year. This gives a total of 5,760 tons, and with the cargo-boats forms an aggregate of 43,320 tons on which to raise Rs. 20,000. We propose, then, that the toll shall be $\frac{1}{2}$ rupee a ton on every laden boat entering the Basin. The term "laden" to extend to boats carrying any quantity of goods, or even a single passenger, for hire.

21. We will only add here, that the slight clearing and deepening which we have spoken of as necessary for the ordinary traffic, would render the navigation perfectly feasible for small screw-steamers, which indeed would draw less water than the common cargo-boats now in use. We have reason to believe that private enterprise would be ready to take advantage of this opening, by placing such small steamers on the line for the conveyance of goods and passengers between Madras and Sooloorpett. The aid afforded by such an improvement to the Northern traffic would be very great; and we would earnestly press the expediency of removing doubts or difficulties from its way, by freely permitting screw-steamers to ply on the canal on payment of the same rate of toll per ton of freightable measurement as is charged on ordinary boats. We say screw-steamers in particular, because vessels so worked damage the banks very little more than tow-boats; paddle-steamers, from their greater width, and from the commotion that they cause, seem unsuitable to this canal. The use of steamers on the canal.

We think the permission to work screw-steamers on the canal and lake on these terms should be given immediately; leaving it to individual discretion to determine whether to introduce such vessels now, or to wait till the proposed improvements shall have made the waters navigable at all seasons.

22. There is one circumstance connected with the canal to which we have already adverted, and which forms a serious impediment as well to its present usefulness as to its improvement; we allude to the rights claimed and exercised by the Zemindar of Vencatagherry over all the landing-places used by boats on the West shore of the Pulicat Lake, which lies within his territory. The chief of these landing-places is Sooloorpett, the most distant point of the navigation, and of that we shall mainly speak. Sooloorpett is at some distance from the lake, and it is reached by a small river; and the mouth of this inlet being closed with sand banks, requires to be frequently cleared for the free passage of boats. This part of the navigation is stated to be often interrupted when the water is low. According to a practice of many years' standing, the Zemindar levies a fee or toll on all goods carried on this river or inlet, according to a certain scale, and fees are also levied by the Cavulgars, or hereditary watchers of some adjoining villages.* The rates are not very heavy; but it is stated that much inconvenience is experienced through the detention of goods by the people engaged in the collection. It is easy to see that this demand and the plea for detention which it affords may be made the means of exacting much more than the amount authorized by the Zemindar; and it is expressly stated by the late principal Collector of Nellore (in his letter to the Board of Revenue, Department of Public Works, October 1st, 1840), that this is the case. The toll was at that time rented out by the Zemindar; and the renter and the servants of the Zemindar detained goods, and by that means extorted much more than the proper toll. Tolls levied by the Vencatagherry Zemindar.

Besides Sooloorpett, there are three landing-places in the territory of the Vencatagherry Zemindar, at all of which fees or tolls are levied, varying slightly in amount from those paid at Sooloorpett; at all these places the canals through the shallow border of the lake, by which boats reach the landing-place, were originally excavated, and are now maintained, by the Zemindar.

23. This subject was brought to the knowledge of the Board of Trade so long ago as 1813, by the Collector of Nellore; but nothing was done about it, and no further notice taken till 1837, when it was again brought forward by Mr. Charles Cotton, in his memorandum Former discussions of the subject.

* The Curmums of the several villages also receive fees on the boats; but the Zemindar declares that these are paid by himself, out of his collections of toll. There is also a small landing-place in the Calastry Zemindary, at which similar tolls and fees are levied to those above described.

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random on the canal above referred to. The principal Collector was then instructed to communicate with the Zemindar, with the view of putting an end to the collections; and he appears to have used his best endeavours to this end, but without effect. The Zemindar once and again replied that the tolls were his right by long custom, and were secured to him by his Zemindary Sunnud, and that they were paid in consideration of his keeping open the bar and the channel at Sooloorpett, and clearing the cuts at the other landing-places. He also stated that the Cavulgar's fees were paid in consideration of the protection of the merchants' goods from depredation.

Mr. Stonhouse ascertained the annual amount of the Zemindar's collections, over and above the small outgoings, to be about Rs. 1,000, and he wished the Zemindar to accept a corresponding reduction of his Peishcush, and surrender the tolls. This, however, the latter pertinaciously refused, alleging indirect advantages to himself from the present system in various ways, all of them obviously enormously exaggerated in amount, and most of them wholly unconnected with the question of tolls.

The tolls appear to be legal.

24. The matter was ultimately allowed to drop, as the Zemindar could not be brought to terms, and it was thought that the validity of his claim could not be gainsaid. Without at all touching the question whether any petty exactions existing in the Zemindary are legal (with which question we have nothing to do), it appears to us that these fees or tolls cannot be denied to be so. It is distinctly stated by Mr. C. Cotton, in his memorandum of June 1837, that in every case in which they are levied, the Zemindar originally made, and still maintains, the improvements by means of which alone those places respectively can be used by boats at all. The payment, therefore, is as strictly a toll for the use of those improvements as the payment at the Madras Basin is a toll for the use of the Cochrane Canal. It is true that the total amount received much exceeds what is expended in repairs, and also that the works are not maintained in perfect order; but both propositions are equally true of the Cochrane Canal and its tolls.

But Government may require him to accept compensation.

25. But though the Zemindar's title to these tolls appears on these grounds to be perfectly valid, yet it seems clear to us that if, from abuses in the mode of collection, or from any other cause, they form practically a material impediment to the public utility of the canal and lake, the Government has an indisputable right to interfere, and compel the Zemindar to receive a fair money equivalent in exchange for his rights, whatever they may be ascertained to be. According to the recognized law and usage of the country, though a declaratory Act, similar to that existing in Bengal, is wanting here (and we understand that the subject is now under consideration), the Government is fully entitled to take such land within a zemindary as may be required for any public purpose, a road, a canal, a railway, or a channel of irrigation, on condition of paying the Zemindar annually the actual yearly value of such land to him; and it seems indisputable, that on this analogy the Government has an equal right to free this important line of communication from obstruction and hindrance by the Zemindar, on paying him the pecuniary value of his interest in such obstructions.

With respect to the roosooms or fees levied by the Cavulgars, they appear to be exactly similar to those formerly levied by the Cavulgars of Pulicat, which were commuted into a money payment from the Treasury some years ago. These also may, it is supposed, be dealt with in the same way.

Some proposed extensions of the navigation.

26. Some suggestions by Mr. Charles Cotton, for extending the canal, have not been acted upon, and it may be useful to notice them here.

The first is a proposal for a channel of six or eight miles along the border of the lake, northward from Cusbah Streethoricottah, where the lake now ceases to be navigable, and where most of the firewood is now put on board the boats. The wood has now to be brought that distance, and much more, by coolies, or on bandies where there are no roads; and it appears, therefore, to be a very desirable improvement: but the extension of the canal, spoken of below in para. 27, includes it, and will render a separate work with that object unnecessary.

With this recommendation was joined another equally worthy of attention; viz., that as the Government jungle available for firewood in that quarter does not exceed from 30 to 40 square miles, and will speedily be destroyed by indiscriminate cutting, it should be divided into eight portions (that being about the number of years in which trees cut grow up again to the proper size for cutting), one of such portions to be cleared every year. A Government tax is levied on the firewood cut, and amounts, on an average of the five years 1843 to 1847, to Rs. 7,135 a year; out of this amount, the trifling sum necessary for carrying that proposal into effect might very beneficially be expended. It seems clear that, if the jungle is thus husbanded, the returns of this tax and the supply of firewood will be perpetuated, and will increase; but if not, there is danger that both will decline. Mr. Cotton calculates the value of firewood consumed annually in Madras at 10 lacs of rupees, or 100,000 £ sterling, and justly observes how vast a public boon and benefit would be any material reduction of its present high price. There are several sources of supply, and among them the jungles of the Calastry and Venecataghery Zemindaries. A reduction in the price of that brought from Streethoricottah would most probably lead those proprietors to follow the example, and endeavour to cheapen the conveyance of firewood, by making roads from the jungle to the lake, or otherwise.

A second proposed extension of the canal is by a cut from the Madras Basin to the beach near the Custom-house, a distance of about a mile and a half; we believe that this, though contemplated as a part of the original plan, has recently been discussed and abandoned, from the fear that the salt water of the canal might injure the seven wells which supply the

fort with drinking water. It would be a valuable improvement, however; especially in case of the extension of the canal to the northward, and perhaps a line may be selected not open to this objection. It seems very doubtful, however, whether the fear be not altogether chimerical; for the proposed canal would not cross the line by which it must be supposed that water reaches the wells, and it would be far less deep than the wells. We observed a well on the Western Esplanade of the town very much nearer to the salt water of the ditch than the proposed canal would be to the seven wells, and of which the line of supply is directly crossed by the ditch, and which yet appears to be in very extensive use. Instead of yielding to theoretical or imaginary fears, it would be important to inquire whether the water of this well is ever brackish.

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A third proposal was to deepen the ditch along the western face of the Madras wall, and the Cooum River, where necessary, so as to enable boats to pass from the basin to Chindadrepettah, and to the Mount road near Richardson's shop, at both which places landing-wharfs should be formed; this also appears likely to be useful. Boats can now pass to those points when the river and canal are full, but not at other times; and there is an absence at both places of every sort of convenience for landing or taking in goods.

27. All these three plans, but more especially the first, seem well adapted to increase the usefulness of the canal, and the cost would be trifling. The first and most important is included in a plan recently sanctioned by the Honourable Court of Directors, as we have explained above; the cost of the other two would not be great, probably not exceeding Rs. 10,000. We would also recur to the improvements of the existing navigation which we have pointed out above in para. 8, viz., forming towing-paths, deepening the shallow parts of the canal, deepening and straightening the channel through the lake and backwater and marking it with beacons, and extending the wharfs at the Basin. The first of these, viz., deepening and straightening the canal, is also provided for in the estimate lately sanctioned; and the others are very much to be desired.

All of them would be beneficial, and cost would be small.

28. The lengthening of the canal alluded to in the last para. as having been sanctioned by the Honourable Court, will extend it to Doorgarazaputnam, a place 70 miles north of Madras. But it is earnestly to be hoped that even this is only the commencement of improvement; for the further extension of the canal to the northward will be wonderfully easy and cheap. Colonel Cotton informs us that the high-level channels, in connexion with the Kistnah and Godavery Anicuts, will lie for 240 miles in the exact direction of the Great Northern Road; and he estimates that the cost of these canals, with the additional size necessary to fit them for navigation as well as irrigation, will be no more than Rs. 8,000 (or 300 £ sterling) a mile. The southernmost point to which these channels will be brought for irrigation only, will be no more than 130 miles from Doorgarazaputnam, extending throughout along the line of back-waters and low ground which run parallel to the coast, and might be converted into a canal at a small cost; and we cannot believe that, under these circumstances, the Government will fail to take advantage of these singular facilities for securing the vast benefits of an extensive inland canal navigation. We need not repeat what we have already said as to the state of the Northern Road, called a road, indeed, by courtesy only: and to make a tolerable road on that line would cost much more than sufficient to provide the vastly superior convenience of water communication. We may here notice, that if this plan of extending the navigation be adopted, the interference of the Zemindar with the use of the lake will be got rid of, as respects the general trade; for then that of the Northern Districts and of Cuddapah—so far as the bad state of the roads and other communications will admit of the navigation being made available for it—will join by the Northern Canal, and not at Sooloorpett; and the Zemindars will thus have only the produce of their own country to toll, and, indeed, they have really very little more now; because, from the various causes which we have noticed, the lake and canal are but little made use of.

But much larger extensions may be effected very cheaply.

Appendix (JJ.)

MEMOIR ON CORINGA HARBOUR, by Lieutenant-Colonel A. T. Cotton.

I HAVE for several years intended to draw up a full report upon the important harbour of Coringa; but the pressing duties connected with the Godavery Anicut have not left time for it; and as at present there seems little prospect of my being able to do so, I think it necessary at once to write a short memorandum, in order that no further delay may be incurred in bringing the subject before Government.

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The value of the port of Coringa will be understood from the following statement:

1st. It is the only sheltered port where ships can lie in safety at all seasons between Calcutta and Ceylon.

2d. It is situated in a district of the greatest capabilities of any in the Peninsula; for the Delta of the Godavery already contains about 600,000 inhabitants, and is capable of supporting 2,000,000. It consists of 1,200,000 acres of the richest alluvial land, abundantly supplied with water, and is being drained, irrigated and provided with water communications in every direction (there are already 600 miles within the Delta), at a total expense of nearly a quarter million sterling, and produces sugar, tobacco, rice, cotton, hemp, &c. &c., to

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such an extent as to have an export trade from the coast of more than 14 lacs, which is rapidly increasing; and such a Delta of course gives an immense value to its port.

3d. It is situated at the mouth of the river Godavery, which drains a basin of much more than 100,000 square miles, of which it is the natural commercial outlet. The river has been navigated 450 miles from the sea, goods having been repeatedly sent down by the enterprising house of Palmer of Hyderabad, about the time of their failure. The extensive cotton fields of Berar, with the great commercial city of Chandah, and the important cotton marts of Oomrawattee, Henghun Ghat and Aroee, are situated on or close to this line of navigation; and from the information of a gentleman who has repeatedly navigated this noble river, it appears that only the annoyances of the petty chiefs on its banks, and the want of European enterprise, have hitherto prevented it from becoming the line of a most important trade. The Nagpore cotton alone (amounting to about 20,000 tons, equal in quality to the Mobile cotton), at present conveyed for export by a long, tedious and uncertain land-carrriage, either 500 miles to Mirzapore, on the banks of the Ganges, or 400 miles to Bombay, could be conveyed in a tenth of the time, and at a tenth of the cost, to Coringa, by water communication.

4th. On this river, and its tributaries also, are situated vast forests; and coal has been found in three localities, one of the specimens of which appears to be of very fair quality.

5th. This port is about the cheapest in the world, provisions being cheap, and workmen abundant, and the shipping expenses of the harbour not one-tenth of those incurred in running up the Hoogly. There is none where repairs to vessels can be executed at a lower rate; and nothing but want of attention to the port at present prevents the ship-builders from having a patent slip, and everything which could facilitate the execution of repairs.

6th. The business of the port has rapidly increased already, since the Government works for the improvement of the Delta and the sugar manufactories have been commenced.

The port has thus remarkable advantages, and cannot but be worthy of the attention of the Government. The anchorage is in a bay protected by the main land, islands and mud banks from the violence of the sea, and nearly opposite the mouth of the small river Yelairoo, which enters the bay between the two villages of Cocanada and Jagamaikpoorum. About seven miles from this, at the bottom of the bay, the Yanam branch of the Godavery flows into it, a little below the town of Coringa. The main branch of the Eastern Godavery falls into the bay by several channels between islands and banks on the southern side of the bay, and has at present no channel with more than a few feet at the entrance.

The Coringa River is the one in which the ship-building establishments are situated, and the native vessels are laid up, and where many of the native merchants reside and have their godowns, partly loading their vessels in the river, and filling them up after they have gone out to the bay. Many of the large vessels are also loaded from here, their cargoes being sent from nine to 12 miles to the anchorage in large decked boats.

The Cocanada River has of late become more and more a place for the collection of goods, and the residence of merchants and agents, and being now connected with the main Godavery by a good navigable channel, it will soon be by far the principal place of shipment.

The principal defects of the port are these:

1st. At the head of the bay, and opposite the mouth of the Coringa River, is a bar of sand, on which there is only nine feet of water at high water; but for which the largest vessels could be taken into the Coringa River for repairs, and all the native craft could be fully loaded there, and leave the river ready for sea.

This bar is evidently generally stationary; but in the great flood of 1849 it was raised about two feet. The centre of it is hard sand; and after much examination and consideration, I am satisfied that a good channel could be made through it (and kept open) by the dredge at an inconsiderable expense, probably under Rs. 10,000. If the water were deepened only four or five feet, it would be an incalculable improvement to the port; for this bar seems to be the only thing that prevents its becoming one of the best repairing ports in the world, on account of its cheapness.

The Coringa River is very winding, and some bends might be cut away with great advantage and at no great expense. Ultimately, it would be desirable to carry out two lines of loose stone-work from the mouth of the river across the bar and some distance into the bay, in order to confine the current, and cause a scour, which would no doubt secure a fine deep channel sufficient to enable very large vessels to pass in and out loaded. But the deepening of the bar to enable vessels to enter the river empty for repairs, is the great point, and certainly worth a much larger outlay than it will require.

2d. The other great defect is the shallowness of the bar at the mouth of the Cocanada River, which is much more exposed to the swell of the sea than the Coringa River, there being almost always a slight surf beating on this part of the shore of the bay, and on this account the opening for the escape of the water of the river wanders up and down the coast, as is usual in such situations. The direction of the surf being at all seasons from the northward, the opening goes further and further to the south, till the turn opposite to the line of the river is so sharp that, on the occasion of some fresh, it cuts through the neck of sand, and the course is again more direct. Five years ago, this action was assisted by cutting a perfectly direct channel to the sea, which was of great use for a time; but the river having been neglected since, it has of course again wandered to the southward. The bar is always considerably lowered by the freshes; but much more when the course of the river is direct than when it goes far to the southward. When the direct cut was made, a line of stones was laid for a short distance at the mouth, so as to keep off the blow of the surf

surf from the point where the stream entered the bay: this was also of use at the time, and should have been gradually extended to seaward. The old course of the river was also banked across, in order to keep or direct the stream as much as possible through the new cut; but this was only a slight work, and was carried away by the flood of 1849. In consequence of the order of Government that no work should be done to this important river till a complete report, with estimates, &c., could be sent in, none of the small works by which it might at a most trifling cost have been kept in a very tolerable state of efficiency, have been executed for the last few years; in consequence of which the bar has been this year so high that there was not a foot of water on it at low-water, and the inconvenience to the shipping has been so great as most seriously to interfere with the trade of the port: the loss by detention of some ships, and by the driving away of others to seek cargoes where more attention would be paid to them, having been very great. To prepare a complete project and estimates for the port, was impossible while the engineers were so engaged with the great works in the interior of the district; but had the Collector and Civil Engineer been thought capable of judging of what works could in the meantime be executed to keep the river in a tolerably effective state till the more extensive works could be planned, these evils might easily have been remedied. The same mistake has been made in this case as in a thousand others, by supposing that the waste of public money is chiefly caused by things being imperfectly done; whilst the real fact is, as I have so repeatedly stated, that for one rupee lost by works being done imperfectly, 10 are lost by their not being done at all. While the Public Works Department is kept in such a state of utter inefficiency as it still is, we must be content to do things in a patch-work way, rather than do nothing; for if neither efficient establishments are kept up for the Public Works, nor the local officers allowed to do the best they can in their cramped circumstances, all classes of the community must be sufferers. The mischief that is done to the country by such neglect of an important port is incalculable; for the captain of a vessel goes away in disgust, and reports to a score of others, masters and merchants, that it is hopeless to attempt to get a cargo in a port so neglected; and numbers of vessels are thus prevented from coming there.

What is immediately wanted is, that the old branch of this river should be closed with an embankment, and a direct cut made as often as is necessary, through the sand that forms inside of the new cut, so as to assist the river in keeping a direct course as much as possible. Probably 2,000 or 3,000 rupees a year will be sufficient to do what can be done in this way.

The permanent works required are,—

1st. A lining of loose stones on both sides of the river, extending from a little distance above the bridge to the sea (about a mile), confining the stream, and compelling it to cut at the bottom instead of the sides; this operation has been attended with wonderful success in the Clyde. 2d. The continuation of these lines of stones out into the bay till they reach a considerable depth of water; they might be taken in the first instance into eight or ten feet water, and gradually extended.* Behind this stone-work, within the river, sand or earth should be thrown, to fill up to above the level of the freshes, so as to form a broad clear space in advance of the present buildings on each side of the river; and these wharves should be carefully preserved in the hands of Government, so as to prevent their being in the smallest degree interfered with by individuals. I have no doubt that by these works the mouth of the river might be kept open at all times for large boats; and country vessels might even be brought in and loaded in this river, as well as in that of Coringa.

So anxious are the merchants and shipowners of the port to have something done, that they are quite willing that the port dues, now very light, should be doubled, if the money were laid out on its improvement; and with the port dues at present about 3,500 rupees a year, would thus immediately amount to 7,000 rupees a year, and would rapidly increase with the improvement of the port. If the Government would but sanction the regular appropriation of these dues as a fund to be faithfully reserved for this purpose, the port might in time be made most complete in every way. But it is astonishing that the principle so extensively brought to bear in England should as yet have found no place in this country, viz., that where an annual income is secure, the principal of which that income is the interest, should be considered available. Almost all the harbour-works in England have been executed by money raised in this way; and if Government would allow money to be raised on the security of the port dues of Coringa, an abundant supply might at once be obtained to carry out for the improvement of the port a complete set of works corresponding to those now under execution in the Delta. Government might double the port dues, and then offer interest of 6 per cent. on a lac of rupees, taking the port dues as their security; and there could be no sort of risk in such a transaction; all parties would be gainers and none losers by it. It is astonishing how we as yet throw away the immense opportunities we have, and this is one of the main causes why the country continues in such a torpid stagnant state. There is no want of money, or of anything else, to prevent our carrying out universally those improvements which are essential to the prosperity of the country; for the money now lost in the ports annually from their wretched state, is equal to the interest of 10 times the capital that would be required to put them in a state of efficiency. A lac of rupees would probably do almost all that the port of Coringa at present requires, and if it were much improved,

* They would be formed on such a line as would be best calculated to lead the sand past the mouth of the river, and so keep the bar as low as possible, according to the known principles on which such works are constructed.

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improved, the increase of the dues would be so great as soon to provide another lac of rupees if wanted; and thus it would not be necessary for Government to pay a single rupee. I should mention here, that it would be very desirable to remove the light-house from its present site on Hope Island, to about five miles to the north point of the mud banks; because since the light-house was built, the islands and banks have extended so far to the northward, that a vessel does not see it till she is near the entrance of the bay; and if rebuilt there (probably on a foundation of screw piles) it would be far more useful than in its present position. This should be included in the set of works for the improvement of the port. I should also mention that the new Godavery works will secure a constant scour to the Cocanada River, by throwing a part of the Godavery water through it, the whole year round.

The following is a rough estimate of the works most urgently required:—

Cutting through the Coringa bar, 50,000 C. yards of sand at 3 annas	Rs.	a.	p.
			9,375
Cutting, and bank to the Cocanada River			2,000
5,000 tons of stone for the mouth of ditto, at 12 annas			3,750
Sundries, including superintendence			3,000
			<u>Rs. 18,125</u>

The further works I should recommend are:—

Lining the Cocanada River, 40,000 tons of stones, at $\frac{1}{2}$ rupee	20,000	-	-
Filling in behind the stones 20,000 C. yards of sand, at 1 anna	1,250	-	-
Extending the stone-work into the bay, 20,000 tons, at 10 annas	12,500	-	-
Cutting bends in Coringa River, 400,000 C. yards of earth, at 1 anna	25,000	-	-
Carrying stone-work on each side of the stream, across the bar, 80,000 tons, at 6 annas	30,000	-	-
New Lighthouse	10,000	-	-
Superintendence and sundries	10,000	-	-
	<u>1,08,750</u>	-	-
To which adding 1st Estimate	18,125	-	-
	<u>Rs. 1,26,875</u>	-	-
TOTAL	Rs. 1,26,875	-	-

The increase of the trade of Coringa has been very great of late; for the exports which a few years ago amounted to only 3 lacs, have lately increased to nearly 14 lacs. The sugar, tobacco, hemp, oilseeds, &c., are entirely new exports, and, with the grain to Mauritius and Bourbon, form a solid foreign trade, free from the great irregularities and uncertainties of a mere home grain trade. A very intelligent supercargo, who had had much experience in commerce, told me that it was the cheapest port in the world; and that as its advantages become more known, the resort of vessels to it would rapidly increase, particularly if by removing the bar its convenience for repairs could be made equal to its cheapness. And I trust that Coringa, as the port of one of the finest tracts of this country, on which Government have thought it worth while to spend nearly a quarter of a million sterling, and situated as it is, at the mouth of a first-class river leading direct to one of the best cotton districts of India, will at length receive that attention which it will so abundantly repay. If it should be said that nobody can be spared to superintend the works, I answer that this also is simply a question of money; if the Civil Engineer be authorised to get the work done, he will find no difficulty in obtaining the superintendence required.

The foreign trade will be seen by the accompanying statement to be very considerable, and in a little more than eight months of the current year, the arrivals exceeded the whole of those of last year. As the new irrigation works approach to completion, if any kind of attention is paid to the port, we may confidently expect a very great increase of trade; and the opening of the navigation of the Godavery to what is acknowledged to be the best cotton tract in India, would immediately make it one of our most important ports.

Madras,)
15 September 1852.]

(signed) A. T. Cotton, Lieut.-Col.,
Chief Engineer.

STATEMENT,

STATEMENT, showing the IMPORT and EXPORT DUES collected in the District of *Rajahmundry*, for the last Ten Years.

YEARS	Imports.	Exports.	Total.	Deduct Charges.	Net Collection.
	<i>C. Rs.</i>	<i>C. Rs.</i>	<i>C. Rs.</i>	<i>C. Rs.</i>	<i>C. Rs.</i>
1842-43 - -	4,297	10,737	15,034	3,916	11,118
1843-44 - -	15,648	4,840	20,488	3,916	16,572
1844-45 - -	11,074	22,927	34,000	3,907	30,093
1845-46 - -	15,035	38,606	53,641	3,909	49,732
1846-47 - -	9,351	44,956	54,307	3,887	50,420
1847-48 - -	21,687	42,592	64,280	3,917	60,362
1848-49 - -	14,106	21,679	35,785	3,646	32,139
1849-50 - -	11,666	21,300	32,966	3,673	29,293
1850-51 - -	8,686	29,166	37,853	3,919	33,934
1851-52 - -	3,088	31,538	34,626	3,922	30,704

The falling-off in receipts after the year 1847-48 was caused by the abolition of the duties between port and port, which took effect in the following year. It will be seen by this and the following Table, that the exports exhibit a material and progressive increase subsequently; the greater part of which is in the shipment of oil, seeds and grain to Great Britain and France; being an entirely new branch of trade.

ABSTRACT STATEMENT of Value of EXPORTS by Sea, in the *Rajahmundry* District, for Ten Years, or from 1841-42 to 1850-51.

YEARS	EXPORTS.		
	Grain.	Other Things.	TOTAL.
1841-42 - -	23,040	4,36,322	4,59,362
1842-43 - -	87,112	4,77,263	5,64,375
1843-44 - -	1,29,197	5,04,794	6,33,991
1844-45 - -	1,92,426	5,36,861	7,29,287
1845-46 - -	3,62,177	5,44,377	9,06,554
1846-47 - -	8,84,296	9,69,207	13,53,503
1847-48 - -	2,56,031	8,39,366	10,95,395
1848-49 - -	2,22,500	8,34,227	10,56,727
1849-50 - -	1,02,041	8,74,678	9,76,719
1850-51 - -	2,81,333	10,23,303	13,04,638

A STATEMENT, showing the Total Amount of SHIPPING, British and Foreign, arriving at and departing from the Port of *Coringa*, in each Month of the following Years.

MONTH.	1850.								1851.								1852.							
	BRITISH.				FOREIGN.				BRITISH.				FOREIGN.				BRITISH.				FOREIGN.			
	Arrivals.		Departures.		Arrivals.		Departures.		Arrivals.		Departures.		Arrivals.		Departures.		Arrivals.		Departures.		Arrivals.		Departures.	
	Num-ber.	Tonnage.	Num-ber.	Tonnage.	Num-ber.	Tonnage.	Num-ber.	Tonnage.	Num-ber.	Tonnage.	Num-ber.	Tonnage.	Num-ber.	Tonnage.	Num-ber.	Tonnage.	Num-ber.	Tonnage.	Num-ber.	Tonnage.	Num-ber.	Tonnage.	Num-ber.	Tonnage.
		<i>Tons.</i>		<i>Tons.</i>		<i>Tons.</i>		<i>Tons.</i>		<i>Tons.</i>		<i>Tons.</i>		<i>Tons.</i>		<i>Tons.</i>		<i>Tons.</i>		<i>Tons.</i>		<i>Tons.</i>		<i>Tons.</i>
January -	1	258	4	804	-	-	-	-	3	758	6	1,347	3	909	5	1,540	4	1,879	5	2,288	5	1,588	1	344
February -	6	1,787	3	762	4	1,683	3	1,183	2	452	6	1,358	2	656	3	870	5	1,105	5	917	4	1,137	6	1,946
March -	8	2,515	6	3,110	-	-	1	500	7	2,026	4	1,359	3	873	4	1,240	2	863	1	62	2	494	3	791
April -	9	2,298	9	2,350	-	-	-	-	8	1,522	7	2,224	2	520	1	260	6	1,225	4	1,007	3	913	5	1,408
May -	6	910	6	1,163	2	431	1	160	5	1,209	7	1,657	2	505	-	-	10	2,341	6	1,561	2	707	4	1,228
June -	6	1,530	9	2,137	3	818	3	705	6	3,045	4	1,473	1	358	2	515	6	2,655	6	1,973	1	296	1	337
July -	5	1,768	2	565	4	1,199	1	884	1	150	6	2,305	6	1,856	3	884	6	2,263	8	2,184	4	1,203	4	1,204
August -	3	921	6	1,589	4	1,920	5	1,459	9	2,440	10	2,620	3	1,008	5	1,650	10	3,481	6	1,835	8	2,475	4	1,165
September	4	806	6	1,689	4	959	6	1,511	5	2,369	8	2,277	2	618	3	1,002	2	978	11	3,593	2	482	3	960
October -	6	1,885	2	746	5	1,466	1	218	3	1,363	2	823	5	1,230	1	207	-	-	-	-	-	-	-	-
November	2	247	3	428	3	967	1	255	-	-	1	420	-	-	2	474	-	-	-	-	-	-	-	
December.	3	960	2	630	3	816	5	1,515	2	370	2	873	1	334	1	271	-	-	-	-	-	-	-	
TOTAL -	69	15,685	60	15,973	32	9,379	27	7,881	51	16,712	62	18,716	30	8,877	30	8,922	51	16,700	52	15,420	31	9,695	31	9,383

British and Foreign Arrivals, Grand Total, 1850 - - - - - 25,064
 Ditto - - - - - 1851 - - - - - 25,689
 Ditto - - - - - 1852 - - - - - 26,485

Coringa Sea Custom Dues and consolidated Port Dues are only computed up to the 1st of May; and those of Cocanada up to the 1st of September of 1852.
N. B.—Native vessels' Port Dues and Sea Custom Duty are included in the above Statement.

Appendix (KK.)

Appendix (KK.)

LETTER from the Chairman of the Madras Chamber of Commerce to the Secretary to the Board of Revenue, on the Subject of the projected Survey of the Godavery River, dated 4th March 1852.

ON the 22d September last you did the Committee of the Chamber of Commerce the favour, under the authority of Government, to place in their possession copies of all the official correspondence and reports relative to the projected survey of the Godavery River, and I have now the honour, by their desire, to request the attention of the Board of Revenue again to the subject, and to submit the following observations, in the hope that the Board may be induced to move the Government to obtain from the Government of India a reconsideration of the question of sanctioning the required outlay for the object that was held in view.

The Committee of the Chamber of Commerce consider that too great importance cannot be attached to the end that the projected survey is destined to lead to, viz., that of opening out the navigation of the Godavery River for purposes of traffic; but they purpose confining their present observations to its effect upon the intercourse between Berar and Nagpore and the Eastern Coast.

From its leading importance, in a general point of view, the Committee would first speak of cotton as one exportable product of the countries named. The reports forwarded by Mr. Commissioner Elliot will have made familiar to the Government both that the growth of this article in the valley of Berar is of great extent, and that the only present means of conveying it to a shipping port are defective, while at the same time costly to the last degree.

In respect of the extent of cotton exported, Mr. Elliot, in his letter of 31st October 1850, estimates it at 1½ lacs of loads, or 50,000 candies (this at 252 lbs. per load should be 75,600 candies). Mr. Chapman, in his work on the Cotton and Commerce of India, quotes the average of nine years' importation into Bombay from Berar, *via* the Concan, viz., from 1836 to 1845, as 34,750,000 lbs. (equal to a fraction under 70,000 candies;) and the Bombay Trade Report for 1849-50 gives the value of the same import for that year as Rs. 32,70,000. The importance of the actual trade in this article from Berar may therefore be considered as established. Taken at 70,000 candies, it exceeds by 17,000 candies the average export by sea of the whole Madras territories for the three years ending with 1849-50, and fills between 25,000 and 30,000 tons of ship-room in its conveyance.*

The same letter of Mr. Elliot, above quoted, sets out the extraordinary difficulties amidst which this valuable traffic is now conducted, and which is amply confirmed from other sources. The only present outlet for this trade is Bombay, the journey to which sometimes occupies 60 days; the only mode of carriage is on bullocks, which must obviously expose the article to such variety and extent of damage as seriously to deteriorate its value before reaching its destination; and, besides the injury thus received, loss in quantity occurs from thefts and destruction by other causes.

Upon the question of the expense of transporting the cotton of Berar to Bombay, the reports forwarded do not admit of an exact calculation. Captain Fenwick's first letters speak of varying rates of cost; and Lieutenant-Colonel Cotton, in his letter of 10th July 1851, quotes, on the same gentleman's authority, Rs. 6 per load of 250 lbs., as hire actually paid for a distance of 320 miles. Mr. Chapman, in his work before alluded to, gives 0.71 pence per lb. as the cost of conveyance between Berar and Bombay, which is equal to Rs. 7. 6. a load. Rs. 7 per load, or 0.67 pence per lb., may therefore be taken as the rate of transport on the other side, for the purpose of making the contrast with the opportunities that would be presented by the opening up of the Godavery for water communication with a shipping port.

Captain Fenwick estimates Rs. 150 as the cost of conveyance from Woonce to Coringa, 427 miles, in a boat containing 50 loads, which is equal to 0.29 pence per lb. Lieutenant-Colonel Cotton, in his letter of 10th February 1851, gives Rs. 22 a ton (= 0.24 pence per lb.) as the computed cost for 320 miles. This would make 0.32 pence per lb. for 427 miles. But these estimates allow for no return traffic, and calculate on the boats being destroyed on delivering their freights of cotton, and batta being paid to the boatman for a march back to the point of departure. With, however, a traffic once fairly established on the Godavery, such a sacrifice as this need not be entailed, and one-third may safely be deducted from the above estimates, leaving thus the cost of carriage at a computed amount of 0.20 pence per lb.

That this computation of the cost of transit is over rather than under estimated, may be reasonably inferred from an examination of the rates fixed by the Government of India for the transport of merchandise by the steamers on the Indus. According to the published table, goods exceeding 29 lbs. per cubic foot in weight may be taken from Kurrachee to Larkana, 450 miles, for Rs. 1. 6. per maund of 80 lbs., and down the river for one-third, or

	Candies.
1847-48	- 49,000
1848-49	- 36,000
1849-50	- 75,000
	<hr/>
	3)1,60,000
	<hr/>
	53,333

* The original letter states it at between 2,500 and 3,000 tons; but this being clearly a mistake, a reference was made to the Chamber of Commerce by the Public Works Commissioners, and it was found that a cipher had been inadvertently omitted from both amounts.

Appendix (Kk.) *As. 7. 4.* This latter is equal to 0·14 penny per lb., and though unscrewed cotton is of course of much greater bulk than what is above indicated, the circumstance that this is the rate for the costly conveyance by a steamer, leaves it a fair matter for comparison.

The saving, then, by the adoption of the Godavery route for the cotton of Berar would appear to be as follows:—

Cost of conveyance to Bombay - - - - -	0·67
Ditto - - - - - Coringa - - - - -	0·20
	0·47
Difference pence per lb. - - - - -	0·47

But this important saving on an article of such small cost is far from being the only advantage that the opening out of the Godavery route would confer. The economy of time would also be most considerable, for the voyage down the river might be completed in from 10 to 12 days; besides that what now appears not unfrequently to happen would be altogether avoided; that is, a loss of a season in the export of cotton, by the monsoon frequently overtaking it in its transit. And to this may be further added, an escape from all that injury to the article which is an inevitable consequence of its being carried on the backs of bullocks, and which so seriously detracts from its value in the home market.

From the foregoing observations it will be seen that in respect of the important article of cotton alone, it being one, moreover, which engages the especial attention of the Government, and of the mercantile and manufacturing communities at home, any measure which contributed to render the Godavery River navigable for purposes of traffic would realise these beneficial results:

1st. One hundred and twenty thousand bales of cotton would, so to speak, be secured for export from this country in a sound merchantable condition, and fit for the use of the manufacturers in England.

2d. An economy in the cost of transport of this from the place of production to a port of shipment would be effected to the extent of 70,000 *l.*, to which may be added,—

3d. That from the foregoing advantages, and facilities there would flow a very extended cultivation of the article, which, according to every report, is now checked by the difficulties that attend the produce being brought to market.

Cotton wool, however, forms only an item (though a very considerable one) in the general trade that is conducted with Bombay *via* the Concan. The following abstract table from the Trade Reports of 1849-50 will show the great extent of this traffic, the articles composing which can only be transported by the same rude means, and under the same impediments, as the cotton of Berar.

PRINCIPAL IMPORTS into *Bombay, via* the *Concan.*

	<i>Rs.</i>		<i>Rs.</i>
Molasses or Jagree - - - - -	2,00,000	Chunam - - - - -	1,90,000
Gingelly oil - - - - -	1,35,000	Cotten Wool - - - - -	32,70,000
Linseed - - - - -	1,50,000	Ghee - - - - -	6,30,000
Gingelly seed - - - - -	2,00,000	Batty - - - - -	4,32,000
Arrack - - - - -	2,00,000	Bagree - - - - -	1,18,000
Turmeric - - - - -	1,19,000	Gram - - - - -	2,40,000
Hemp - - - - -	2,40,000		
Wheat - - - - -	4,40,000		Rs. 74,64,000
Rice - - - - -	9,00,000		

PRINCIPAL EXPORTS from *Bombay to* the *Concan.*

	<i>Rs.</i>		<i>Rs.</i>
British Piece Goods - - - - -	19,00,000	Woollen broad-cloth - - - - -	1,00,000
Twist and yarn - - - - -	5,00,000	Dates - - - - -	3,20,000
Raw silk - - - - -	9,60,000	Sugar - - - - -	1,20,000
Wines and spirits - - - - -	2,90,000	Hardware, cutlery, &c. - - - - -	17,00,000
Malt liquors - - - - -	1,30,000		
Metals - - - - -	10,00,000		Rs. 74,55,000
Cocoa-nuts - - - - -	1,25,000		
Cocoa-kernels - - - - -	3,10,000		

The tonnage of this entire traffic cannot be ascertained, but Mr. Chapman, in his work before alluded to, estimates that of the whole trade with Bombay through the Concan at ten times the tonnage of the cotton, or 180,000 tons. The saving in the item of carriage at the rate of a halfpenny per lb. upon such portion of this as might be diverted into the Godavery route, would swell the 70,000 *l.* effected on the article of cotton to an incalculable amount.

The Committee of the Chamber of Commerce indulge the hope that a consideration of the foregoing remarks may weigh with the Board of Revenue in inducing it again to solicit the attention of Government to the question of a preliminary survey of the Godavery River. But they cannot avoid observing, in conclusion, how much it becomes additionally pressed upon the attention of the authorities, in the future imparted to it in the letter of Mr. Collector Prendergast, who has pointed out the important advantages to be reaped to the State, and imparted to the people of Hyderabad, by the establishment of a salt depot 200 miles up the river. Looking at the nature of the country traversed at present within those 200 miles

by

by the salt-laden bullocks, it will be evident that the cost of transporting the article into the interior must be gravely enhanced, and, in that fact, the consumption be interfered with, with its consequent detriment to the Government finances. Whereas, with a great local depôt at the site proposed, there cannot be a question that, with the avoidance of the delay, difficulties and expense that are now encountered, the sale of salt to the people of Hyderabad and Nagpore would be vastly increased, and the consumption in those countries bear a nearer approach to the general average than it now does, as shown by the Madras Trade Reports for 1849-50, where the total export by land from Rajamundry, Masulipatam and Guntoor, was but 373,797 cwt., or between 3½ and 4 lbs. per head of the population.

Appendix (K K.)

From	Cwt.
Rajamundry	10,823
Masulipatam	152,434
Guntoor	210,493
	<u>373,797</u>

(signed) *Jas. Ouchterlony,*
Chairman.

Appendix (L L.)

LIST of the Works executed out of the Four Lacs a Year granted for the Trunk Roads.

First.—Roads Constructed or Repaired by the direct Agency of the Road Department.

Description of the Roads.	Length in Miles.	Sums spent from December 1845 to May 1851.	REMARKS.
		<i>Rs.</i>	
No. 1. The Great Western Road from Madras to Vaniembaddy.	121	3,71,212	This road, 121 miles in length, has been constantly improving under the disadvantages of a badly-selected line, imperfect surface and drainage, and a traffic such as no other road in India is subjected to. The cost of carriage has been reduced one-third since the Road Department was formed, and though the surface is not in a condition altogether suitable for fast travelling, it admits of posting at the rate of six miles an hour. The sum spent has been 47 l. 4 s. a mile yearly, including the cost of a number of bridges of different sizes.
From Vaniembaddy to Neykoondy, on the borders of Mysore.	4	6,383	This sum has been spent in repairing or improving four miles of the continuation of this line.
No. 2. Road from the western borders of Mysore, by the Sum-pajee Ghaut, to Mangalore.	105	21,877	This road was in tolerable order through Canara, but in a very incomplete state through Coorg, when the department was formed; but a considerable amount of work has been done upon it in Coorg, and a bridge of one arch, 42 feet span, has been built; and for the last four years it has been kept in excellent order through Canara, and in fair order through Coorg. The Collector of Canara speaks in high praise of this road in his reports for 1850 and 1851. Another bridge of one arch, 45 feet span, has been about half built. Length, in Coorg 36 miles, in Canara 70 miles; total, 105 miles.
No. 4. The road from the borders of Mysore, by the Perumbuddy Ghaut, to Cannanore.	68	1,63,185	This is a new work from end to end, and includes the Perumbuddy pass, which ascends 3,000 feet. The whole line, 68 miles in length, is through a most difficult mountainous country, the greater part of which is under dense jungle. The whole line has been under-drained, and all the rivers bridged except one.
Ditto	-	2,000	This sum was spent on the same line in keeping the roadway passable for cattle while the work was in progress.
No. 5. From Walliaur to Ponnany.	71	27,572	This road has been greatly improved, and has been maintained against a very heavy cart traffic for three years.
Another portion of No. 5 extends from Coimbatore to Walliaur.	16	28,478	This is an entirely new line of road, and some part of it through a very difficult country.
The road from Vaniembaddy, through the Salem district, to the borders of Coimbatore.	112	5,800	This line has been kept up in a great measure by the cart-tax of the Salem district, but the small sum here set down has been spent on it from the "Four-lac Fund."
A portion of No. 6. Road from Goomidapoondy to Nellore.	64	30,783	This sum has been chiefly spent between Goomidapoondy and Nellore, and that part of the road only has been completed and kept in order.
On the same line, between Madras and Goomidapoondy.	27	15,149	Repairs of earth-work have been done; but the estimate for metalling and bridging the streams not having been sanctioned till 20th May 1851, the work is incomplete, and of little value to the traffic, which is in consequence very trifling.
From Itchapoor to the frontier of Bengal.	54	15,519	Some portion of this has been repaired, and all that has been completed has been kept in order, but the line is very incomplete.

First.—Roads Constructed or Repaired by the direct Agency of the Road Department—*continued.*

Description of the Roads.	Length in Miles.	Sums spent from December 1845 to May 1851.	REMARKS.
		<i>Rs.</i>	
No. 8. Road from Palaveram to Vicravandy, on the road from Madras to Trichinopoly.	55	2,21,721	From Chingleput to Vicravandy, 55 miles; the road has been newly made with the greatest care, and is in the highest order for travelling. The charge includes the cost of 24 bridges, from 12 to 36 feet span, and 36 smaller tunnels.
From Vicravandy to Oolandoorpett, on the same line.	30	46,000	This road has been re-formed, and is nearly completed; length, 30 miles.
No. 9. From the Lower Coleroon Anicut to Combaconum.	14	16,017	The principal work done on this line has been from the south bank of the Coleroon to Combaconum, under the management of the Civil Engineer's Department.
No. 10. Road from Arcot to Yellapilly.	65	54,330	This line is well advanced, and it is expected that it will be open for carriages in a few months.
Nos. 11 and 12. Goolcherroo Ghaut and Road.	18	21,952	Opening the Goolcherroo Road and Ghaut from No. 1 Road towards Cuddapah, and rendering it fit for wheel carriages. This is a mountain road, through very difficult country.

Second.—LARGE BRIDGES built by the Civil Engineer's Department, but paid for out of the "Four-lac Fund."

Description of the Bridges.	Sums spent.	REMARKS.
	<i>Rs.</i>	
Naragumpilly Bridge, on the road from Walliur to Paulghaut.	5,903	This bridge has five arches, of 39 feet each; the entire span between abutments being 214½ feet.
Rebuilding a bridge over the Cauvery at Bowany.	35,000	A bridge building at the cost of the Pagoda Fund, having been destroyed by an unseasonable flood in the river, which occurred when the work was on the point of completion, a new bridge was erected with money supplied from the Road Fund. This fine structure is in part founded on the solid rock, and in part of very large rubble stones, filled in upon the rock below the low-water level. It consists of 26 arches of 47½ feet span each; the whole breadth spanned being more than a quarter of a mile (1,385 feet). The parapet walls are now building, and the work, which has already been in use for some months, will be completed for the sum of 38,942. 10., or <i>Rs.</i> 27. 5 annas (2 <i>l.</i> 14 <i>s.</i>) for each foot in length of the bridge.
Completing the construction of a bridge over the Cauvery at Trichinopoly.	27,665	A bridge over the Cauvery at Trichinopoly was in progress when the same flood which destroyed the work at Bowany, carried away several arches. The work has been completed from the Road Fund, and has been some time in use. This magnificent work is founded on wells in pure sand, no solid earth or rock having been met with in the entire length. It consists of 32 arches, of 45 feet each, and spans a total breadth of more than one-third of a mile (1,711 feet). The whole cost, including losses, has been <i>Rs.</i> 98,640. 6. 6. (about 9,800 <i>l.</i>), or 6 <i>l.</i> 10 <i>s.</i> the running foot of bridge.
Bridge on the Coleroon River, on the road from Madras to Trichinopoly.	1,22,288	This is a similar structure, but on a still larger scale. It is now building, and it estimates the cost a further sum of <i>Rs.</i> 44,160. A considerable loss was sustained by a flood in this river also when the work was far advanced. The cost of the work up to this time, including all losses, is at about the same rate as that last-mentioned. The work is to consist of 38 arches, of 60 feet span each; the piers founded on wells, and the whole span nearly half a mile, 2,567½ feet between the abutments; including the wing walls, the total length is 889 yards. If this work is completed for the sum estimated, it will cost about 14,600 <i>l.</i> , or 5 <i>l.</i> 12 <i>s.</i> a running foot. The breadth of roadway in all these bridges is 26 feet.
A bridge along the anicut across the Vellaur River, on the road from Madras to Combaconum.	18,480	19 arches of 31 feet span; breadth spanned between abutments, 674½ feet, or including wings, 806½ feet.

A GLOSSARY OF THE INDIAN TERMS OCCURRING IN THE
REPORT AND APPENDIX.

<i>Abharry</i>	- - - -	The revenue derived from the monopoly of the sale of spirituous and fermented liquors.
<i>Amanny</i>	- - - -	A term used to designate direct administration or management by the officers of the Government, as distinguished from that by contract, lease or other intermediate agency.
<i>Ameen</i>	- - - -	A subordinate officer in the Revenue or Police Department.
<i>Anna</i>	- - - -	A small denomination of money; being the 16th part of a rupee. Also the 16th part of anything.
<i>Anicut</i>	- - - -	A weir or dam of masonry across a river.
<i>Ayacut</i>	- - - -	This term signifies the whole taxable area in a village, or under an irrigation work.
<i>Bandy</i>	- - - -	A wheel conveyance; most commonly used in the limited sense of a bullock cart.
<i>Budgerow</i>	- - - -	A river passenger boat, with a raised cabin.
<i>Bund</i>	- - - -	The retaining bank of a tank. A river embankment. A bank generally.
<i>Calingulah</i>	- - - -	A masonry work in the bank of a tank or channel, for the discharge of surplus water.
<i>Calwah</i>	- - - -	A channel.
<i>Candy</i>	- - - -	A denomination of weight. The Madras Candy is 500 pounds avoirdupois; the Bombay Candy is 784 pounds.
<i>Carcoon</i>	- - - -	A subordinate officer under the Tahsildar; the same as a Tur-rufdar.
<i>Carnatic</i>	- - - -	The plain country on the eastern side of the Indian Peninsula, between the Central Mountains and Table Land, and the Bay of Bengal. To the north it is bounded by the Northern Circars.
<i>Cavulgar</i>	- - - -	A watchman; commonly used of the village watchman.
<i>Cawny</i>	- - - -	A land measure. It contains 6,400 square yards; being within a fraction one English acre and one-third.
<i>Chit</i>	- - - -	A small piece of written paper or Palmira leaf, as a memorandum or receipt.
<i>Choultry</i>	- - - -	A public shelter or lodging for native travellers.
<i>Cholum</i>	- - - -	A species of grain.
<i>Chunam</i>	- - - -	Lime; also mortar.
<i>Circar</i>	- - - -	The Government.
<i>Concapillay</i>	- - - -	An Accountant; not applied to mere office accountants, but to men having some charge or duty involving the keeping of accounts.
<i>Cooly</i>	- - - -	A labourer who works for daily hire; or a man who does single jobs for hire.
<i>Cotay</i>	- - - -	A depôt for the sale of salt.
<i>Cullum</i>	- - - -	A nominal measure of grain. At Madras, it is equal to about three bushels, but varies in different places.
<i>Cumbly</i>	- - - -	A thin and coarse blanket; made of the wool of Indian sheep.
<i>Curnum</i>	- - - -	A village accountant.
<i>Curry Stuff</i>	- - - -	The mixture of spices used by the natives of India to flavour their staple food, boiled rice.
<i>Cusbah</i>	- - - -	The chief town of a District or Talook.

- Cutcherry* - - - - The office of a Collector, a Tahsildar, or other Revenue Officer.
- Cutwall* - - - - The head police officer in a town or cantonment. He has no judicial functions; being charged merely with the prevention of offences and the apprehension of criminals.
- Dhoney* - - - - An inferior sort of coasting craft employed on the Coromandel coast. It is of bad form and awkward rig, and is little seaworthy. The dhoney is going out of use, being superseded by the brig.
- Dusterbund* - - - - An office porter; employed to carry about papers and records where wanted within the office building; and occasionally to look for papers wanted, and to put them in their proper places when done with.
- Enam* - - - - Land held free, or partially free, of Government tax.
- Fusly* - - - - The revenue year; it begins on the 12th July. Fusly 1263 began on the 12th July 1852.
- Garce* - - - - A nominal measure for grain and salt. It contains 400 Madras mercals, being equal to 185·2 cubic feet, or a fraction more than 18 quarters English.
- Ghaut* - - - - A mountain pass. "The Western Ghauts" is used to signify the range of heights bounding the central table land of the Indian Peninsula to the westward, where it sinks down into the plain; and the term "Eastern Ghauts" is in like manner applied to the less abrupt declivities of the same tract on its eastern side.
- Ghee* - - - - Butter prepared by boiling; an article very much used in Indian native cookery.
- Godown* - - - - A store-house; also an out-house.
- Gomustah* - - - - An agent for the transaction of business; also (in official use) an accountant or writer in a native language. In this report it chiefly occurs in the latter sense.
- Gunny* - - - - A very coarse kind of sacking.
- Hungmy* - - - - Temporary; applied to servants entertained for temporary purposes.
- Jaggry* - - - - Coarse sugar before the separation of the molasses.
- Jagheer* - - - - A portion of territory, from a few villages to an extensive tract, conferred by the Supreme Power in the State on an individual. Such a grant confers on the grantee all the fiscal interests of the Government in the tract granted; originally Jagheers were usually granted as a reward for military service.
- Jagheerdar* - - - - The holder of a Jagheer.
- Jatra* - - - - A religious fair.
- Jelly* - - - - Properly July, from a Tamil word. Bricks or stone broken small, or small stones of uniform size. Used in the Road Department, to signify gravel as distinguished from "metal."
- Jellial* - - - - (From the foregoing) gravelled—used in the Road Department.
- Jumrahbundy* - - - - The annual settlement of the land revenue made under the Ryotwar system.
- Khoonds* - - - - A wild people inhabiting the hill country west of Ganjam.
- Kist* - - - - An instalment of the Government tax or rent. All branches of revenue are divided into certain portions, payable at fixed times of the year.
- Krore* - - - - One hundred lacks, or ten millions.
- Kunker* - - - - Nodulous limestone. It forms a very convenient as well as serviceable material for road making; and in the north of India, where it is very common, it is largely used for that purpose.
- Kusser* - - - - An extra tax levied on Poonja land, when irrigated from a Government tank or channel.
- Lack* - - - - One hundred thousand.

- Maliaks* - - - - A hill tribe in Ganjam.
- Mamool* - - - - Custom, usage.
- Mango tope* - - - A plantation or orchard of mango trees.
- Maramut* - - - - Strictly, repairs. The whole department of Public Works under the Board of Revenue, is styled the "Maramut Department;" and the term "Maramut" is applied to all the work which engages that Department.
- Maistry* - - - - A master workman in any trade; more particularly a head bricklayer, carpenter, stonemason, &c. In the Public Works Department, a subordinate officer employed to superintend building, &c.
- Masula boat* - - - The surf-boat used at Madras and on the Coromandel Coast.
- Maund* - - - - A measure of weight. It varies much in size from place to place, and even at the same place in different trades. The Madras standard maund is 26 pounds; the "Indian maund," used in the Salt Department, is 80 pounds; the Bengal maund is 82½ pounds.
- Meerasy* - - - - A proprietary interest or estate in the soil, of a particular kind. Also the title to certain hereditary offices or emoluments.
- Meerasdar* - - - - A holder of land or office on such tenure.
- Mogany* - - - - A division of a Talook.
- Momaty* - - - - The Indian substitute for the spade or shovel. In its general form it resembles a hoe, but with a large and strong blade, and a handle not exceeding 18 or 20 inches in length.
- Monigar* - - - - The head revenue officer of a village. A tank or channel Monigar is an officer charged with the custody of an important tank or channel.
- Moochy* - - - - An office servant employed to rule paper, bind books, mend pens, make ink, &c.
- Moonshy* - - - - A teacher of a native language; also a native Secretary or Jawabnavees.
- Moonsiff* - - - - The head police officer of a village, having also a small penal jurisdiction.
- Mottah* - - - - A few villages held on Zemindary tenure; a small zemindary.
- Moottahdar* - - - The holder of such a property.
- Moplah* - - - - A tribe on the Malabar Coast, descended from Arab settlers.
- Moturpah* - - - - Special taxes on those who follow manufactures and trades.
- Nabob* - - - - A Viceroy. The Mussulman ruler of the Carnatic was so styled, as the Deputy of the Nizam or Soobadar of the Deccan.
- Neerany Monigar* - A subordinate functionary, charged with the distribution of the water of a large tank or channel.
- Nizam* - - - - The ruler of the Hydrabad country is commonly so styled; his title being Nizam-ool-Moolk, or Regulator of the Empire.
- Nuddee* - - - - A river or large watercourse.
- Nullah* - - - - A small river; also an artificial watercourse.
- Nunjuh* - - - - Land irrigated, or capable of irrigation.
- Pattimar* - - - - A species of coasting craft employed on the Malabar Coast; it is superior to the dhoney both in seaworthiness and in sailing qualities.
- Peishcar* - - - - A revenue officer; subordinate to the Tahsildar, but of higher rank than the Turrufdar.
- Peishcush* - - - - Tribute. The revenue payable by the larger Zemindaries is called by this term.
- Poolbundy* - - - - The term applied to the repair and maintenance of river embankments in Bengal.
- Poonjah* - - - - Land cultivated without irrigation; also land classed as such in the revenue accounts.

- Rajah* - - - - - A King or Chieftain. Extensive Zemindars assume the title.
- Roosoom* - - - - - Customary fees or perquisites to village servants and others.
- Rowannah* - - - - - A permit or pass for goods having paid duty.
- Ryot* - - - - - An occupier and cultivator of land.
- Ryotwar* - - - - - The term used for that system of land revenue administration under which the Government officer deals with each Ryot.
- Saderwurid* - - - - - The office expenses for stationery, &c.
- Sayer* - - - - - Transit duties or land customs.
- Serishtadar* - - - - - The head native officer of a Collector's office; also the officer in a Talook next under a Tahsildar. The Serishtadar's business is chiefly with accounts.
- Sibbendy* - - - - - A term applied to an establishment of Peons; and sometimes more largely to all classes of Talook or district servants.
- Shaary* - - - - - Rice crops withered for want of water; sometimes applied also to dry crops withered from failure of rain.
- Shroff* - - - - - An examiner and sorter of coins in a treasury.
- Sudr Ameen* - - - - - A subordinate native judicial officer.
- Sudr Aduulut* - - - - - The highest Company's Court at Madras.
- Sunnud* - - - - - An order; a permit; a grant.
- Tahsildar* - - - - - The native revenue officer in charge of a Talook.
- Talook* - - - - - A sub-division of a district or collectorate.
- Tappal* - - - - - The mail or post.
- Toty* - - - - - An inferior village servant, who assists the Cauvulgar or Taliary.
- Turrufdar* - - - - - An officer under a Tahsildar, in charge of a sub-division of a Talook; a Carkoon.
- Valie* - - - - - The standard land measure used in Tanjore; it contains exactly five cawnies, or about 6½ acres.
- Voykal* - - - - - A channel or watercourse.
- Wuddler bandy* - - - - - A kind of bullock-cart used by the tribe called Wudders; it is of excessively rude construction, and has low wheels rudely cut out of a solid plank of wood, with axles of the same material.
- Yairy* - - - - - An irrigation tank or reservoir.
- Zemindar* - - - - - One who holds a tract of country, and levies all the Government revenues therein for his own benefit, paying a certain fixed amount annually to the Government.
- Zemindary* - - - - - A tract of country so held by a Zemindar.
- Zillah* - - - - - A division or part. A district or collectorate, as being a division or portion of the Empire.
- Zobildar* - - - - - A subordinate revenue officer under the Tahsildar, who has charge, under him, of a "division" or "portion" of the Talook. This term, "Turrufdar," and "Carkoon," are applied, in different districts, to the same class of officers.

MINUTES of MEMBERS of GOVERNMENT, and ORDERS of DESPATCHES of the
COURT of DIRECTORS.

PUBLIC WORKS DEPARTMENT.

(No. 1, of 1853.)

From Sir *H. C. Montgomery*, Bart., Chief Secretary to Government, Fort St. George, to *James Cosmo Melvill*, Esq., Secretary at the India House, 13 April 1853.

Sir,

I AM directed by the Right honourable the Governor in Council to forward, for the purpose of being laid before the Honourable Court of Directors, five printed copies of the First Report furnished by the Commissioners appointed to inquire into, and report upon, the Department of Public Works, together with a transcript of a letter addressed on the subject to the Government of India.

I have, &c.
(signed) *H. C. Montgomery*,
Chief Secretary.

PUBLIC WORKS DEPARTMENT.

(No. 121.)

From Sir *H. C. Montgomery*, Bart., Chief Secretary to Government, Fort St. George, to *J. P. Grant*, Esq., Secretary to the Government of India, 13 April 1853.

Sir,

1. IN obedience to the instructions conveyed in Officiating Secretary Major Wylie's letter of the 21st December 1850, a committee was appointed at this Presidency to investigate and report on the system of Public Works.

2. The Commission was composed of Mr. Bourdillon of the Civil Service (Collector of North Arcot), Major Frederick Cotton, Civil Engineer of the Seventh Division, and Major Balfour of the Artillery, Member of the Military Board.

3. These officers assembled at the Presidency, and commenced their labours on the 21st March 1851. Early in January 1853 they laid before the Government their First Report, of which I am now directed to forward five printed copies for the use of the Government of India, and to intimate that a similar number has been forwarded by the mail of the 13th instant to the Honourable Court of Directors.

4. The Government of India will perceive, from this very voluminous Report, extending to 725 paras., that the Commissioners have entered most minutely into the subject which they were appointed to investigate, and their very lengthened proceedings will in some measure account for the time these inquiries have occupied.

5. It was, I am instructed to state, the intention of the Government to submit the Report, with a full review of its contents, but finding it so comprehensive that the review contemplated cannot be accomplished within any definite period, they deem it proper not to detain the Report longer, but to forward it for the information of the Government of India and the Honourable Court of Directors respectively, transmitting, separately, the expression of the views of this Government as soon as the whole subject has undergone the necessary discussion.

6. The present Report, it will be seen, is divided into 11 sections, the last of which, as intimated by the Commissioners, is a recapitulation of the contents of the preceding chapters.

7. The first four sections are devoted to the past history and present state of the department in all its branches, and to an exposure of the defects which the Commissioners conceive to exist in it.

8. The Commissioners, in the subsequent chapter (V.) proceed to develop the changes which they consider necessary to make the department thoroughly efficient in every respect.

9. The proposition of the Commissioners for withdrawing from the Revenue and Military Boards and the Superintendent of Roads* the control now exercised by them, and vesting the sole charge of Public Works in a new Board, composed of one Revenue Officer from the Civil Service, and two Engineer Officers, with the Chief Engineer as an *ex-officio* member, requires careful deliberation, and will meet with due consideration from the Government.

10. Passing on to the Executive Department, the Commissioners press on Government the urgent need of a large increase of the Engineer Establishment.

11. They recommend that the corps of Engineers, which now consists of two battalions of 46 officers, exclusive of nine supernumeraries, shall be augmented to 112 officers, to be disposed in four battalions, one of which shall be added immediately, and the other gradually, in the course of six years.

Vide Appendix (DD.), (EE.), (FF.)

Proposed Establishments.	Nos.	Charge.
		<i>Rs.</i>
Commissioned - - -	113	5,31,590
European Subordinate - -	204	3,85,201
Native - - ditto - - -	725	2,35,560
Office Establishments - -	1,370	2,66,724
College - - - - -	-	50,000
		14,69,075
Present Establishment—vide App. (HH.)		6,79,471
Increase - - <i>Rs.</i>		8,89,604

12. The Subordinate European Engineer and Native Professional Departments are also proposed to be largely increased, with office establishments of a suitable extent. Provision is also made for an Engineer College of Instruction. The recommendations of the Commissioners on the score of Establishments thus involve an aggregate charge (in the proportions marginally shown) of *Rs.* 14,69,075, or *Rs.* 8,89,604 in excess of the present charge under that head.

	Present Average of 5 Years.	Proposed.
Irrigation - - -	10,37,398	22½
Roads, &c. - - -	4,20,762	20
Buildings - - -	4,20,491	4½
About - - -	19 lacs	48

13. The Commissioners dwell on the alleged neglect of roads and irrigation works, and calculating the profitable returns, directly and indirectly, from expenditure on such undertakings, they propose that the future outlay on Public Works shall be about 48 lacs annually, or about 29 lacs in excess of the present expenditure. The whole to be at the unfettered disposal of the Local Government.†

	Present.	Proposed.
Outlay - - -	19 lacs	48
Establishment - - -	6 "	15
	25 - lacs	63

14. The proposition of the Commissioners thus provides that the annual expenditure in the Public Works Department shall be raised from about 25 to 63 lacs, being an increase of about 38 lacs per annum.

15. The Right Honourable the Governor in Council will content himself with this brief summary of the suggestions of the Commissioners. The comprehensive nature of their Report, the great changes advocated, and the importance of the questions discussed, both financially and with regard to the improvement of the country, and the welfare of the people, obviously call for careful and mature deliberation.

16. The Right Honourable the Governor in Council will not here notice the comments of the Commissioners on the alleged parsimonious policy of the Government of this Presidency and the Supreme Government in regard to Public Works, further than to observe that they appear to have overlooked the restrictions on expenditure necessarily imposed on Government by the financial condition of India during the late wars. The irrigation works of Tanjore, Trichinopoly and Tinnevely, the fine ghauts and passes of Malabar and Canara, and the trunk roads leading west and south from Madras; and later, the magnificent works in progress on the Godavery, Kistnah and Pennar Rivers, evince the interest taken in the progress of improvement, and the manner the Government have made use of the means placed at their disposal.

17. I

* Under date the 21st November 1851, the Commissioners had proposed that the Road Department should be placed under the existing Board of Revenue Department of Public Works; this proposition was considered by Government, and Minutes recorded, copies of which are annexed, (vide Letter to the Honourable Court of Directors, dated 13th November 1852, No. 11. para. 25), under date the 6th April 1852.

† Para. 684.

17. I am directed to request the attention of the Government of India to the separate Minutes herewith transmitted.

(signed) *H. C. Montgomery,*
Chief Secretary.

(True copy.)

(signed) *H. C. Montgomery,*
Chief Secretary.

MINUTE by the Honourable Mr. *Thomas.*

DRAFT LETTER, forwarding Report of the Public Works Commissioners.

It is, I think, very desirable that this Draft should point out distinctly the misrepresentation of the views of this Government into which the Commissioners have been led by their ignorance of the records.

In various passages of their report they ascribe to this Government a practical indifference to, and even an unwillingness to sanction any expenditure on works for the improvement of the country; and the Government is represented throughout the Report as opposed for a series of years to such outlay; such appears to me the general tone and character of its statements.

It will be seen from the following extract from a letter to the Government of India, in 1848, how entirely this representation is at variance with fact. It was there observed and proposed to the Government of India, that "whilst this Government would counsel a wise economy in all branches, it is of opinion that a considerable outlay of its revenues, at this time, on internal improvements, even if there were no surplus (revenue), would prove, in the end, a more sound policy, and more beneficial to the country." (See also para. 21 of the same letter to Government of India, Financial Department, 3 January 1848.)

Vide Financial Letter to the Honourable Court, dated 8 Nov., No. 13, 1848.

Like misconception and misrepresentation of the views of Government exist in the statements of the Commissioners on the Road Department; and, as the Commissioners brought this subject under the notice of Government, in their letter of the 21st November 1851, that letter and the views of Government, with the minutes pointing out their errors,* should be adverted to in this review of their proceedings.

Vide Letter to the Honourable Court Public Works Department, dated 13 Nov. 1853, No. 11, p. 25.

12 April 1853.

(signed) *J. F. Thomas.*

(A true copy.)

(signed) *H. C. Montgomery,*
Chief Secretary.

MINUTE by the Right Honourable the President.

THE Draft of the Letter to the Government of India has just been returned to me, with certain remarks, embodied in a Minute of the 12th instant, by my Honourable Colleague, Mr. Thomas.

I have not had time to devote to a complete and careful perusal of the First Report of the Commissioners on the System of Public Works, and therefore I pass the draft of the letter above noted without comment; but as the Honourable Mr. Thomas has since briefly recorded his sentiments,† and as they have just come back to me, and my silence might be interpreted into dissenting from his views, I beg most distinctly to say that I entirely coincide in them, and shall endeavour, at some future period, to show my reasons for the opinion I have formed, that this First Report of the Commissioners is one-sided; that it misrepresents the actuating motive and real feelings of Government with regard to its measures for the improvement and amelioration of the country, and, therefore, that it is not entitled

* Para. 11, Minute of the Honourable Mr. Thomas, 6th March 1852, on Letter from the Board, 15th January 1852.

† Minute, dated 12th April 1853.

entitled to that confidence, though some facts set forth in it may be well supported, which such a document should command to render it of any general practical use.

13 April 1853.

(signed) *Henry Pottinger.*

MINUTE by the Honourable Mr. *Elliott.*

DRAFT of Letter to the Government of India, to be transmitted with the First Report of the Commissioners on Public Works.

SINCE this Report came to me I have been so engrossed with other important subjects, particularly the Reports of the Special Commissioners on Malabar, that I have not been able to give attention to it; I am therefore unprepared to make any comment upon it. Having now nearly disposed of the business which has so much occupied me, I hope to have leisure to study the Report deliberately; and I shall diligently apply all the time I can spare from the papers passing in circulation, to a careful review and digest of it, in order that I may be able, as early as possible, to express my views upon the many important subjects of which it treats so largely and discussively.

13 April 1853.

(signed) *D. Elliott.*

PUBLIC WORKS DEPARTMENT.

(No. 120.)

EXTRACT from the Minutes of Consultation, under date the 13th April 1853.

READ the following Report from the Commissioners appointed to inquire into and Report upon Public Works.

(Here enter 23d December 1852.)

Ordered,—That five copies of the First Report of the Commissioners upon the Department of Public Works be forwarded to the Government of India, with the following letter.

Ordered, also,—That the same number of copies be forwarded to the Honourable Court of Directors, with a copy of the letter addressed to the Government of India, to the Secretary to the Government of India.

(Here enter 13th April 1853, No. 121.)

Ordered,—That the following Minutes be recorded:

Minute by the Honourable Mr. Thomas.

(Here enter 12th April 1853.)

Minute by the Right Honourable the President.

(Here enter 13th April 1853.)

Minute by the Honourable Mr. Elliott.

(Here enter 13th April 1853.)

(signed) *H. C. Montgomery,*
Chief Secretary.

(True Copies.)

(signed) *T. L. Peacock,*
Examiner of India Correspondence.

PUBLIC WORKS (BENGAL, &c.)

RETURN to an Order of the Honourable The House of Commons,
dated 24 February 1853:—for,

COPIES “ of the REPORTS of the several COMMISSIONERS on PUBLIC WORKS
at *Bengal, Madras, and Bombay*, in the Year 1851-2; of the MINUTES
of the Members of the Government thereon; and of any Orders or
Despatches of the COURT of DIRECTORS relating thereto.”

East India House,]
17 January 1854. }

JAMES C. MELVILL.

B O M B A Y.

[*Note.*— The Return from the Presidency of BENGAL was presented to the Honourable the House of Commons on the 26th April 1853; and that for the Presidency of FORT SAINT GEORGE on the 27th May 1853.]

(*Mr. Hume.*)

Ordered, by The House of Commons, to be Printed,
6 February 1854.

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East India House, }
17 January 1854. }

T. L. Pracock,
Examiner of India Correspondence.

B O M B A Y

EXTRACT MILITARY LETTER from *Bengal*, dated 9 September 1853.

(No. 231.)

In transmitting to you the accompanying Report of the Commission on Public Works in the Bombay Presidency, called for by your Honourable Court's letter to the Government of India, in the Public Department, No. 47, of the 20th July 1853, we beg to observe, that we were not aware that the Government of Bombay had omitted to forward a copy for your information.

Considered—
3 June 1853, Nos. 19/31.
19 Dec. 1851, No. 46.
8 Oct. 1852, Nos. 25/27.
28 May, No. 21.
Received in the Military
Department, with Ex-
tract, Home Department,
No. 867, dated 2 Sept.
1853.

2. We take this opportunity to state, that we are not prepared to pronounce any opinion on the Report in question; but we trust before long to be able to communicate to your Honourable Court the result of our deliberations on the whole question.

(No. 2961.)

From Lieutenant-colonel *P. M. Melvill*, Secretary to Government, to Lieutenant-colonel *R. J. H. Birch*, C.B., Officiating Secretary to the Government of India in the Military Department, dated 10 November 1851.

Sir,

I AM directed by the Right honourable the Governor in Council to forward, for submission to the Government of India, the Report of the Commission appointed to inquire into the existing system of Public Works, in conformity with the instructions conveyed in your despatch of the 21st of December, No. 584.

As the Appendices to the Report are voluminous, the Governor in Council has directed such as appeared to be required for the correct understanding of the text to be extracted, and forwarded herewith; but should the Government of India desire to have the whole laid before them, the volumes, I am to state, will be immediately despatched, either in original or in copy, as may be deemed most convenient and useful.

I have, &c.

(signed) *P. M. Melvill*,
Lieut.-colonel, Secretary to Government.

Bombay Castle,
10 November 1851.

(True copy)

(signed) *R. J. H. Birch*,
Lieut.-colonel, Officiating Secretary to the Government
of India in the Military Department.

Report.

REPORT FROM THE COMMISSION ON PUBLIC WORKS,
1 September 1851.

EXTRACT from GENERAL ORDERS by the Right honourable the Governor in Council, Military Department, Bombay Castle, the 26th of March 1851.

(Nos. 180 of 1851.)

THE Right honourable the Governor in Council has been pleased to appoint Colonel G. Moore, Mr. J. D. Inverarity, C. S., Captain H. B. Turner, Engineers, and Captain J. Gaisford, Artillery, a Commission to inquire into the existing system of Public Works, both as regards superintendence and execution; Captain Gaisford will act also as Secretary.

All departments in any way connected with Public Works are hereby required to correspond with the Commission, and to comply with any requisition for papers, or any information which the Commissioners may make.

By order of the Right honourable the Governor in Council,

(signed) J. G. Lumsden,
Secretary to Government.

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SECTION I.

The present System of conducting Public Works described.

It is indispensable to the method and clearness of this Report, that we be permitted to introduce our subject with a description of the system on which Public Works in this Presidency are now conducted; this we shall endeavour to do in the briefest terms.

1. The proposal for a Public Work may originate with any Government functionary who is in a position to judge of the wants of the country, or of his own particular department; at military stations new works may not be applied for without permission of his Excellency the Commander-in-Chief.

2. The plan and estimate are prepared by the Executive Engineer, and proceed from him to the Superintending Engineer of the Province, who examines the design, the calculations, the rates, and all such details, and, if he thinks proper, suggests to the executive officer alterations.

3. From the Superintending Engineer the papers pass on to the Military Board, for approval, and also for their decision, in case of any difference of opinion between the Engineers. If in the Military Department, the Board finally submit the plan and estimate to Government, by whom the work is sanctioned or not, as the case may be.

4. But

4. But in Civil Works, whose utility hinges upon considerations of which the Military Board is not officially cognizant, such, for instance, as works of irrigation, which depend upon the increased revenue derivable, or cases which have reference to the increased efficiency of departments not controlled by the Board, as, for example, if a judge or collector should require additional accommodation in his adawlut or cutcherry, the plan and estimate is considered by the Superintending Engineer and Military Board with sole reference to its fitness for the objects desired by the Civil Department: accordingly, on receiving a plan and estimate for a bundara dam, the Board would not consider whether the work were likely to be profitable; they would only consider the construction with regard to the immediate object, and the cost with reference to that construction; neither would the Board inquire whether the additions to the adawlut or cutcherry were necessary; they would only consider the construction and cost, with a view to providing economically and efficiently whatever the Judge or Collector demanded.

5. Such plans and estimates are not forwarded by the Military Board to Government, but are returned, with their approval, to the Judge or Collector, who submits them to Government through the Revenue Commissioner or Sudder Adawlut, with full information of the advantage expected from the work. The sanction, if accorded, is communicated to them, and to the Military Board, and by the latter through the Superintending to the Executive Engineer.

6. The same course is followed in the Road and Tank Department, where the assistants stand in nearly the same position as other executive officers, and the Superintendent in nearly the same position as a Superintending Engineer.

7. No Superintending Engineer intervenes between the Military Board and the Garrison and Dockyard Engineers at the Presidency. The professional member of the Board having an opportunity of seeing, with his own eyes, everything connected with their executive duties, it is assumed that the office of Superintending Engineer would be superfluous.

8. The Civil Engineer at Satara also was exempt from superintendence; but occasions having arisen for deputing a superior officer to inspect works in that Province, he has lately been placed under the Superintending Engineer of the Southern Division.

9. The course of further proceeding is the same for all works. The Engineer executes them as soon as he can, either by contract or departmentally, furnishing quarterly reports of progress. When ready to commence work, he draws from the disbursing officer of the Department chargeable an advance of money; and in prosecuting an extensive work, he obtains from time to time further advances within the limits sanctioned. His cash indents are first countersigned by the Superintending Engineer, who is supposed to see, by the progress reports, that no unnecessary delay occurs, and that no inordinate advances of cash are not drawn. The fixed salaries of the establishment are obtained on a monthly bill.

10. When the work is finished, its audit takes place on a bill comprising the entire outlay, supported by a certificate from the Superintending Engineer, if present, otherwise from the head of the Department concerned, that the work has been completed satisfactorily in accordance with the sanctioned plan and estimate, or with exceptions, as the case may be. This bill exhibits the total expenditure of labour and materials; attached to it is a schedule of rates derived from that expenditure as per the "figured Abstract," described farther on, which thus tests the accuracy of the estimate, and affords practical data for future use. If the work is unfinished at the close of an official year, and a portion of the estimated cost still remains unspent, a bill for the outlay up to the 30th April is preferred, containing only two items, namely, the amount spent for labour and materials respectively, and this supported by a certificate, on honour, that it has been spent, is passed. But any item that may be deemed objectionable, though passed in the annual bill, may still be checked on the final audit; for the object of the annual bill is not so much to relieve the executive officer of his responsibility, as to prevent large outstanding balances against him, and to simplify the accounts of Government by debiting the expenditure of every year appropriately to the period in which that expenditure was incurred.

11. Besides the work thus executed by the regular establishments, undertakings

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are occasionally committed to extraneous management. The procedure in these works is various, according to whether they are conducted under orders of the Military Board or not.

12. When Civil, or other than Departmental Officers execute works under the general control of the Board, bills for the actual amount of labour and materials expended are usually rendered, with a certificate, on honour, that such charges have been incurred, and these bills are passed by the Military Board.

13. The Revenue Officers are vested with authority to lay out annually certain sums in effecting improvements, without making previous reference for sanction, reporting, however, half-yearly to the Revenue Commissioner how those sums have been expended.

In the Collectorates of Tanna, Rutnagherry, Poona and Ahmednuggur, the sums thus disposable were reduced in 1835, on the creation of a separate agency, for roads and tanks, to Rs. 1,600 (sixteen hundred) for a Collector, Rs. 600 (six hundred) for his first, and Rs. 400 (four hundred) for his second assistant. In the other parts of this Presidency Collectors may disburse the amounts stated in Appendix (A.): works specially sanctioned by Government, and executed under the Revenue Officers, are accounted for separately in detail, with bills and receipts for vouchers.

SECTION II.

The System of Accounts.

14. THE system of accounts in the Public Works Department was modified in 1846-47 to embrace certain forms which appeared preferable on a comparison with the methods followed in Bengal. Previously to this, the practice was for Engineers to render monthly bills of their actual expenditure, vouched by the receipted dealers' bills for materials, and by muster-rolls of the workmen entertained.

15. The fault of this practice was a deficient check upon the disposal of labour and materials when purchased; while in works executed without an estimate, there was the utmost facility for misapplication.

* Except the annual bills.—*Vide* para. 10.

16. The present system admits no bills* until the completion of a work, or of an integral and easily measured portion of it, which may be treated as a separate work; and the engineer is required to register the daily expenditure of labour and materials on each part of the work, rendering, at its completion, a bill in detail for every item of the estimate. If any considerable difference has arisen between the cost as per estimate and the cost per bill, it is explained at the foot of the latter.

17. When a work has for any reason been performed without an estimate, the bill is nevertheless drawn out in the same detail; so that if the cost appears extravagant, the register of daily expenditure shall afford the means of thorough investigation.

18. It might be objected against this system, that, supposing the amount of an estimate to be Rs. 1,000 (one thousand), and the actual cost Rs. 900 (nine hundred), there would be no check if the officer should charge the larger sum. The answer is, that then his book of daily expenditure of labour and materials must be forged, or there would always be good chance of the discrepancy attracting notice, besides a likelihood of exposure by the persons who kept the accounts. Further, the Military Board consider the criterion of a system to be, that it shall direct its checks rather against an executive officer's negligence than against fraud; for there is every reason to believe that fraud on part of the officers practically does not exist.

19. The above is believed to differ from the Bengal mode of accounting in the following particulars only, viz.:—

1st. In passing bills for the expenditure of each year on works unfinished at the close of the official year.

2d. In the substitution of a daily cash account and ledger kept by double entry, for the journal or day-book, stock-book, and book of accounts current, with suppliers of materials.

3d. In

3d. In monthly, instead of daily payments to labourers.

4th. In permitting the figured Abstract to be kept in the language of the overseer who prepares it.

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20. In order that we might judge of the completeness of the accounts kept by Executive Engineers, and whether it would be possible to alleviate, by any simplifications, the clerical labour of their officer, we have examined three sets of accounts, obtained for us by the Superintending Engineer, Southern Provinces, as being respectively fair examples of the mode of estimating, accounting and charging for what might be termed a small work, a work of moderate extent, and a large work, viz. —

No. 1. The estimate.

No. 2. The figured Abstract of daily expenditure of labour and materials.

No. 3. Abstract of daily cash totals.

No. 4. The bill.

No. 5. The certificate of completion.

The forms are the same for all.

The estimate, bill and completion certificate, which are in English, are as succinct, and, at the same time, as explicit as can be desired. The two other papers are usually kept in some native language, and, by daily repetitions, they swell in the course of protracted works to considerable bulk [see Appendix (B.)]. The estimate includes contingencies, and that portion of superintendence which is paid for extra to the fixed establishment. The cost of superintendence by the officer and his permanent subordinate is not charged, because they are usually engaged on various works, proceeding simultaneously, and subject to constant variation.

21. We have collected from the records of the Military Board Office, and from numerous other sources, opinions upon the merits of the present system of accounts. The majority regard it as a decided improvement upon the old, while some object to the figured abstract as not being universally applicable; not, for instance, to cutting roads through rock along the irregular surface of a hill-side, and as involving an extent of paper-work disproportionate to its utility. They represent, that although this abstract, if faithfully kept, is valuable, there is difficulty in getting qualified and trustworthy persons to fill it in, and that there is a temptation to make up for neglect by fabricated entries; moreover, they question whether it is worth while perpetually to record such elaborate details of the expenditure on every work, when the rates ought, after a few trials, to be accurately known.

22. Considering the circumstances under which Government Works are carried on in India, we think it is quite credible that a paper professing to record every minute item of expenditure on a large and heterogeneous work, would not, in all cases, bear the test of a searching examination; still, the executive officer is accountable for the degree of inaccuracy that may exist, and with due existence on his part, the theory may be carried out to an extent most useful, and for practical ends sufficient. *Sic orig.*

23. The "figured Abstract," however formidable, from its expansiveness, is in its nature clear, and level to the ability of ordinary karkoons. The labour of native writers being cheap, its cost cannot often countervail its usefulness, and if the officer is conversant with the native written characters, it will present continually before his eyes, in a shape readable almost at a glance, the information he chiefly requires; it will enable him to tell daily the rate at which his work is progressing, and effectually to check negligence and fraud on the part of his subordinates.

24. Indeed, this document is admitted, even by opponents, to be the only means whereby the expenditure on the various divisions of a work can be developed, and wasteful outlay be detected; and since Government will always demand an explanation of excesses, such accounts must be kept as will admit, in most cases, of explanations exactly true, and in exceptional cases, true approximately.

25. When works are transferred in an unfinished state from one executive officer to the charge of another, this document is all-important, because, compared with the abstract of daily totals, it at once shows the quantity of work completed.

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completed, its rate, and its entire cost up to the date of transfer: as there are, however, cases where the figured Abstract entails more trouble than is equivalent to its worth, we shall again notice it in our suggestions for reducing office-labour. --[See Section 166.]

26. We have received from Lieutenant Chapman, an officer of considerable experience in the Road Department, a complete set of office documents of the form in which he has been in the habit of keeping his accounts of labour and materials. These appear to us so clear and perfect, that we think it worth consideration by the authority that is to review the general system how far Lieutenant Chapman's method is an improvement upon the ordinary figured Abstract. For works such as Lieutenant Chapman has been engaged on, we have no hesitation in recording our favourable opinion of it; and although in other than Road Works the advantage may not be so apparent, the forms are perfectly adapted to work of any description. We have appended these papers accordingly --[Appendix (C).]

SECTION III.

The Rules for Minor Works and Repairs described.

Thus far we have spoken of new works and important alterations. We now come to the minor works, styled "emergent," and to the customary repairs of public buildings.

27. Emergent works are commenced at once, on requisition of any competent authority, or by the executive officer on his own responsibility, if he judges the occasion to be urgent. Special report is made to the Military Board of the circumstances, and, if possible, of the expenditure required. This discretion on part of the Engineer refers to works in the general department only. The Engineer would repair a bridge, for instance, or a traveller's bungalow, but he would not repair a bund, without a requisition from the Collector.

28. Annual repair estimates are limited to preserving the structure of buildings. They are prepared at the close of every rainy season, and used to be sanctioned conditionally by the Military Board.

29. Other repairs, such as colouring, plastering, repairing floors, ceilings and fixtures, are styled "petty repairs," and can be made at any time, on requisition of commanding officers, or of the civil authorities, being charged for in the executive officer's monthly bill.

30. The expenditure for emergent repairs is also charged if under Rs. 400 (four hundred) in the Engineer's monthly bill, to which the authority and completion certificate must be attached. If beyond this limit of the Military Board's power to sanction, or if the emergent work come under the head of "additions, alterations, or new works," a separate Bill must be passed by Government. The money for prosecuting an emergent work can be obtained by the executive officer direct on a cash indent, supported by copy of his instructions from an authority competent to order the work.

SECTION IV.

Effects of the present System.

31. RESPECTING the practical operation of the rules above described, we have consulted the experience of numerous officers, civil and military, upon whose aggregate opinions and our own judgment the following view is founded.

32. Foremost, by the consent of all, stands the censure, that unreasonable delays are a pervading and most pregnant evil of the present system.

33. First are delays of projections. The needful portion of these arises in drafting plans and estimates with that minuteness of specification which the rules demand, and, in reason, we think, requires. The casual part occurs when subjects are referred

The Court of Directors ordered this rule to cease in 1850.

referred back for clearer reports, and from the necessity of correcting faults found by Superintending Engineers and the Military Board. The needless portion consists in much time of highly paid officers consumed in doing inferior work, on which lower abilities might be employed. The remedy for this belongs to the separate division of our Report, headed "Subordinates."

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34. Next come the delays of sanction. In order to know the amount of correspondence and inquiry ordinarily incurred between the proposal and sanction of works, great and small, we obtained from the Military Board a statement of actual proceedings, tracing step by step the progress in 96 examples of works taken as they came from the records of one quarter in 1850. This enabled us to see where the longest and most frequent stoppages intervene. The statement will be found in Appendix (D.)

35. The statement itself needs to be examined, case by case, before one can fully comprehend how wearisome is the process of carrying projected works through the offices of control. But since few can pause to examine a record so bulky, we shall give for illustration the results only of a scrutiny, to which we subjected its contents. It is obvious that the analysis of such a return can only be exact enough to separate its more tractable elements, and that it would have been curious rather than useful to have investigated particulars not apparent on the face of the statement itself. Rejecting, therefore, the abnormal and incomplete cases, but without eliminating those which had the advantage of ready-prepared plans, or of having been partially discussed at some former time of proposal, we have dealt with the remainder only.

36. And we find that on an average of 64 examples, taken casually as aforesaid, 106 days elapse between the call for "Plan and Estimate" of a work, and the date of its being sanctioned. In the quickest case, that of sanctioning a Rs. 12 (twelve) drain for the General Hospital in Bombay, the whole course was run in 24 days. In the slowest case, that of repairs to a channel for irrigation at Wurneir, it took 436 days.

These 64 cases occupied in all 6,823 days; we estimate the consumption of this time to have been as follows, viz. :—

	Days.	Per Cent.
1. Delays in transit per post, estimated at - - - -	472, or	6.92
2. Days consumed between the call for, and transmission of, plan and estimate by the Engineer Department,	2,938, or	43.06
3. Stoppages while under consideration by the Military Board - - - - -	1,400, or	20.52
4. Further interval until sanctioned by Government -	2,013, or	29.5
TOTAL - - -	6,823, or 100.	

The courses which make up the last-named interval are separable into two species, the one when the project goes on direct from the Military Board to Government; the other when it proceeds through the channel of the civil authorities. In the 64 cases examined, 49 belong to the first kind, and received sanction of Government in 27 days' average, after leaving the Board; 15 belong to the second kind, in which the delay was increased to 45 days.

37. In the stoppage with Government is included the time occupied by inquiries. That these, although perhaps indispensable by rule, were often supererogatory in themselves, may be presumed from the constancy with which projects seem to have received approval as originally designed. It remains for Government to pronounce how much the delay in the more important cases may have been aggravated by their procrastination in favour of works equally claimant, although so trivial that, let for the law compelling them, they really needed not to have come before the Government at all.

38. The Military Board is likewise made to bear its own references. The longest delay time charged is 170 days, consumed in discussions between the Board, the Commodore and Government about a railway in the Bombay Dockyard. In another case the Board's correspondence with the Engineer and Quartermaster-general, regarding shelves for some staging* pendals, prolonged the stoppage to 142 days. These cases are both exceptional, and materially affect the average.

* Sheds for Tru. ps.

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39. Under the head of delays with the Engineers, is included the time occupied in preparing plans and estimates for works probably far distant from the spot where the officer received the call, perhaps asked for at a season where travelling was impracticable, or when officers were in course of relief, and also the time occupied in references rendered necessary by the duties alluded to in para. 2. The longest stoppages thus debited against the Engineers are 245, 216, 215, and 180 days.

40. The bare outline of proceedings serving as an index to the above collection of cases, fills 28 close foolscap sheets: 59 letters are indicated as having been written about two boats (value Rs. 975—nine hundred and seventy-five) for the Colsette Ferry, and 88 about repairing a tank at Pendoor. When it is remembered that there is yet a catalogue of works rejected or postponed [*see* Appendix (E.)], and an unknown amount of collateral correspondence between Superintending and Executive Engineers, Collectors, Revenue Commissioners and others, additional to that above stated, and all belonging to the same period of gestation, we may reach to some conception of the bulk to which mere papers swell.

41. This is no place for dwelling on the thought how circuitous, troublesome and obstructive is a system of centralized control over petty matters; how unproductively it wastes the energies of its men of action, who have not only to do, but to write down what they do, have done, and intend to do, with the why and the how, and the when, in all their multitudinous particulars.

42. A large amount of writing being inseparable from our Indian methods of business, it is especially requisite to free the action of executive men from the trammels of superfluous office work, and the needless reduplication of checks, while the necessity is evidently not less for abating the congestion in the Secretary's office that is now caused by the flood of reference to Government, which produce this complaint, delay.

43. Both would be relieved by restoring authority in minor cases to those local centres which report to the Revenue Commissioners, and by enlarging the provisional authority of the Military Board, the same unity of procedure as now, and the same subservience to the general policy of Government being securable through reviewing the administration of those authorities in the gross, as by sanctioning beforehand petty cases in detail. Thus the central interference of Government would regulate, not supersede, the functions of those officers who ought to be responsible for managing the minor circles of the system; all functionaries would save time and labour, while the State would get more work for its money:

44. We have met with some remarks by Captain Wingate, Superintendent of the Revenue Survey in the Southern Mahratta country, upon the impediment of official forms, which are so forcible, that we here transcribe them from a letter addressed to the Collector of Dharwar on the 21st December 1845.

"It is without doubt very desirable that no needless expenditure should be incurred; but in guarding against this, by requiring every proposition to receive, in the first instance, the sanction of Government, it may be well to consider whether we do not run into the very error we strive to avoid. Under the existing plan, a portion of the valuable time of the Collector of the Revenue Commissioner and of Government is unavoidably consumed in the consideration of every reference, however insignificant, and very often in addition that of the Executive and Superintending Engineers, and of the Military Board. The value of the time of these officers and authorities may be readily deduced from the amount of pay received by them respectively; and in making due allowance for this, I think it will appear incontrovertible that the briefest proposition and estimate submitted for sanction could not, under the most favourable circumstances, pass the round of them all under a cost of Rs. 300 (three hundred), and I believe it very rarely does so without costing very much more; in the case of all works under this amount, then, it is clear to me that their actual cost is more than doubled by the process required for obtaining sanction, and that, even on the almost impossible supposition of a work being wholly useless, it would be better to empower the Collector to order its construction without reference, rather than consume the valuable time of so many high functionaries of the State as the present method requires.

But it may be argued, that as these functionaries must be paid upon other plans, no saving would be effected by transferring the power of sanctioning such expenditure

ture from the head of the Government to the Collector; and the reasoning would be sound if they all have leisure for the consideration of such trifling matters without detriment to more important business: such a position will, I believe, be at once admitted to be quite untenable, as in all departments of the State the pressure of an overwhelming mass of business is keenly felt. The most active feel themselves in danger of being swamped amidst the never-ending streams of routine business pouring in upon them, and their best energies are expended merely in keeping the cumbrous machinery of their departments moving. The state of things here described is clearly traceable to the gradual appropriation by the central authority of much of the supervisory and executive functions previously exercised by the local officers; and though the change may have led to greater system and uniformity of practice in public affairs, it has, in my humble opinion, been pushed greatly too far into details, and has had the effect of so increasing the mass of business in all departments, that it becomes a task of yearly increasing difficulty to prevent it falling into arrears.

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45. In three cases out of the first 36 on the statement (§ 34), the Military Board expedited the work 55, 15, 82, in all 152 days, by authorizing the Engineer to proceed at once, the Board reporting to Government that they had done so: looking to the character of the 96 cases before us, there appear to be not less than 37 which might have been treated similarly, if the regulations reposed more responsibility in the Board, or in other authority short of Government.

46. We observe that Government hardly ever find occasion to dissent from the Military Board's recommendations, where the question is not whether a work shall or shall not be done, but one merely of the amount it ought to cost.

47. In all cases, therefore, of repairs, reconstruction, and inevitable additions in which all authorities short of Government and the Board have agreed, we think the Military Board, if also concurring, might, as a rule, let the works proceed, making a periodical return to Government of their nature and expected cost: the State must pay in the end, and this course would save one-third of the delay.

48. And if Government would every year acquaint the Board of the sum prospectively available for improvement of the country, that body, possessing the general views of Government, might proceed to apply the funds, and to employ the executive corps to much better advantage than is possible under the present arrangements.

49. The Superintending Engineer, S. P., has represented to us the injuriousness of delay in the particular case of tanks for irrigation. In the Dharwar Collectorate there are about 2,000 such tanks: they are formed by earthen embankments, faced with dry stone-work, to prevent injury from the ripple, a species of construction which obviously needs frequent slight repair, and where a trifling dilapidation, if not attended to, often ends in a serious breach.

50. Yet so great has been the delay in that Collectorate, that, on an average of 18 cases, in a statement before us, 11 months elapsed from the date of the Collector's requisition to the date when the estimates were sent in.

51. It seems to have been considered indispensable, before furnishing a plan and estimate, that the Engineer should personally visit every tank. This officer having various calls upon his time at Dharwar, could not attend simultaneously to several tanks dispersed over the Collectorate; but the Superintending Engineer considers that, although two or even three months may often elapse, and in the rains more, the above delay was exorbitant.

52. In 13 of the above estimates which were sanctioned, eight months were consumed in passing the ordeal described in paras. 2 to 3.

53. The sanction having at length arrived, it might be supposed that the work would begin: but no; other difficulties have still to be overcome. First, the ryots' contribution towards the work has to be collected—no easy matter; then wuddars* have to be got together, and then, if the Executive Engineer has a builder available, the work commences.

* A wuddar is a camp of a gipsy tribe, which, on this side of India, performs the kind of work undertaken by "navigators" in England.

54. Thus, from the first call for an estimate, long perhaps after the repair was needed, up to the time when the work begins, according to the average of nine of the above works, omitting those commenced without sanction, 26 months passed away.

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55. We again extract from Captain Wingate's letter already quoted—
 "An estimate for repairing the Chickeroor Tank was sanctioned so long ago as 1835, and a portion of the sum placed at the Engineer's disposal expended. From some cause, the repairs were not immediately proceeded with, and in 1841 the Engineer would appear to have informed the Collector that the sum sanctioned was insufficient, when the latter officer directed the Mamlutdar to ascertain how much the villagers would contribute in addition. They agreed to contribute Rs. 390 (three hundred and ninety), and of this sum about Rs. 380 (three hundred and eighty) were immediately collected, and placed in deposit in the district treasury. The sum available was probably still found insufficient, for time passed on without any repairs being made, until at length the contributions of the villagers were finally passed to the credit of Government, under the operation of some general instructions regarding the disposal of sums placed in deposit."
56. In parts of this Collectorate the villagers have refused to pay towards their tank repairs, if to be done by the Engineer Department, although ready to do so if executed under the Mamlutdar. This is easily accounted for without attaching blame to the Engineer, because the delay that takes place in obtaining sanction through his department frequently adds heavily to the expense, and deprives the villagers for a long period of their means of irrigation, as is forcibly exemplified in the paragraphs foregoing.
57. The petty repairs of irrigating tanks should be executed on the instant; and, to create in them a local interest, which alone can be effectual, we think that means, by legislative enactment, if necessary, ought to be taken for compelling villagers to repair slight damages as they arise, and that a responsible person should annually report that every tank has been properly maintained.
58. Petty repairs at the expense of villagers should be managed entirely by the district civil authority. All emergent repairs of damage, proceeding from accidental causes, and not from neglect of the villagers, should be executed at once by the Collector, with the Engineer's advice, at the expense of Government; and for all other works of irrigation, whether new projects, additions, improvements or general repairs, plans and estimates should be made and submitted, as at present, Government contributing towards the cost, but superintendence of the work, and payment of the wuddars, resting with the Mamlutdar.
59. Since the foregoing conclusion was entered on our proceedings, we have seen a draft Act, sketched by Captain Wingate, on the 30th January last, to provide funds for the construction and maintenance of works for irrigation. It sets forth the justice and expediency of the several parties who may benefit by such works contributing thereto, and it defines rules for regulating and enforcing contributions in aid of these objects by the parties concerned. It also provides that petty repairs to such works shall be effected by the owners and occupiers of the land capable of being watered by them. In the opinion of the Collectors, whose minutes on this draft we have perused, Captain Wingate's proposals are well adapted to the purpose in view: we understand that the same officer has also drafted rules for executing the works for which funds are thus to be procured. The attention of Captain Wingate and of the Revenue officers of Dharwar having been specially devoted to these measures, we think it our most judicious course to relinquish, in favour of their plans, the further pursuance of this particular subject, assuming that the rules they have propounded will, if passed into an Act, be made applicable to the entire Presidency.
60. We have next to recommend that local authorities should be required and encouraged to make due use of those clauses in the code which refer to emergent works. We say encouraged, because since every officer who accepts responsibility incurs some risk of blame, we think that even when his zeal may have misled his judgment, and he has authorized a work of which the real emergency may be questioned, the admonition he deserves should rarely pass into reproof, lest the officer should thereafter shrink from using a power with which, on the whole, the public good requires him to be vested. That this power is not sufficiently exercised at present is evident, from last year's emergent expenditure in the Territorial Department having been only Rs. 1,532 (one thousand five hundred and thirty-two) [Appendix (F)]. Indeed the present inquiry has constrained us to notice in too many officers what at first sight seems to be either inertness to use the

power that has been left to them, or else a timid evasion of responsibility, which each endeavours to shift upwards. But it must be confessed that the system is, more than they, to blame. Some Collectors, besides the great extent of business transacted by them in the native language, have occasion to write about 4,000 English letters per annum, two-thirds of which require to be drafted by themselves. The apprehension of drawing upon themselves troublesome inquiries must naturally deter many from doing what they otherwise would be ready to do. The microscopic investigation of their acts, not the trouble of the acts themselves, is the real hindrance.

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61. We have been desired to frame some rules to avert in future the hesitation which Collectors feel in making emergent requisitions.

The code defines a work to be emergent only when there would be "certain loss or inconvenience to the public service," by referring to higher authority. Whether a work falls or not into this category, must be left to an officer's judgment. It seems to us inexpedient to clog with definitions the present simple rule; its benefits must depend on the judgment and exactitude of those who are to use it, and its misinterpretation can only be corrected by admonitions *pro re nata* on the part of the authorities.

65. But we advise that an Engineer, when he can promptly inspect a work, and doubts its real emergency, be directed to state his opinion to the requiring officer, and, in event of the requisition being still adhered to, to report to the Superintending Engineer, without, however, delaying the work.

66. There is said to be some uncertainty on the part of revenue officers as to whether the emergent rules properly apply to works of irrigation. We recommend that they be declared applicable to all Public Works, of what nature soever.

And we are led in this place to suggest that a compendium of rules for the guidance of all persons concerned in Public Works should, as soon as the Reports now called for from the three Presidencies have been received, be compiled in such a shape as to allow civil officers to see at once what their powers are, without wading through irrelevant matter. To the contents of Section XXIII. of Jameson's Code, otherwise arranged, might be added rules for the guidance of young Engineer Officers in the management of working parties; and it would greatly assist all concerned with Public Works if this digest were to be prefaced with a descriptive statement of the entire system. Officers in general, who might be expected to know the rules, we find know them very imperfectly indeed, and their unacquaintance is ascribable partly to the repulsive shape in which a code presents them. A descriptive outline, on the contrary, might be made attractive, and would be easily comprehended.

67. Lastly, in cases of such importance as Government may reserve for their own decision, we propose the following mode of acceleration, viz.:

Before a plan, prepared at the requisition of a civil authority, is committed to the channels described in paras. 3, 4, 5, it is shown by the Engineer to the requiring officer, who signs it, in token of his approval. (This does not exactly accord with Act 119, s. 23, Military Code.) Now, as the Revenue Commissioner or Sudder Adawlut offer no professional opinion upon the plan, but merely notice its fitness with reference to their wants, it appears to us that the civil officer, having once seen the plan, possesses, and might communicate to the controlling authority, all the particulars requisite to a decision on the subject.

68. We therefore propose that the project, with its plan and estimate, if to go before Government, be submitted direct by the Military Board, instead of going back to the civil officer, and that the latter hand up his statement of the matter through his ordinary channel of communication to the Government, which would thus receive the requisite documents from both parties concurrently.

69. The sole objection to which this course seems liable is, that if the Superintending Engineer, or Military Board, make in the plan alterations materially increasing its cost, the Revenue Commissioner might see reason to change his opinion; but such cases are rare, and even in them no delay greater than at present would arise; for the Collector would receive the altered plan as soon as he would do under the practice existing.

70. It has been suggested to us, that the members of Government very seldom require to see the "detailed estimate and plan" of a work, being ordinarily satisfied as to these with the professional opinions that accompany the project before them.

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them? If so, it would relieve the mail, and otherwise be more convenient, that the project should go up to Government without these accompaniments; if wanted, they could be called for.

71. Delays of execution arise mainly from the want of subordinates, of which more hereafter; also from the areas assigned to executive officers exceeding their power of superintendence.

72. Delays of audit only so far hinder work that large unsettled balances are a source of anxiety to executive officers. This subject has had much attention from the Military Board, and the rules appear to be as perfect as circumstances admit. It is desirable that executive officers should make bills for each successively completed portion of large works; but it would increase labour, and might be found troublesome, if such a rule were made imperative.—[See para. 16.]

73. The balances outstanding against the Executive Engineers serving under this Presidency have for the last six years been as follows.—It will be observed, that the discontinuance of monthly bills under the new system of accounts has largely swelled these balances.

The Accounts for 1850-51 have not yet been made up.

Against Executive Engineers in	Under the Old System.		Under the New System.			
	1844-45.	1845-46.	1846-47.	1847-48.	1848-49.	1849-50.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
India	9,479	2,269	21,312	1,85,660	2,43,499	2,36,482
Sinde	53,729	53,729	8,71,101	7,09,056	7,72,710	7,57,106
Aden	-	-	96,586	3,00,129	5,84,069	3,04,283
TOTAL - Rupees	63,208	55,998	9,88,999	11,05,105	16,00,277	12,97,941

74. The next change we have to recommend aims at the threefold object of saving time, saving labour, and simplifying accounts, while it will afford to Superintending Engineers better means than they now possess of checking cash advances. Under the existing practice, every indent for cash is sent for the Superintending Engineer's counter-signature, with the view of enabling him to check unnecessary drafts. Practically, this course is useless; for the Superintending Engineer can only judge whether the money asked for is necessary by examining the quarterly Progress Reports; but, these Reports rarely reaching him until some weeks after, and generally three or four months after, the cash indent has passed through his office, he is compelled, as a matter of course, to countersign every indent that comes, provided the sanctioned amount is not overdrawn.

75. Again, when Superintending Engineers are on their tours of inspection, frequently off post-roads for weeks together, the delay is inconvenient, and obliges executive officers to keep in hand a larger stock of cash than would otherwise be necessary. Now, as cash indents are forwarded and returned with letters or memoranda, which all have to be registered and copied, separate often for each work, always so for each department, the number of such documents that pass through his office creating work, and loading the mail, is very great, and we are not aware of a single useful object that is thereby attained.

76. We therefore suggest, that cash indents be sent direct by Executive Engineers to the disbursing officers, to whom the sanction and audits are always communicated, and who already are bound not to advance money beyond the amount sanctioned.

77. Cash indents for monthly current expenses might always be passed on the executive officers' responsibility, for these amounts are not large, and their audit is generally received within two months.

78. Instead, then, of submitting his cash indents, as now, we propose that on the 1st of each month every executive officer shall render to the Superintending

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Engineer a single memorandum of cash balances, showing the following particulars, viz.:

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1. Names of the works he has in hand.
2. Amount of the estimate for each.
3. Amount drawn in advance.
4. Amount expended as per ledger.
5. Balance in hand.

All this information is, or ought to be, available in every Engineer's Office, on the 1st of each month, from his book alone: it would at once show the Superintending Engineer whether money is unnecessarily asked for by the executive officer, and would oblige the latter to keep up his office accounts to the latest date.

SECTION V.

Subordinate Branch of the Public Works Department.

79. Our inquiries under this head have been answered by one general and loud complaint, so that we cannot doubt that the want of subordinates of all classes neutralizes, to a great extent, the advantages that might otherwise be derivable from the present inadequate number of Engineer Officers, while it wastes public money, both directly in bad work, and indirectly in restraining those officers from working up to their full powers of superintendence.

80. The difficulties which in this country arise from the relative distances of the several works under one officer's control, can only be met by maintaining a body of men who may be trusted to carry out the Engineer's instructions between his periodical visits.

81. It seems agreed that this body should consist, besides European overseers, of two classes of natives, the one trained as surveyors and builders, the other as practical mistries, capable of keeping clear accounts in their native language, and of working from a plan.

The European Branch.

82. By direction of the Honourable Court, the source of supply for European subordinates is limited to the military class. Their number at this Presidency was originally 30; but in July 1847, on account of the annexation of Sindh, it was increased by 10; and in April last, to meet demands at Satara and elsewhere, Government permitted the appointment of six supernumerary Sub-Assistant Overseers.

83. We subjoin Table of the establishment as it now stands, as it stood before the above changes, and as the Board, in their letter to Government, No. 2,169, of 1847, desire that it should prospectively be fixed. The Military Board inform us, in reply to our inquiries, that 60 Europeans are required to meet the present wants of the establishment.

	Prior to Annexation of Sindh.	After Annexation of Sindh.	After Annexation of Satara.	Further Increase now required.	
				Plan of the Bengal Military Board.	Plan of the Bombay Military Board.
Executive officer	-	-	-	-- Numbers to vary according to demands.	The proportional number of the several grades to be fixed; but the actual numbers of the whole to vary according to eventual demands.
Assistant ditto	-	-	-		
Supervisor	1	1	1	To be fixed numbers.	
Assistant ditto	3	4	4		
Overseers	0	8	8	Unlimited.	
Assistant ditto	9	12	12		
Sub-Assistant ditto	11	15	21	Not proposed.	
TOTAL	30	40	46	-	Sixty.

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84. The addition of two superior grades forms a principal feature of the scheme for improving the European branch; and we consider it to be of the highest importance.

85. We have inquired what is the general report from the Engineer Officers upon the character and usefulness of the European subordinates, and are informed by the Military Board, that it must be considered, on the whole, to be highly favourable. There is a constant demand for their services; and were their prospects somewhat better and their numbers greater, so as to allow of more selection for important works, they would be a most efficient body.

86. Having read the documents containing the concurrent views of the Bengal and Bombay Military Boards on this subject, and entirely agreeing in the same, we are left nothing to suggest.

Surveyors and Builders.

87. Excepting a remnant, now 60, of the Surveyors and Builders educated a quarter of a century ago in the Government Institution, and who have proved on the whole an useful body, no qualified class of native subordinate now exists, nor are any measures yet working to create one.

88. The theoretical class in the Elphinstone College, projected some years ago by Colonel Dickinson, has contributed only nine members to the Public Service.

89. In the opinion of Colonel Jervis, late Chief Engineer, this class was deserted, because every student's reception depended on his possessing such a knowledge of English as would allow of his being instructed by a Professor ignorant of the native languages.

90. The Board of Education inform us, that the object was not to produce a class of Surveyors and Builders trained according to the rule of thumb, but scientific Civil Engineers, fully grounded in the theory of their profession, and that, therefore, it was determined by Government that instruction should be given through the medium of English, as in the kindred institution of the Grant Medical College. The same Board are of opinion that sufficient encouragement has not been given to those students, and that the same proportionate reward should be extended to the native Civil Engineer, as to the native Judge and the native Medical Practitioner.

91. The Honourable Court of Directors, in para. 44 of their despatch, express the difficulty they found in reconciling this urgent demand for subordinates, with the alleged absence of inducement for native youths to enter the engineering class, and accept a gratuitous education for the numerous vacancies supposed to be awaiting them.

92. We, being convinced that the outcry is fully justified, shall proceed to show what we believe to be the real cause of the inconsistency noticed by the Court.

93. The 11 young men selected to fill this class were the pick of the whole College, not only for general ability, but also for their proficiency in the English language. The expectations of such students naturally ran high; they passed examinations for the service in November 1847. About three months thereafter these pupils, not having been enrolled in the Public Service, as they expected, memorialized the Military Board on the 6th April 1848; that Board recommended the employment of the whole number, but on terms inferior to those enjoyed by the old Surveyors and Builders; and it was not until the 23d June following that Government permitted the engagement of six only to fill vacancies, which we now find to have been really 15, still omitting to settle the terms of their entertainment.

94. On the 6th September 1848 these lads were required to sign an agreement to serve wherever ordered, and were sent to Sind and elsewhere, all knowledge of the terms on which they were to serve being still withheld. They proceeded to their destinations, but drew no pay from the time of passing until the end of September 1848, when the Military Board, still in ignorance of Government's intentions, took upon themselves to authorize temporary rates.

95. Thus

95. Thus we find that these young men were for months kept in suspense whether they would be employed at all; that when their employment was permitted, several of them were sent at once to Sind, a quarter extremely distasteful; and that up to this time those who remain in the service have no fixed position, and are receiving, contrary to hopes they had been led at college to entertain, a lower rate of pay than their comrades of the same denomination; since then, this class has found no favour at the college.

Report.

96. On the 13th June 1846 the Military Board of this Presidency laid before Government a scheme, proposed by the Chief Engineer, for admitting into the Public Service a class of native assistants. This scheme, which will be found in Appendix (G.), was accompanied with a scale of qualifications for each grade, and with rules for examination of candidates for their promotion, furlough, &c. The Military Board strongly recommended that these should be the rules under which from time to time individuals might be entertained according to the demands of the service. The Board have since frequently inquired whether there are any hopes of Colonel Jervis's scheme being adopted, and Government's last answer refers the Board to the Honourable Court's despatch, now before this Commission—[Appendix (H)].

97. We observe that the Military Board's views accord closely with those of the Board at Calcutta, as expressed in the reports from the latter body to the President of the Council of India, dated 28th October 1845 and September 1846; also, that the Honourable Court of Directors, so long ago as 1846, were prepared to approve one arrangement for the same object at the three Presidencies. Our plan in supplement to Colonel Jervis's, will be found in Section VI. of this Report.

98. A great drawback to efficiency in the Public Works Department seems to be the too exclusive use of temporary clerks and overseers, who have no claim to pension after any length of service, however meritorious: whether, in the end, the State gains by this, is doubtful; for, apart from other considerations, the prospective pension, and its possible loss, operates in checking misconduct more powerfully than penal enactments, however stringent. Security of service seems essential to the *morale* of all such bodies, and service in the Public Works Department should, therefore, in regard to permanency and eventual provision for old age, be rendered as attractive as service elsewhere.

99. We do not say that the entire subordinate establishment should be permanent, but that the permanent proportion should be large enough to excite and reasonably to fulfil the hopes of a large probationary class of assistants, the worthiest of whom should be transferable to the fixed establishment.

100. At present temporary employ has no allurement for qualified persons, and for mistries the Engineer must choose among a set who have never been properly apprenticed to their trades. Hence work goes on, year after year, in the old way, without a thought or a care for the numerous improvements and devices constantly adopted at home.

101. As an instance, the Superintending Engineer, S. P., informs us, that in the Satara district an extensive work is going on,* the Passumee Ghaut, which will cost a lac of rupees. The superintending officer, Captain Hart, cannot hope to visit this work above twice in the year: the native who conducts it, the only man Captain Hart could get, receives 15 rupees a month, and his sole qualification previously to this undertaking was, having been employed under the late Rajah in repairing the town roads of Satara: we have not inquired why this man, if fit to be so far trusted, is not better paid; if unfit, why the work should proceed.

* The work has been suspended.

102. Pensioned sappers are found very useful as Macadamis. For a small addition to their pensions, they are willing to render services which their previous training makes very valuable. Information as to the characters and ability of pensioned Sappers should, we think, be furnished to the Military Board for circulation among Engineers, who might induce good men to accept such service as they might still be able to perform.

Extent of the Deficiency in the subordinate Branches.

103. Captain Crawford, the Superintending Railway Engineer, contrasts the number and efficiency of the persons now employed by the contractor in superintending

Report.

tending the Bombay Railway with the assistance which would probably be allowed to a Government Engineer conducting the same work. In the one case for executing simple cuttings, embankments and bridges of small size, there are two European contractors present on the spot, and taking an active part in the operations. They have engaged the services of a Civil Engineer, and have several English workmen and overseers, in all 16 persons, over and above any Native Superintendents they may have engaged.

104. In the other case Captain Crawford judges, from past experience, that if a Government Engineer similarly employed could obtain, in addition to native assistants, the aid of one European warrant officer or serjeant, whose highest qualification might be that of a fair writer or accountant, it is as much as would be granted; as for his getting the help of another officer, it would rather be judged that he himself had too little to do, and calls would soon be made upon him to attend to any other work that might occur in the neighbourhood. The work would no doubt go on, and in time be completed; but it would lag along in the old way, and the introduction of new and economical methods of labour would not be dreamt of.

105. At present there is no fixed establishment of native subordinates. The original number of Surveyors and Builders seems to have been about 78, and to have at first exceeded the wants of the service. It now falls short of the demand; but the original number was assumed as the standard in admitting the six pupils alluded to in our 93d para. It appears, however, that at that very time, and for a long while previously, the Military Board was pressing Government for an increase. A present state of the Establishment of Surveyors and Builders is annexed to this Report, Appendix (K.)

106. The Military Board have proposed to allow the exigencies of the service to regulate a gradual increase in the establishment of all subordinates. It is certain that the number exactly sufficient now will not suffice a few years hence; every year the wants of the country press harder, and the advantages of Public Works, in extending commercial intercourse, and improving the condition of the people and the revenue, become more apparent. Every year something more is done by the department than before. To take the present demand, therefore, as the prospective limit, would be in unreasonable opposition to past experience; while it would be wasteful to make some uncertain guess at eventual demands, and propose an immediate establishment to meet them.

107. But as it is requisite that we should value the present deficiency, we have ascertained from the Military Board that, instead of 66, the number of Surveyors now remaining, not less than 120 will fulfil the actual demands of the present time.

SECTION VI.

Engineers' Schools.

108. AFTER the Government Institution had been some years abolished, the Quartermaster-general's Department felt the want of qualified persons as Draftsmen and Surveyors. To remedy this, Government, in 1846, sanctioned a plan by Lieutenant Wemyss, who then commanded at head quarters of the Engineers Corps (now called the Sappers and Miners), for remodelling the Regimental School, so as to qualify recruit boys for filling those situations.

109. The number was fixed at 40 boys, of whom the best were to be appointed to the corps of guides, and the remainder, if eligible, were to be permitted to enlist into the ranks on attaining the age of 18 years.

110. At present 27 boys attend this school, 10 of whom belong to the Sappers, and 17 to other native corps. They are instructed by an English teacher, a sapper, and two Mahratta Pundits, on stipends of Rs. 30, Rs. 15 and Rs. 3 respectively.

111. The

The subjects of instruction, and the students' allowances, are as follows:

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CLASS.	NUMBER of BOYS.		Monthly Allowance.	SUBJECTS TAUGHT.
	Established.	Actual.		
First	10	-	Rs. 6	Plane Trigonometry and Surveying.
Second	10	5	5	Geometry, Mensuration, Plan drawing.
Third	20	22	3½	- - Geometry, Mahratta and English Reading, Writing, &c.

112. The Quartermaster-general informs us, that the lads entertained in his department from this school have all been found capable, on joining, of carrying on an ordinary road survey with perambulator and compass, keeping a field-book, and plotting neatly.

Thirteen of these young men are now employed, whereof five have been promoted to draftsmen, on salaries varying from Rs. 30 to Rs. 50, all of them drawing with neatness and correctness, able to read and write English with tolerable facility, and to use the plane table and theodolite. Lieut.-colonel Holland considers that this Engineer School adequately fulfils the purpose for which his predecessor supported, in 1840, the late Captain Wenys's plan.

113. The East Indian youths, permitted by Article 64, p. 311, Jameson's Code, to be entertained as apprentices to the European artificers, seem to be tacitly declined. The Regimental School, when enlarged, may supply lads more suitable for apprenticeship to Mistr'es; but we are diffident of Engineer Mistr'es being thus produced from any class: they should rather spring from among the operatives of the country; we prefer, therefore, to advise that young workmen approving themselves by skill in handicraft already attained, and by superior intelligence, should be recommended by Executive Engineers for instruction in the Sapper School, and there allowed ordinary wages for a certain period, with a view to their acquiring practice in accounts, and ability to work from a plan, or where, from distance, this would be inconvenient, we recommend their being attached to the Engineer's own office for instruction by the officer himself, or by his establishment, as circumstances might admit, on the same terms.

114. We have visited the Sapper Schools; the Europeans have a creditable knowledge of plan drawing, writing and accounts; they are all instructed in surveying, leveling and estimating.

115. We found the older native boys tolerably instructed in English reading, writing and accounts. Reflecting on what we had thus far seen, we were all disposed to question whether it was not a mistake to give up so much time to English instructions, particularly as a correct knowledge of the vernacular is commonly found wanting in lads who from an early age have been taught through the medium of a foreign tongue.

116. Considering the Public Work Department only, and not that of the Quartermaster-general, we were at first inclined to think that, instead of teaching the many natives a difficult language, like English, the few Europeans should rather have instruction in Mahratta, whereby, and only, might all the subordinates communicate one with another; but the Europeans, as overseers, would become a far more efficient body.

117. However, having since consulted Major Candy, Superintendent of the Poona College, and having witnessed what the scholars at that institution can do, we are satisfied that a competent knowledge of English may be required from candidates for the Public Works Department without the slightest apprehension of deficient numbers offering, or that this additional qualification will at all impair their fitness for that portion of engineering business which is conducted in Mahratta.

118. We would, therefore, expunge the 6th clause from Colonel Jervis's scheme,

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scheme, and require from every grade of Surveyors and Builders a thorough acquaintance with English. There are various institutions, all deserving a share of such encouragement, from which competitors for employment will come forward.

119. We find that the Poona College alone is capable of supplying, in any numbers likely to be wanted, young men, mostly Brahmans, thoroughly grounded in mathematics and English, and needing only the superstructure of engineering knowledge to become qualified as Surveyors and Builders.

120. From these sources the present deficiencies of the branch may be replenished, without long delay, and its future wants may certainly be supplied at Poona from a class of willing lads, preferable to those bred in Bombay, from their moderate expectations, harder training, and better fitness, as Deccanics, to fare abroad in the districts.

121. Major Candy is of opinion that 7 rupees per mensem would be a sufficient rate of subsistence for students while under instruction in the Sapper School.

122. Colonel Jarvis's rules, in the Appendix, containing all the main provisions that will not be better left to the officer who will direct the Engineering Institution than attempted by us, the only arrangements remaining for us to make, as requisite for improving the present means of instructing Engineer subordinates, are as follows:—

123. To accommodate classes of European Overseers, Native Surveyors and Mistries, an appropriate building must be erected: the present school-rooms are not more than sufficient for the recruit boys. A competent English teacher, not liable to be moved, for the upper classes, with a native assistant, drawn, perhaps, from among the present Surveyors, must be appointed: general supervision of the whole will appropriately rest with the commanding officer of the Sappers. Before determining his scheme, that officer should communicate with the Principal of the Civil Engineering College at Roorkee, whence may probably be obtained a course of instruction made ready to his hand.

SECTION VII.

Qualification of Young Officers.

124. THE Honourable Court's Despatch, para. 48, notices the importance to Engineer Officers of conversancy with the native languages, and we quite concur in its necessity. Beyond their use as a medium of communication with the people, the native languages are the cheapest vehicle for ordinary correspondence and accounts, and are extensively used as such whenever the officers know them competently.

125. So important do we consider this acquirement, that we think it should be made obligatory. Some years ago the salary of Engineer Officers was subject to a certain deduction until they passed an examination in Hindoostanee. The demand for their services is now so urgent, that this qualification cannot be waived for; and, as an officer once employed has scarcely time for study, present circumstances hardly warrant the revival of such a rule. But hereafter, if the strength of the corps shall admit of selection, study of the languages may be enforced by withholding employ from every young officer who fails to pass.

126. Useful as the education given for a ground-work to the Company's Engineers at Addiscombe and Chatham, the Honourable Court of Directors must be aware that their officers bring to India no practical knowledge of Civil Engineering, beyond what little some acquire by employing in its pursuit their leisure after quitting Addiscombe.

127. The consequent deficiency is, we know, acutely felt by many officers during their early career. One of the ablest in this service, writing to our Commission, has thus expressed himself:—

"It seems hard to blame us for the want of that skill, for the acquisition of which there

there is no provision made in our professional education under the present system ; an Engineer Officer, shortly after his arrival in India, is placed in charge of Public Works. His previous education has not provided for the slightest practical knowledge of Civil Engineering in any one of its branches ; so far from being qualified to teach the departmental subordinates over whom he is placed, he has to acquire from them the little they know."

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With all of us, from the top to the bottom of the Department of Public Works the case is, I believe, the same ; we all acquire our practical knowledge by failures, more or less frequent, at the expense of Government : the same remarks apply, of course, to officers selected from the line to superintend the construction of Public Works, while their failures are frequently and indiscriminately attributed to the Engineer Department.

SECTION VIII.

Style of Work.

128. In a country where every thing is done by the Government, it may be worth considering whether expenditure on Public Works might not advantageously be regulated with regard to some fixed standard of quality and style, so as to leave as little as possible to individual tastes and fancies.

129. One man deems not even a branch road complete unless it be expensively kerbed, while another thinks it needless to kerb even trunk lines ; one man rejects cut stone for drains and minor bridges as needlessly expensive, another uses nothing else.

130. A high officer of the corps remarks to us, that Engineers generally are not willing to do any thing, except in the most approved way, consequently at greater expense than the object is worth, or than is absolutely necessary ; thus, projects of first importance to the country are set aside, and civil officers are found unwilling to call in an Engineer if they can make a shift without him.

131. It rests with the Military Board and with Superintending Engineers to restrain tendencies to ambitious estimating for objects of humble pretension ; but probably some general rules might in the case of roads and ordinary buildings be laid down with advantage.

132. In para. 68 of the Report made by a Committee in February 1851 on the Phonda Ghaut, we see incidental mention of a resolution by Government not to sanction, in the present state of the finances, expensive roads under any circumstances, and that roads which have cost between Rs. 5,000 (five thousand) and Rs. 6,000 (six thousand) a mile, are out of the question. Possibly these instructions had only local application ; but we find the Superintendent of Roads even now proposing roads as costly as are above interdicted ; and we have frequently had occasion to reflect, that as it would materially profit the Military Board to know beforehand what expenditure on Public Works Government is annually prepared to meet, so would it reduce the labour of Engineers to possess definite instructions regarding the style of work to which their designs should consequently be accommodated.

133. The Collector of Rutnagiree informs us, that when new works or repairs are wanted at his Sudder or District Stations, there being no local Engineer, his native officers draw out as well as they can the requisite papers, which are translated and submitted through the Superintending Engineer for approval of the Military Board.

134. On arrival of the sanction, the work is given out on contract, and its execution is superintended by the native revenue officer, and subsequently inspected by the Collector or his assistants in their annual tour.

135. Since 1830, several alterations and additions have thus been made to existing buildings, and many new structures, as kutcheries, have been erected ; so far as the Collector is able to judge, the work has been well done, and at less outlay, though perhaps with less finish, than would be given to it by an Engineer.

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136. We think it may be conceded, that the State often gains by leaving the care of his own district buildings to the Civil Officer; and we have all heard of instances where a Collector, interesting himself in local improvements, and making such his recreation, has effected works of public utility with like economical results.

137. To ascertain whether Collectors and their Assistants fully use the authority they possess under the rules quoted in our 13th para., we have obtained the following statement of their expenditure for 1850-51.

The return from Ahmedabad Dharwar and Surat has only been received for the first half of the year.

RETURN of Sums expended by COLLECTORS and ASSISTANT COLLECTORS IN 1850-51 :

Sums at disposal of the under-mentioned Revenue Officers for 1850-51.

	Rs.		Amount disbursed by them collectively for Public Works.	
			Rs.	a. p.
		Surat	2,776	9 4
Collector	3,000	Ahmedabad	918	12 -
First Assistant	1,800	Khandish	5,408	3 3
Other Assistants	1,200	Broach	7,929	11 2
		Kaira	2,450	5 3
		Tanna	2,811	12 -
		Rutnagiree	907	8 11
Collector	1,000	Poona	1,716	- -
First Assistant	600	Ahmednuggur	2,537	1 3
Other Assistant	400	Belgaum	1,883	7 8
		Dharwar	2,117	7 10
		Shalapoor	1,386	5 -
	600	Nassick, Sub-Collector	-	-
	1,000	Colaba Agent	973	1 -
	1,300	Collector of Customs	-	-
	700	Deputy ditto	-	-

138. Collectors exercised their discretion in disposing of these allowances in the construction and repair of wells, tanks, chowries, &c., the villagers, who benefit generally, we believe, contributing equally or partly to the same. But this money is not intended to be spent on works for which separate sanction is solicited.

139. It depends apparently on the degree of interest taken in such beneficial works by individual Collectors whether the entire allowance is disbursed or not; but as we are certain that the trouble of obtaining funds deters the most willing from applying to Government in numerous cases locally important, which a trifling aid from public funds would dispose of, we strongly advise that the zillahs of the Southern Province be restored to equal privileges with those of the Northern Division. When our 13th para. was penned, we were under the impression that only four Collectorates had been reduced in this respect, on account of the Road and Tank Establishment being created for them especially, and we are still at a loss to conjecture how Sholapoor, Belgaum and Dharwar have been deprived of the benefits of Government Letter, dated 11 October 1832.

140. In the Belgaum Collectorate there appears to have been a happy co-operation between the Collector and the Engineer, the Department of each ready to take any work that it could perform more conveniently than the other.

141. When a revenue or other officer undertakes a Public Work for his recreation, the charm depends, of course, on his immunity from control, and any comparative cheapness in his work may be ascribed to its being a labour, not of duty, but of choice, and to the simple arrangements that can be made for single undertakings, conducted independently of the rules laid down for works in general, and which constitute the system to which professional Engineers in this service are bound.

142. But between works of the simple kind just instanced and those high branches of engineering to which few amateurs pretend, lies a class of works largely demanded throughout India; namely, roads, of three kinds, the cleared country cart-way, the branch road made of mooroom, and the perfect trunk line, metalled, kerbed and bridged. For the first of these, engineering skill is needless; for the second it is desirable, and for the third indispensable.

143. It is extensively believed that Government will refuse a heavy estimate while it may be induced to do the same work cheaply: many whose position permits them to be improvers argue from this general persuasion, that the present financial circumstances must be met by devices to do much cheaply, in a manne-sufficient for the day, rather than to do a little in the perfect style which Engineers approve.

144. But it is not with a State as with a private individual, to whom an object may be attainable solely because it is cheap, and to whom durability is secondarily important. In road works, on the contrary, their permanence must be contemplated. In America, indeed, there are special reasons for constructing cheap thoroughfares for the present alone; but in an old settled country, like India, the directions of intercourse are ascertained and permanent. A road positively cheap can here be made serviceable in an inferior degree for the present, and yet capable, at a further moderate outlay, of becoming thoroughly serviceable for all future time; and since experience shows how seldom a bad line once taken is relinquished, a judicious direction, easy gradients, and sound principles of construction, held steadily in view from the first, are cheapest for the public in the end. Notwithstanding this, it is certain that, unless the highways of India are seen to extend according to true principles, by a settled purpose of the Government, their servants will continually strive to meet the necessity in any way they can; so prevalent and so strong is the conviction that roads are the prime wants of this country.

145. Unless the controlling authority has the assurance of an amateur's ability, we think that no outlay should be permitted on road works beyond the mere clearance of a country cart-way until a competent engineer, cost what it may, has reported on the line proposed.

146. A very instructive caution against the opposite course appears in the above-cited Report on the Phonda Ghaut, and the roads leading from it to Kolapoor and Belgaum.

147. In promulgating the oft-neglected principles affirmed on that occasion by the committee, and admitted by Government, it might be useful that a general standard should be appointed for the style of execution to which in similar countries road works of the first and second class should respectively conform; and the precision of these only rules to which volunteer agency needs be bound should be such as to insure that the earliest small improvement shall be preparatory to future steps in keeping with the first; so that all progress, however tardy, shall tend directly to the ultimate standard which, on wide and comprehensive views, may for all Government works be adopted.

SECTION IX.

Estimates for Public Works.

148. To our inquiries regarding rates and estimates, some observations were made by Lieut.-colonel Scott, which, coming from an Engineer of his experience, merit consideration. Lieut.-colonel Scott believes, that—

“The mischief of extravagant rates arises in some degree from the strictness of the rule about excesses: when an estimate is high, the rates will be high also: an

Report. officer dares not write down a price which he could only keep to by the strictest supervision and perfect faithfulness on part of his subordinates: if the estimate is not exceeded above 10 per cent., I can scarcely see what inconvenience would be caused, and I am certain the work could be done for less money if the estimate was 10 per cent. below the cost than if it was 10 per cent. above it."

149. The Superintendent of Roads likewise comments on the detriment produced by the displeasure with which an excess is viewed by Government, and the unwillingness evinced to accord a second sanction for the same work. He views this as tending to induce, on the part of officers, a practice of over-estimating as the only means to save themselves from blame.

150. We think that an estimate ought to represent the cost truly expected, and that, for the reasons above, it would be advantageous to leave with the Department of Audit a discretion of admitting 10 per cent. above the estimate without obligation to refer to Government.

SECTION X.

Contracts.

151. PERFORMANCE of Public Works by contract, although it saves an officer much trouble in accounts, releases him from money payments in detail, and when contractors do not fail, protects Government against excesses over the calculated outlay, is not looked upon by Engineer officers here as advantageous or economical.

152. Vigilant superintendence of the persons usually contracting is even more necessary than in the departmental work, or it will be badly done; defects undiscoverable at first appear in after years, and the work remains a constant source of trouble and expense.

153. At the Presidency, and at Poona, almost all works are executed by contract. At both places natives of capital occasionally come forward; yet the advantage derived is said to consist solely in the power it gives the Engineer, by simplifying his accounts to superintend a much greater number of works than he otherwise could do.

154. The Executive Engineer at Poona tells us, "I could not do my work except on the contract system: I am bound to accept the lowest tender, unless I can assign good reason. So systematic is the use of bad materials, so incessant the endeavour to slur through work, so great the ordinary chances of success at large stations where many works are at the same time going on under very few responsible subordinates, that contract work is almost invariably tendered far below the estimates for best work.

"At Kirkee I have contracted at liberal prices: the work there, two barracks, is excellent: I have not had to impose a single fine.

"I view the contract system favourably only when men of some capital are engaged. The poor contractor's only saving is in employing his own and his family's labour; for most materials he must pay more than the Engineer himself. A rich man who makes a trade of contracting can do fair work under an Engineer's average, because he can lay in his stock with foresight; while the Engineer must defer all arrangements for supplies until the sanction comes.

"At Poona the average saving on all works done by contract is about 32 per cent."

155. In the opinion of the Garrison Engineer at Bombay, where works are done almost exclusively by contract, the saving is only what might fairly be expected from the inferiority of the work.

156. The Executive Engineer, Surat Division, tells us, that "the moment a work is given out on contract, a scene of actual warfare commences between the contractor and the executive officer, in which the latter, from having many other things to do, while his adversary can concentrate all his attention and cunning upon me,* generally gets the worst of it."

* *Sic orig.*

157. The case will be altered when English contractors with capital, and provided with European appliances, become competitors for employment in India. We think that then there will be no question upon the advantage of using their agency as largely as is the practice in England.

158. Even now, if in the case of the experienced and judicious the relaxation of rules ordinarily necessary were to leave the Engineer such freedom that he could inspire confidence by his proceedings, the advantages of contracting might be expected to bear proportion to his tact. To produce all the evils now complained of, faults must be mutual between the contractor and the system. Often on the employer's side is the sufferance of a competition, in which no honest man can live: he is thrust aside by the low bidder, who pretermits legitimate profits, in order to secure a contract, trusting to knavery for his gain: thus redounds discredit on a method which itself is good. In promise it is the very aid which a weak superintendency should employ, and to the well working of which there seems nothing wanted but liberal terms to leave contractors their due profit, and circumstances to favour the independence which would secure that profit from interception. Such is the character of native officials, as we commonly see them, that without great vigilance, even liberality would be futile. An old hand alone could work the contract system beneficially.

159. Vol. IX., No. 427, of "The Builder" contains a paper on the effects of this system in England. The writer says, "It is not building by contract that is so objectionable, but building by competition. The very nature of competition is to deprave the character and harden the conscience, and those who thus suffer by the world's cupidity, are by that same world called dishonest and fraudulent. When a contract is required, why not obtain a tender from one man? There are many ways of preventing him from making his estimate unfairly high. He can be brought to take work as low as he ought to do in justice to himself. It is, moreover, satisfactory to be able to choose one's own man, and give him first chance. The probability is that he will not, for any fault of his own, let you go to another. The system of public tenders admits all sorts of men to an equal chance with the fair and honest, and, moreover, gives the worst man, the best chance."

160. Native contractors are named to us who have worked fairly for private persons during a long course of years, and we think, notwithstanding the shortsightedness attributed to contractors for Government, that it would be economical to empower Engineers to make liberal contracts whenever they can find a worthy man to reciprocate fair dealing; but this requires full confidence to be reposed in the Engineer, who is now bound by Art. 149, sect. 23, of the Military Code.

And in this difficulty we can discern no better expedient than for the controlling authority to regard rules less, and specialities more: "personal individualities may from time to time be of such moment as to make it well worth while to set aside the general rule on account of them."

SECTION XI.

Security.

161. It appears that in Bengal every non-military overseer of Public Works is required to lodge security to the extent of Rs. 500 (five hundred) before he can enter the department even in the lowest grade; and from enlisted men, security is required before they are entrusted with separate executive charge.

162. Considering that security is by legislative enactment exacted from native subordinates in the Civil Departments of the service, whenever entrusted with the charge and disposal of public money, we think that similar provisions should be extended to non-military subordinates in the Department of Public Works.

Report.

SECTION XII.

How Office Work and the Non-professional Employment of Engineers may be diminished.

163. We adverted in para. 39 to the excessive clerical labour with which Engineer officers are encumbered: viewing this kind of labour as a serious hindrance to the efficiency of Engineers, having a wide range of country to superintend, and many simultaneous works to look after, we have sought in the course of our investigations to discover in what particulars it might be alleviated.

164. The proper office of an Engineer is, 1st, to design; 2d, to estimate; 3d, to superintend. Under the present system, pecuniary responsibilities press so heavily upon him, that they have become, practically, those he most attains to.

165. The time of an Engineer officer appears to us entirely misapplied when taken up by the repair, charge and supply of barrack furniture, which belonged formerly to the Commissary of Stores; by the tinning of cooking pots and supplying lights, which are more appropriate to the Commissariat, and to drawing the pay of Punkah pullers, and the like, which might be left to commanding officers, or the station staff.

166. There are some works and petty repairs of which it is scarcely possible to measure with any degree of accuracy the quantities daily executed. In such, it is clear that the "figured abstract" is useless. We therefore suggest that the Audit Department use their discretion in dispensing with its being kept in all such cases.

167. The committees now assembled to survey the annual repairs of public buildings appear to us to be of no real use; practically, they do not form even a check, and only render an executive officer less responsible. Such committees, according to the evidence of Engineer officers, and to our own experience generally, write on their proceedings whatever is dictated to them, and very often without looking at the work they are assembled to report on. If this arose from removable causes, it might be remedied; but since it proceeds from the inability of unprofessional men to do what these committees are supposed to do, we would relieve the Engineer from all the trouble connected with the present regulations on this head, and substitute a simple certificate by the Executive Engineer, that the annual repairs estimated for are absolutely necessary. This might be countersigned by commanding officers, or heads of departments.

168. The erection and repair of district kutcheries, the opening of country cart tracks, clearance of tanks, repairs of wells and embankments, and the performance generally of work requiring no professional skill, should be executed by the civil authorities.

169. To profit fully by the services of the Executive Engineer and his surveyors, plans and estimates for such works might be prepared by them. The description and measurement by a surveyor of simple work would generally enable the former to make his estimate without personally visiting every distant tank. On sanction arriving, and the Mamledar being ready to commence the execution, a surveyor should attend and remain on the work until portions of the revetment, say of a tank, have been erected, the levels determined, and the Mamledar's karkoon made acquainted with what is to be done. The surveyor might then go away to other work, returning at intervals of about 10 days, and on the completion the Engineer should certify that the work has been executed according to the plan and estimate.

170. We have observed that at present much unsatisfactory correspondence takes place in maturing schemes of which the main difficulties might all be cleared away by two hours' personal conference. In the course of their tours, and while at head-quarter stations, the Superintending Engineer and Revenue Commissioner must often meet, and as, by the plan proposed further on, the Executive Engineer's range will become co-extensive with the range of the Collector, the latter officers might meet on the scene of any important project, and report on it conjointly.

We

We would not create fresh excuses for delay by making it imperative to put off the discussion of important schemes until a meeting could take place; but we advise that a free resort to personal communication be enjoined upon the parties whose concurrent opinion usually guides Government to a decision.

171. As an example of the want of such conference and co-operation to expedite a very simple and important work, for the last 20 years, to the knowledge of this Commission, there has been an acknowledged necessity for a branch road to connect Poona with the Ahmednuggur line at Wagholee, a place only eight miles distant. The Superintendent of Roads informs us, that on the 12th of September last he submitted a plan for approval; hearing nothing about it, he addressed the Revenue Commissioner, S. D., on the 11th June last, to learn what had been done, and was informed that the matter was still under consideration.

Pursuing the inquiry, we found that the project was—

Received by the Revenue Commissioner	- - -	7 January 1851.
Referred by him to Collector	- - -	3 February „
Collector's reply came on the	- - -	11 March „
Revenue Commissioner asked the Superintendent of Roads for the plan	- - -	10 April „
And was by him referred to Government	- - -	21 April „
To whom Revenue Commissioner applied on	- - -	30 April „
And obtained it on	- - -	24 May „

Since when, the case has remained with the Revenue Commissioner to be disposed of simultaneously with another reference from the Military Board relative to proposed lines leading out of Poona to the Katrug and Devee Ghauts. What has been done thus far might surely have been more easily, pleasantly, and effectually disposed of in the course of a morning's ride over the ground, without recalling the plan, and without letter-writing, except to put the project into an official form. We believe that more money has been spent in repeatedly surveying and writing about this insignificant bit of road than would have sufficed to complete it altogether in a substantial manner.

SECTION XIII.

Strength and Distribution of the Corps of Engineers.

172. THE improvement thus far proposed, comprehends all the expedients we are able to devise for economising and reclaiming to their legitimate sphere the services of engineer officers, so as to render the present establishment more capable of extending its superintendence over a large breadth of work. The system had already been so well matured, that we can discern no other remedy of importance likely to arise from improved modes of working. Any increased efficiency beyond what these measures can yield must, we think, be sought in a revised organization.

173. In considering what our further recommendations should be, we have found ourselves mainly in accord with the Government plan of 1849, for re-uniting all the officers available for Public Works in one general department, and instituting a new arrangement, under which the services of an Executive Engineer in every Collectorate, controlled by a Superintending Engineer in each of three Provinces, will be applied to improve the country; while the juniors, after short service and preliminary instruction in the corps of Sappers, will be variously employed under the executive officers, gaining day by day, from this training in the best of schools, experience to fit them for an independent charge.

174. Any division of Public Works into Civil and Military, seems unsuited to the circumstances of this service: the executive officers, unless similarly divided—which they cannot be, because the expanse over which a few men are to be

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scattered, divides them too far already—would have two masters giving them different orders; and if it be said that the Chief Engineer would be the principal person in each department, there would, in fact, be no real division at all.

175. The department, which in this Presidency exists specially for roads and tanks, was organized, A.D. 1835, in four Collectorates, for the purpose of improving the communications of the country, and to extend the benefits of irrigation, by constructing new tanks, and preserving those of former Governments from decay.

176. Prior to its organization there had been no special provision for civil works, except at the Presidency, in the Southern Mahratta Country and Khandeish; all engineering operations elsewhere being conducted by the executive officers at military stations, and by the corps of Pioneers.

177. The new scheme was based upon the principle of severing the civil from the military branches of engineering. It was believed that a distinct department for the former would hasten improvement of the country, and that its constitution, as a separate body, under a superintendent, controlled entirely by the Revenue Commissioner, would remedy a want of good management, which was then felt to prevail in all departments of the Public Works.

178. A fund, affording at first about a lac of rupees annually, was placed at the disposal of the Revenue Commissioner, whence he was to sanction such sums as might appear to him expedient for the objects contemplated, reporting the same to Government.

179. If the department had answered expectations, another superintendent was to have been appointed for Guzerat and Khandeish: however, its earlier operations were unfortunate. The superintendency extended over four large Collectorates, a range through which the first incumbent failed to make practicable his duty of inspecting the sites of projected works prior to submitting for sanction his assistants' plans; and these assistants being generally young officers, appointed regardlessly of professional qualifications, were trusted to originate plans, and execute important works.

180. The sequel proved that, while the cost of superintendence had been excessive for a quantity of work altogether inconsiderable, the money sunk in projecting works never likely to be sanctioned, and in undertakings which turned out abortive, far exceeded the proportion spent on works of real utility. One principal object of the department, namely, improvements of irrigation, was almost entirely missed. The most signal failures were in tanks.

181. In reviewing the annual Report of this department for 1841, Government resolved that the whole attention of the establishment should thenceforward be directed to making roads.

182. Its duties now comprise the charge of tanks and bunds in the Poona and Tanna Collectorates, and of all works on the Deccan and Concan lines of communication. It takes care also of such other public buildings and works as the department can look after at those Civil and Military stations within the circuit which are without an Executive Engineer. Ahmednuggur and Rutnagherry are also nominally within its range, but in effect have been almost excluded from its operations by distance, and the want of assistants.

183. In 1844, the performance of the department still continuing unsatisfactory, Government began to consider what other measures should be taken to carry out the objects for which it had been created. Its control was in the same year transferred to the Military Board, who shortly afterwards gave their opinion that the management of roads and tanks should be made over to Provincial Engineers, with assistants specially allotted for such duties.

184. Notwithstanding the strong reasons then adduced, Government resolved to suspend its abolition. The department was thought capable of becoming more efficient under improved arrangements and better experience, and there was apprehension lest its sudden cessation should throw works then in progress upon the corps

corps of Engineers, which the latter, from its numerical deficiency, and the pressure of actual duties, could not undertake.

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185. These expectations have, to a certain extent, been realized: so far as our inquiry enables us to judge, there have been no failures or errors of late; indeed, we believe the management almost from the first to have been zealous and able; but upon the main question on which the continuance or abolition of the department has been suspended, namely, the policy of separating Military Works from Civil, and maintaining a superintendent, with eight assistants, for the roads of two Collectorates, and a few minor works, we have no doubt at all; and since Government now views those improvements for which the Road Department has been a tentative and partial agency, or the settled object to which, in peaceful times, the main energies of the corps should be addressed, we think that the double machinery of superintendence should henceforth cease.

186. The extension of territory which has taken place since 1848, and other changes, together with the necessity, in our opinion, of allotting the entire services of one officer to the camp and city of Poona, require some departures from the original scheme. The distribution to suit present circumstances might, we think, be arranged as follows:—

187. PROPOSED RE-DISTRIBUTION OF ENGINEERS.

No.	OFFICERS.	SALARY.
	<i>Northern Division:</i>	<i>Rs.</i>
1	Superintending Engineer - - - - -	700
2	Civil Engineer, Surat Branch, Gogo - - - - -	450
3	Ditto - - Almedabad, Kaira, and Territory North of Cambay	450
4	Assistant to ditto - - - - -	—
	<i>Central Division:</i>	
5	Superintending Engineer - - - - -	700
6	Civil Engineer, Khandeish Collectorate - - - - -	450
7	First Assistant to ditto - - - - -	200
8	Second ditto - - - - -	200
9	Civil Engineer, Nuggur Collectorate - - - - -	450
10	Ditto - - Nassick, Sub-Collectorate - - - - -	450
11	Executive Engineer, Poona Camp as now - - - - -	—
12	Civil Engineer, Poona Collectorate - - - - -	450
13	Assistant to ditto - - - - -	200
14	Civil Engineer, Tanna Collectorate - - - - -	450
15	Ditto - - Rutnagherry Collectorate - - - - -	450
	<i>Southern Division:</i>	
16	Superintending Engineer - - - - -	700
17	Civil Engineer, Satara - - - - -	450
18	Ditto - - Kolapoor - - - - -	450
19	Ditto - - Sholapoor - - - - -	450
20	Ditto - - Belgaum - - - - -	450
21	Ditto - - Dharwar - - - - -	450

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188. To ensure cheerful exertion, to make work in the country preferable to loitering in camp, and to leave no pretext for inactivity to the Executive Engineers, who ought to be constantly moving about their districts, and to be required by the Superintending Engineers to travel in the most expeditious way, we think that their travelling allowance, while actually afield, should be commensurate with their necessary expenses.

189. Accordingly in this respect we would depart from the scale originally proposed, in substituting for the fixed office tent allowance such a scale of remuneration for travelling as will cover the officers' actual expenses, including office carriage, without trenching upon their staff-pay. In making this suggestion, we would particularly bring to notice that the expense of travelling in this Presidency is considerably greater than in Bengal and Madras.

190. We agree with the Chief Engineer's Minute (29 August 1848), that to give efficiency to these changes, the several Superintending Engineers should pass at least six months of the year actually and *bona fide* in traversing their districts, and communicating personally with their subordinates, with the Collector and the Revenue Commissioner, so as to become thoroughly conversant with the wants and resources of the country; to visit works finished or progressing, and the sites of works contemplated; also to advance, in concert with the revenue authorities and the executive officer, new measures of improvement.

191. As regards executive officers, upon whom the devising of new projects will ordinarily devolve, the ability of the corps will, under the above arrangement, be distributed throughout the Presidency, in position of emolument more or less according to the efficiency displayed by each; and although there is not now, nor can be, without augmenting the corps, even one officer of adequate experience for every Collectorate, time, with additional numbers, will rectify this, and there will no longer be the present constitutional liability of important works falling to the youngest officers and to warrant officers, while men of greater experience are left comparatively idle.

192. The State has suffered so much from unprofessional officers being employed on Public Works, that, although extraneous assistance is for the moment indispensable, we see the strongest reason for deprecating a continued recourse to other branches of the service. In a country where so much is to be done, we would not, however, exclude from employment any officer of peculiar turn and talent for civil engineering, merely on the score of his not belonging to the professional corps.

193. The arrangements proposed in 1849 were made rather to fall within the compass of former expenditure in the Public Work Department, than to fulfil the necessities of the country; but the recent extensions of this Presidency, its growing wants, and the Home Government's intention, declared in Parliament to enlarge their engineering operations, required provision for a much larger establishment than we, taking the scheme of 1849 for our basis, venture to propose as perfect.

194. Although, by redistributing the corps, more and better work may be expected, we believe that the divisions of country under each executive officer will still be too large for perfect efficiency, and that when any great work, such as a line of road, or extensive bundhara, is required, it would be true economy to employ an officer specially upon it.

195. The scheme now proposed, excluding Sind, Aden, Rajpootana and the Presidency, requires three superintending and 18 executive officers; although unusually few are away on furlough, we find that, after deducting a commanding officer, an adjutant, and two second lieutenants, for the corps of Sappers, only 14 officers are now available to fill 21 situations; but if the average number of absentees, which we understand exceeds 10, be deducted, there would be available but 10, even including the junior second Lieutenant.

	Absent.	Available.
Colonels - -	2	-
Lieut.-col. - -	1	1
Captains - -	1	3
Lieutenants - -	1	9
2d Lieutenants - -	1	1
TOTAL - -	6	14

196. It

196. It is represented to us that many demands for professional reports cannot be met, and that many important projects are in abeyance for want of Engineer Officers to carry them out.

197. Beyond the fact that officers must be employed, whether qualified or not as linguists, and whether instructed or not in practical engineering for this country, there is in the present exigency no power of rejecting from employ an officer who has degenerated into indolent habits, or who cares not to keep pace with the times; all are alike absorbed in the general demand, and engaged, fit or unfit, upon an extent of work that demands the maximum of exertion which the ablest and best can put forth.

198. We have reason to believe that the Government of India have made repeated appeals to the Honourable Court of Directors to increase their Engineer corps at all the Presidencies; but although the Bengal corps has been doubled since 1827, no addition beyond four subalterns has been made to that of Bombay, notwithstanding the great increase of territory, and the far greater attention that is now paid to its improvement.

199. Although irrigation has been extended in Dharwar and Khandoish, we are told that the number of tanks in the former district might be doubled with advantage; while in the rest of the Presidency, including Guzerat, our most fertile Province, nothing has been done; and although the facilities for road-making exceed those of any country we have heard of, insomuch that a cart-road without ghauts and bridges can be made all over the Deccan and Southern Mahratta country at a minimum of Rs. 500 to Rs. 1,000 per mile, vast areas of territory, whose intersection by highways would be vital to all interests, lie to this day as impervious as we found them at the conquest.

SECTION XIV.

Control and Audit.

200. By the regulations of this Presidency, the Superintending Engineer'ships are held by the senior officers next below the Chief Engineer. These officers are the channel of communication between the executive officers and the Military Board; their duties are those of check and control, for the due exercise of which they are responsible to the Military Board; they are answerable that every document transmitted by them is correct and complete, and they are to record their opinion on every design. They are specially responsible for the correctness of rates; they make an annual tour through their Province to inspect the Public Works of all kinds, to scrutinize the operations of the executive officers, and to make an inspection report to the Military Board.

With respect to the chief superintending authorities alluded to in para. 62 of the Honourable Court's despatch, we have perceived no reason at all for recommending change.

201. The Public Works of this Presidency are controlled in a department of the Military Board entirely distinct from all others, with its own secretary; and the stipendiary member, who would otherwise have insufficient occupation, aids the professional member of the Board.

202. Even were it necessary, for purposes of assimilation at the three Presidencies, to have a separate controlling authority over Public Works, we still think that no alteration would be requisite beyond a change of name.

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203. We have been led to this opinion from having observed the promptness with which the Board disposes of the current business of the department, together with the audit of its accounts. The Board's efficiency for controlling Public Works must depend greatly on the qualifications of the Secretary in this department, who ought always to be an Engineer.

(signed) *G. Moore*, Colonel.
J. D. Inverarity, C. S.
H. B. Turner, Captain Engineers.
T. Gaisford, Captain Artillery,
 Member and Secretary.

(True copy.)

(signed) *P. M. Melvill*, Lieut.-colonel,
 Secretary to Government.

(True copy.)

(signed) *R. H. Birch*, Lieut.-colonel,
 Officiating Secretary to the Government of India
 in the Military Department.

Poona, 1 September 1851.

A P P E N D I X.

Appendix (B.)

Appendix (E.)

TERRITORIAL DEPARTMENT.—*Khandeish* Division of PUBLIC WORKS.

ESTIMATE, No. 1, of 1849-50.

ESTIMATE, framed by Lieutenant *H. W. E. Bell*, Civil Engineer in *Khandeish*, of the probable Expense of constructing a new Bundarah across the Mushar Nuddee, for the Village of Wuzzar, in the Baglan Talooka, agreeably to the Collector's Memorandum, No. 1,351, dated 5th September 1848, and Accompaniment.

Civil Engineer's Office, Mallegaum, 2 May 1849.

GENERAL DESCRIPTION.

Excavators' Work.—The bed and banks of the Nullah being rock, will have to be properly levelled, to form a secure footing for the Bundarah walls.

Masons' Work.—All the walls to be built of coursed rubble masonry and chunam, hammer-dressed one side, and to be of the respective widths and heights figured on Plan and Sections.

Stonecutters' Work.—That portion of the Bundarah wall from G to C and Waste Weir Ghaut to be coped with 3d sort cut stone; the grooves for the sluice-gates and soles of scouring-slucies are also to be of 3d sort cut stone.

Carpenters' Work.—The sluice-gates are to be made of teak timber, three inches thick, and one of such a height and width as to properly fit the two scouring sluices in the Bundarah wall and the arched openings into the water-courses.

[Sanctioned by Government in Mr. Secretary Goldsmid's letter to Mr. Revenue Commissioner (S. D.) Shaw, No. 6,814, dated 13 November 1849, per Military Board's memorandum, No. 7,925, of 17th, and Superintending Engineer's (S. P.) endorsement, No. 2,734, of 19th idem, for Rs. 1,047.]

MEASUREMENTS.

DESCRIPTION.	Length.	Breadth.	High or Depth.	Number.	QUANTITIES.
	C. n.	C. ft. in.	C. ft. in.		C. ft. in.
<i>Excavators' Work:</i>			m.		
Bundarah, 1st Portion -	129 0	4 0	0 6	-	258 0
Ditto - 2d ditto -	140 0	3 0	0 6	-	210 0
Ditto - 3d ditto -	177 0	2 6	0 6	-	221 3
Curtain Wall on right Bank.	40 0	3 0	0 9	-	90 0
Curtain Wall on left Bank.	30 0	3 0	1 0	-	157 6
					936 9
<i>Masonry:</i>					--Cubic feet levelling found in rock.
Bundarah, 1st Portion:					
No. 1 Piece -	3 0	4 0	1 0	-	18 0
No. 2 ditto -	10 0	4 0	1 0	-	40 0
No. 3 ditto -	6 0	4 0	2 0	-	48 0
No. 4 ditto -	4 0	4 0	2 9	-	44 0
No. 5 ditto -	10 0	4 0	4 0	-	160 0
No. 6 ditto -	20 0	4 0	3 6	-	280 0
No. 7 ditto -	30 0	4 0	3 3	-	300 0
No. 8 ditto -	20 0	4 0	4 0	-	320 0
No. 9 ditto -	5 0	4 0	3 0	-	60 0
No. 10 ditto -	5 0	4 0	2 3	-	45 0
No. 11 ditto -	5 0	4 0	1 9	-	35 0
No. 12 ditto -	11 0	4 0	1 3	-	55 0

N.B.—Exclusive of thickness of curtain wall.

--Cubic feet levelling found in rock.

N.B.—Exclusive of coping.

(continued)

Appendix (B.)

MEASUREMENTS—continued.

DESCRIPTION.	Length.	Breadth.	Height or Depth.	Number.	QUANTITIES.
	<i>C. ft. in.</i>	<i>C. ft. in.</i>	<i>C. ft. in.</i>		<i>C. ft. in.</i>
<i>Masonry—continued.</i>					
Bandarah, 2d Portion:					
No. 1 Piece - -	10 0	3 0	1 9	-	52 6
No. 2 ditto - -	40 0	3 0	1 3	-	150 0
No. 3 ditto - -	10 0	3 0	2 0	-	60 0
No. 4 ditto - -	30 0	3 0	2 9	-	247 0
No. 5 ditto - -	35 0	3 0	1 0	-	420 0
No. 6 ditto - -	10 0	3 0	3 6	-	165 0
No. 7 ditto - -	5 0	3 0	2 6	-	37 0
Bandarah, 3d Portion:					
No. 1 Piece - -	7 0	2 6	4 0	-	70 0
No. 2 ditto - -	10 0	2 0	4 9	-	118 9
No. 3 ditto - -	10 0	2 6	5 6	-	137 6
No. 4 ditto - -	40 0	2 6	6 0	-	600 0
No. 5 ditto - -	70 0	2 6	5 0	-	875 0
No. 6 ditto - -	40 0	2 6	5 9	-	575 0
Curtain Wall, right Bank:					
No. 1 Piece - -	10 0	3 0	6 6	-	195 0
No. 2 ditto - -	5 0	3 0	5 6	-	82 0
No. 3 ditto - -	5 0	2 0	4 0	-	60 0
No. 4 ditto - -	5 0	3 0	3 0	-	45 0
No. 5 ditto - -	10 0	3 0	2 0	-	60 0
No. 6 ditto - -	5 0	3 0	1 6	-	22 6
Curtain Wall, left Bank:					
No. 1 Piece - -	5 0	3 0	3 3	-	48 9
No. 2 ditto - -	14 0	3 0	5 9	-	141 6
No. 3 ditto - -	2 0	3 0	4 3	-	25 6
No. 4 ditto - -	2 0	3 0	3 0	-	22 6
No. 5 ditto - -	7 0	3 0	3 0	-	63 0
					5,810 0
Deduct.—					
Stices in Bandarah - -	3 0	4 0	3 6	2	84 0
Arch openings in Curtain Walls.	3 0	3 0	2 0	2	45 0
Waste Weir - - - -	30 0	2 0	1 6	-	112 6
Scouring Stance - - -	3 0	2 0	2 6	-	18 9
					230 3
					5,579 9
<p>N.B.—This part has No. 3 sort cut stone coping.</p> <p>N.B.—Including 6 of sole cut stone.</p> <p>N.B.—Including 6 of cut stone sole. Ditto - ditto.</p> <p>(- Cubic feet covered include masonry. Financed dressed one side.</p>					

MEASUREMENTS—continued.

Appendix (B.)

DESCRIPTION.	Length.			Number.	QUANTITIES.	
	S. ft. in.	Breadth. S. ft. in.	Height or Depth. S. ft. in.		S. ft. in.	
<i>Stone-cutters' Work:</i>						
Coping to Bandara, 1st Portion, and Sole of Sluices.	129 0	4 6	- -	-	580 6	
Grooves - - -	3 0	0 9	- -	4	9 0	
Coping to 2d Portion of Bandara.	140 0	3 6	- -	-	490 0	
Waste Weir and Sole of Sluices	30 0	3 0	- -	-	90 0	
Grooves - - -	4 0	0 9	- -	-	3 0	
Grooves to openings to Curtain.	2 6	0 9	- -	4	7 6	
Ditto - - -	4 0	2 3	- -	4	36 0	
					1,216 0	Sup. at rough cut-stone.
<i>Carpenters' Work:</i>						
Sluice-gate - - -	C. ft. in. 3 6	C. ft. in. 3 9	C. ft. in. 0 3	2	C. ft. in. 6 6	
Gate to openings in Curtain.	3 6	5 9	0 3	2	10 0	
					16 6	C. ft. teaktimber.

ABSTRACT.

		Rs. a. p.	Rs. a. p.
937	Cubic feet levelling Rock for foundation, at Rs. 3 per 104 cubic feet.	28 1 9	
5,550	Cubic feet coursed rubble Masonry, hammer-dressed one side, at Rs. 12. 4a. per 100 cubic feet.	679 14 -	
1,216	Square feet 3d sort cut-stone coping, at Rs. 18 per 100.	218 14 1	
16½	Cubic feet teak timber Sluice-gates, at R. 1. 8a. per cubic foot.	24 12 -	951 9 10
	Contingencies, at 5 per cent. - - -	47 9 3½	
	Extra Establishment, at 5 per cent. - - -	47 9 3½	
			95 2 7
	TOTAL Company's Rupees, One thousand and forty-seven		1,047 - -

(signed) *H. Barthorn*, Captain,
Acting Superintending Engineer, S. D.
H. W. B. Bell, Lieutenant,
Civil Engineer, Candcish.
A. Elphinstone, Collector.

Figured Abstract of Daily Expenditure of Labour and Materials for the Plunge Bath at *Ahmednuggur*—continued.

Number of Feet.		TEAKWOOD POSTS.														Sawyers' Wages, Guz.	TOTAL EXPENSE of LABOUR.	TOTAL of MATERIALS.		TOTAL.			
		Carpenters.						Bricklayers.		Biggaries.		Women.		Boys.				Bullocks, Pair.			4 Rs. Candy.	Choonam, 2 1/2 S. t. Mounds.	
Date.		8 a.	7 a. 1 p.	7 a.	6 a. 6 p.	6 a.	5 a.	5 a.	4 a.	2 a.	1 a. 6 p.	1 a. 9 p.	1 a. 6 p.	1 a.	6 a.	TOTAL.	4 1/2 Rs. 100.	Rs. a. p.	Rs. a. p.	Rs. a. p.			
8	7	-	-	1	-	-	-	-	-	-	-	1	-	-	-	2	-	- 8 9	-	- 8 9			
	8	-	-	1	-	-	-	-	-	-	-	1	-	-	-	2	-	- 8 9	-	- 8 9			
	9	-	-	1	-	-	-	-	-	-	-	1	-	-	-	2	-	- 8 9	-	- 8 9			
	11	-	1	-	-	-	-	-	-	-	-	1	-	-	-	2	-	- 8 10	-	- 8 10			
	24	1 1/2	1	-	-	-	2	-	1	5	-	1	-	1	1	12 1/2	-	2 12 7	-	2 12 7			
	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	1	1		
	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	4	4	-	4		
		1 1/2	2	3	-	-	1	2	-	5	-	5	-	1	1	20 1/2	100	9	3	8	5	1	10

Running Feet TEAKWOOD POST PLATE.

48	12	-	1	1	-	-	-	-	-	-	-	1	1	-	-	4	-	1	1	4	-	-	1	1	4
	14	-	1	1	-	-	-	-	-	-	-	1	1	-	-	4	-	1	1	4	-	-	1	1	4
	15	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	7	1	-	-	-	-	7
	18	-	1	1	-	-	-	-	-	-	-	1	1	-	-	4	-	1	1	4	-	-	1	1	4
	25	1 1/2	1	-	-	-	1	2	-	7	-	2	1	-	-	14 1/2	-	2	12	1	-	-	2	12	1
	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	4	4	-	-	-	4	4	-
		1 1/2	3	3	-	-	1	2	-	7	-	5	4	-	-	27 1/2	100	10	11	2	-	-	10	11	2

Cubic Feet TEAKWOOD DOORS, to be shut up with Stone and Lime Masonry.

Number of C. ft.		November 1880.														TOTAL EXPENSE of LABOUR.	TOTAL EXPENSE of MATERIALS.		TOTAL.			
		Carpenters.						Bricklayers.		Women.		Boys.		Bullocks, Pair.			3 1/2 Rs. Candy.	2 1/2 Rs. 100.				
Date.		7 a.	6 a.	5 a.	4 a.	2 a.	1 a. 6 p.	1 a. 9 p.	1 a. 6 p.	1 a.	6 a.	TOTAL.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.						
50	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	4 1/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	10 1/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	1	1	1	1	1	4 1/2	6	10	10	1	10 1/2	3	9	-	6	10	1	12	-	5	6	-

Figured Abstract of Daily Expenditure of Labour and Materials, &c.—continued.

Appendix B.

TERRITORIAL DEPARTMENT.—*Khandeish* Division of PUBLIC WORKS.

BILL, No. 29, of 1850-51.

The Honourable Company - - - - - *Dr.*

To expense incurred by Lieutenant *H. W. B. Bell*, Civil Engineer in *Candeish*, in constructing a new *Bundarrah* across the *Musbar* River, at the village of *Wuzzar*, in the *Baghan* Talooka of the *Khandeish* Collectorate, agreeably to Estimate No. 1 of 1849-50, dated 2 May 1849, sanctioned by Government in Mr. Secretary *Goldsmid's* letter, No. 6,814, dated 13th, per Military Board Memorandum, No. 7,923, of 17th, and Superintending Engineer's endorsement, No. 2,734, of 19th November 1849.—*Vide* also accompanying Completion Certificate.

Civil Engineer's Office, *Mallegaum*, 29 June 1850.

	<i>Rs. a. p.</i>
Amount of Labour expended on the above Works, per Office Books - -	593 5 4
Ditto of Materials - - ditto - - - - -	435 3 4
GRAND TOTAL Company's Rupees Expenditure - - -	1,028 8 8

ABSTRACT OF RATES.

	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
957 cubic feet Rock levelled for } foundation - - - } - 3 13 8 $\frac{330}{100}$ per 100 -		36 2 -	
6,612 cubic feet Walls, built of } coursed rubble masonry, } - 9 1 7 $\frac{5612}{100}$ ditto -		655 7 7	
1,216 square feet third sort cut- } stone work - - - } - 18 - 3 $\frac{650}{100}$ ditto -		219 1 8	
11½ cubic feet teak timber in } Sluice Gates - - - } - 13 - $\frac{13}{100}$ per foot -		9 6 -	920 1 3
Contingencies - - - 4 3 5 $\frac{20105}{100000}$ per cent. - - -			38 12 5
Extra Establishment - 7 9 2 $\frac{2630}{100000}$ per cent. - - -			69 11 -
GRAND TOTAL Cost for constructing a new Bar at Wuzzar - <i>Rs.</i>			1,028 8 8
Estimated Cost - - - - - <i>Rs.</i>			1,047 - -
Amount received - - - - - <i>Rs.</i>			1,047 - -

I do hereby declare, upon my honour, that the sums contained in this bill have actually been expended by me for the purposes set forth.

(signed) *H. W. B. Bell*,

To the Secretary Military Board, Bombay.

Lieutenant, Civil Engineer.

Appendix (B.)

Figured Abstract of Daily Expenditure of Labour and Materials, &c.—*continued.*TERRITORIAL DEPARTMENT.—*Khandeish* Division of PUBLIC WORKS.

CERTIFICATE of Completion by *Alexander Elphinstone, Esq.*, Collector of Candeish, upon the construction of a new Bhundarrah across the Musher River, at the village of Wuzzur, in the Buglan Talooka of the Candeish Collectorate, agreeably to Estimate, No. 1 of 1849-50, dated 2 May 1849, sanctioned by Government in Mr. Secretary Goldsmid's letter, No. 6,811, dated 13th, per Military Board Memorandum, No. 7,925, of 17th, and Superintending Engineer's endorsement, No. 2,734, of 19th November 1849.

Civil Engineer's Office, Candeish, Mallegaum, 1 June 1850.

Number.	NAME OF WORK.	REMARKS BY THE CIVIL ENGINEERS.	REMARKS BY THE COLLECTOR.																
1	Bundharah	<p>-- The bed and banks of the nullah, being rock, have been properly levelled, to form a secure footing for the bundhara walls, which have been built of coursed rubble masonry, and chunam, hammer-dressed one side, and the bundharah proper and waste weir have been coped with third-sort cut-stone. The scouring sluices have third-sort cut-stone soles and grooves, fitted with three teak planks. The two arched openings at the mouth of the watercourse on each bank of the river have also cut-stone grooves and teak planks fitted in similar to the scouring sluices. The whole of the above works have been completed satisfactorily, in accordance with the sanctioned plan and estimate; but it was found necessary to increase the depth of the foundation of that portion of the bundhara which rests on the right bank of the river.</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: right;"><i>Rs.</i></td> <td style="text-align: right;"><i>a.</i></td> <td style="text-align: right;"><i>p.</i></td> </tr> <tr> <td>Estimated cost -</td> <td style="text-align: right;">1,047</td> <td style="text-align: right;">-</td> <td style="text-align: right;">-</td> </tr> <tr> <td>Executed -</td> <td style="text-align: right;">1,028</td> <td style="text-align: right;">8</td> <td style="text-align: right;">8</td> </tr> <tr> <td>Saving -</td> <td style="text-align: right;"><i>Rs.</i> 18</td> <td style="text-align: right;">7</td> <td style="text-align: right;">4</td> </tr> </table>		<i>Rs.</i>	<i>a.</i>	<i>p.</i>	Estimated cost -	1,047	-	-	Executed -	1,028	8	8	Saving -	<i>Rs.</i> 18	7	4	<p>(signed) <i>A. Elphinstone,</i> Collector.</p>
	<i>Rs.</i>	<i>a.</i>	<i>p.</i>																
Estimated cost -	1,047	-	-																
Executed -	1,028	8	8																
Saving -	<i>Rs.</i> 18	7	4																

(signed) *H. W. B. Bell,*
Lieutenant, Civil Engineer.

(True copies.)
(signed) *P. M. Melvill,* Lieut.-col.,
Secy. to Govt.

(True copies.)
(signed) *R. J. H. Birch,* Lieut. Colonel,
Offg. Secy. to the Govt. of India, Military Department.

Appendix (C.)

No. 338, of 1851.

From *W. Chapman*, Esq., Superintending Engineer, (to Captain *Graham*, Superintendent of Road, *Poonah*, dated the 12th of July 1851.

Sir,

ACCORDING to instructions received from you, I have the honour to forward herewith the Accounts, for the month of February last, for the Undwell Bridge. I have selected this month as the one embracing the most numerous heads of work, and as being well adapted to exemplify the extended use of the Stock sheet, to which I would beg particularly to direct your attention. The documents received in Maratha I have had translated, in order that they may be clearly understood.

2. In again revising and considering the modified system of accounts which has been introduced in this office, it appears to me to be so simple, at the same time ensuring all the accuracy and minuteness that can possibly be required, that I beg to submit an outline of the documents and returns connected with it, which, in case of their meeting your approval, I would beg to suggest should be laid before the Public Work Commission for their consideration.

3. I would, however, in the first instance, premise, that the "daily payments" and "daily measurements" are not, in my opinion, applicable to works of an extensive nature, such as those with which this department has been of late occupied: it may doubtless be carried out where works are in the immediate neighbourhood of the Head-quarter Office, and when the measurements are of so simple a nature that it may be ascertained at the end of each day that a proper quantity of work has been done, and that no risk is run in at once making payments accordingly; but in works of a complicated nature, and situated in remote parts of the district, I am persuaded, from an experience of seven years' active executive duty, that the system, whatever might in appearance be done, could not fairly and really be carried out without having recourse to shroffs as paymasters, and entailing so considerable an expense in superintendence as would counterbalance any advantage supposed to be derived from it.

4. The great and only advantage of daily payments, which alone render daily measurements necessary, appears to be the doing away with the supposed hardship endured by labourers in being kept a month and upwards in arrears of pay. This advantage, when considered in all its bearings, is rather imaginary than real. Were all the labourers employed upon any work inhabitants of its immediate neighbourhood, the daily payment would enable such as were so inclined, to work one day and idle two, a waywardness in which the generality of labourers are most prone to indulge, to the great hindrance of the work on which they may be employed; but as this is by no means the case, and the greater number by far of the workpeople engaged in extensive works are collected by mucedums, in whom they have confidence, and with whom they make agreements, from distances varying from 100 to 200 miles, and they assemble with their whole families, not with the view of eating from hand to mouth, but of making money during the months of the working season to support themselves and their families during the remainder of the year, I much doubt whether the daily payment system would be even acceptable to them, and, consequently, to the bulk of native labourers.

5. The arrangements now made to obviate the difficulty of procuring food or credit, on their first arriving empty handed at the commencement of the working season, consists of making an advance of a sum of money to the mucedum (if a known man), for which he is held responsible, sufficient to give, say Rs. 100 to each family. This provides for their immediate wants, which are further provided for, after they have worked some days, and have, consequently, money due, by an order to the Government banian to supply the party with grain in proportion to the pay to be received. The banian himself is protected from imposition by being allowed, in any doubtful case, to inquire of the person in charge of the work as to the amount of pay due to any labourer employed on it; and in consideration of the permission to open a shop in the lines, the large and regular custom secured him, the banian is always willing to allow his prices being revised, and kept at or below the nearest bazaar rates; so that, if a proper supervision is exercised, the best interests of the workpeople are by this means also secured.

6. Having these advantages afforded them under the monthly system, and being thus placed above want, the question only remains whether the bulk of the labourers, with

Appendix (C.)

reference to saving for their future subsistence, would prefer receiving their payments in daily dribblets of copper coins, or at the end of the month in silver. Some doubtless would be found, especially those of the class above alluded to (whose loss could, however, be borne), who would prefer what they would consider present advantage; but any one knowing his inherent dislike to "breaking a rupee," would not scruple to claim for the provident man the advantage of monthly payment.

7. A very serious objection to general daily payments, and one which affects Government more particularly, is, that it in many cases virtually deprives the executive officer of all due control in money payments, and transfers it into the hands of his subordinates. This statement, however improbable it may appear at first sight, is not difficult of proof.

Suppose, for instance, a work in progress at a distance from head quarters, with an expenditure at the rate (a common occurrence) of Rs. 2,000 monthly: at its commencement the executive officer lays out the work, explains all that has to be done, makes arrangements for a supply of money, which must of necessity be entirely entrusted to the subordinate, and leaves to attend to other calls, and to do similar work elsewhere. At the end of, say 15 days, he returns to inspect the work, and, after having learnt the expenditure, has every reason to be greatly dissatisfied with its progress. He eventually measures portions of the work himself, finds that idleness has been the order of the day, and that the rates, consequently, exceed the estimate. In answer to his questions as to why a proper quantity of work has not been enforced, the subordinate's reply is, "Sir, I trusted to the maistrees' and charkoons' measurements being correct; it is impossible that I can myself measure daily every part of so extensive a work; I can fine but to a small amount, and have still orders to pay daily, and this, in fact, takes up all my time, which I might otherwise employ in assuring myself, without recording nice dimensions, that a fair average of work had been performed."

A statement of this kind, the proof afforded by his own knowledge, the officer cannot gainsay; nevertheless, to make a fresh trial, the subordinate is admonished, the maistrees and carcoons fined, the muccadums are reduced, but the money is paid, and not to be recovered. The estimate is exceeded, and the executive officer is involved in an excess, and its many troubles, which no foresight or arrangement on his part could have prevented.

The only means of avoiding such a difficulty would be to leave to the subordinate entire discretion in fining and discharging, and with that, in effect, the entire control of money payments, a most dangerous alternative.

8. In the monthly system, on the other hand, all money allowed for the use of the work, is for materials mostly, and is paid under the name of an advance, which remains, in every case, to be accounted for by the subordinate, when the monthly report of the works is forwarded. The Distribution Report and Rate-table (to be afterwards described) then enable the executive officer to detect any overcharges or excessive rates, and at once to make such arrangements for reducing the payments as circumstances may call for.

9. The monthly payment system has another advantage over daily payments, the value of which the executive officer can fully appreciate, and that is, that by its means an inducement can be held out to the workpeople calculated to secure constant attendance, which is, the payments on Sundays being made only to those who have worked the six days of the week.

10. I have entered thus fully into the respective advantages of daily and monthly payments, the former of which I understand as embracing daily measurements, with a view to strongly recommending that a minutely detailed monthly system "should be again adopted, in the place of a nominal daily one, which I am convinced, if minutely scrutinized in its working, would not bear out its supposed character."

11. Daily payments have their peculiar difficulties, and have not, as I have endeavoured to show above, the great advantages generally assigned to them.

12. Daily measurements, as a check to daily payments, even I have in practice no confidence in; and, with reference to their fallacy, I may here mention a practical case which occurred during the last season, when I was in immediate charge of the Undwell Bridge. I had the masons' work measured every evening before them, and generally in my own presence; the number of cubic feet per man was 18 to 20; I was dissatisfied, and in many cases fined. From my own calculation at the end of the month, taking the work *en masse*, I found that on an average 30 feet had been done per man. A large number of masons was employed, it is true, and the marks were difficult to preserve when the work was proceeding rapidly. But if such a result as this is obtained, certainly under more than ordinary care, and in tolerably plain work, what may not be expected from indifference, complication and hurry?

13. I will now proceed to explain what returns and documents I think it necessary should be kept for every district work, from its commencement to its last stage, which is that of making out

out the bill for sanction, explaining the use of each in order, and not of course touching upon the general money accounts of the office, which must but with few exceptions be kept as at present. It will be observed that the figured Abstract, in so far as its only troublesome portion is concerned, has been entirely done away with, by the extended use of the Stock sheet.

The report of the Undwell Bridge for February being drawn up from actual work done, will serve practically to illustrate the whole. An European subordinate is supposed to be employed.

The monthly documents to be furnished to the Executive Office in English, are for any work three, being all that is required to enable the officer to check the rates, and make the payment of work. They are—

1. The monthly Distribution Report of labour and materials, with rates of work performed.
 2. Monthly Stock Balance-sheet.
 3. Bills of payment of labour and materials, with vouchers for materials and stores' bills. Returns in Marratha, or the language of the district.
 4. (Not sent). A general muster-roll, with a separate muster-roll, for store bills.
 5. Receipts and issues of materials and stores to the general works, showing the balance both in money and kind.
- Books to be kept in the Head-quarter Office.
6. (Not sent). Abstract of monthly totals of labour and materials, and rates of work performed, arranged under the estimate heads.
 7. Office books, a check day-book of form, at present used for labour.
 8. Daily or figured abstract of each description of labour.

Uses of the above Returns.

1. Monthly Distribution Report.

In this document is shown the daily expenditure and distribution of labour, and the distribution of materials, and stores from stock, during the month on each portion of the work, arranged under the general and minor heads of the estimate. The number of labourers with the rates of each description of labour, are given in detail; but to save writing (to the European subordinate), the materials used are shown in one sum only, at the foot of the material column; and with regard to these, the Stock Balance-sheet affords every necessary detail.

A second total column is added at the bottom of the report, giving the amount expended "up to the end of the last month" on each item, so that the total expenditure on each different head may be at once compared with the estimate.

A Rate-table is also appended, and forms a very important part of this document, the "total" of which, by adding contingencies and establishment, is made to agree with the "total" of monthly expenditure shown in the report, and thus forms a check upon its accuracy. A certificate below, signed by the subordinate in charge, to the effect that he has himself made the measurements from which the above rates have been deduced, renders him personally responsible for their correctness.

N. B.—This return alone, if kept correctly, contains in itself all the information necessary for making the bill in its present form. I would beg to remark, that the form of the above document, which is almost identical with that received under the Military Board Circular, No. 5,932 of 1856, of the 6th of August, was originated in this office, and was in use in the Thul Ghant accounts four years ago.

2. The Stock Balance Sheet.

In the first portion of this return, which has reference more particularly to the money balance of stock on hand (for which the subordinate is responsible), and which is very useful for expeditious transfer, is first shown: the money balance of materials and stores according to the last month's Stock Balance-sheet; to this the materials and stores received during the month are added in detail.

In the second portion of the return, the materials and stores used during the month, with the prices affixed, as taken out of the stock of the previous month, are given, having all the different portions of the work upon which they have been used arranged under the heads of the materials themselves. The amount of the total issues deducted from the total of the receipt side gives at once the balance of stock in hand at the end of any month in money. And the addition of all the sums under any head of materials for the same portion of the work, gives the materials and stores used on it, both in kind and money, the amount of the latter agreeing with that entered in the material column under the same portion of work in the Distribution Report.

Appendix (C.)

I would beg particularly to draw your attention to the extensive use to which the Stock sheet has been applied by the introduction of what have above been denominated "Store Bills." This application is most satisfactory as a means of systematising, and consequently, to a very great degree, simplifying the examination of the accounts, and bringing out clearly the subordinate rates of minor heads for work, such as, for example, in masonry, "grinding chunam," "collecting stone," preparing "cut-stone coigns," &c., which, with all other stores combined of labour and materials (though once issued), are again in a composite form ready for use, put into the stock, to be once more issued for use in the body of the work: "separate bills similar to vouchers," as being stores supplied, are furnished for these.—*Vide* "Store Bills," Nos. 40, 41, 42, 43, 45 and 46, at the foot of each of which the rate of the usually estimated quantity is taken out; and, according to these bills, the expenditure, measurement and rate are entered into the Stock sheet, under the proper head.—[*Vide* Entries.]

The rates of "chunam ground," "stone collected," &c., must, of necessity, vary in a slight degree each month; but no confusion can possibly arise, if the quantity first prepared or collected is always first used from the stock.

In addition to the advantage these bills offer in showing clearly the rates of the subordinate heads of the work, another improvement effected by their use is, that when made stores, "and issued as such," the exact quantity only of "chunam" or "stone" which has actually entered into the composition of the number of cubic feet of masonry reported to have been completed during the month, is charged to it, and consequently the rate of masonry must always be true for the month: Whereas, according to the old system, from a considerable quantity of materials being collected and charged to the head of masonry at once, a nearly constant rate was difficult of attainment.

The use of Store Bills is again very advantageously applied in the case of Government carts, when, instead of distributing it here and there at random, or guess-work, the whole of the expenditure relating to them, whether for cartmen, food, repairs or oil, are entered into one bill, entitled the "Cart Stone Bill;" the rate of each cart or pair of bullocks is correctly taken out at its foot, and by this rate they are eventually charged under the head of work, on which they may have been mustered. Donkeys, puchals, and all similarly combined labour, were at the Thul Ghaut treated in the same manner.

Nothing can, in my own opinion, tend more to the systematising of the accounts of the work than the full development of the Store Bills and Stock sheet, as above described, as by their means only the great principle, attention to which can alone make every thing clear, i. e. "that neither materials or labour of any description should be shown in the pukka monthly expenditure, which does not enter into and form part and parcel of some completed portion of the work," can be effectually carried out.

To keep up this principle more clearly, the separate Muster-roll is required for the labour employed in the Store Bills, and the expenditure on these, as well as that on all the materials, &c. borne on the Stock Balance-sheet, though paid for at the end of each month, under the name of an advance, is denominated "kutchra," in contradistinction to the "pukka" expenditure, which has actually entered into the body of the work.—[*Vide* Abstract at the end of Bill of Payment for Materials, &c.]

3. Bills of Payment for Labour and Materials.

These are of the same form as those of the old system, and answer the same purpose. In the Bill of Payment of Materials the whole expenditure is shown in the first total. In the abstract below, the "hulcha" expenditure, i. e. that on the "Store Bills," is then deducted, and the "pukka" expenditure, the items being shown in detail, and agreeing with the material column of the Distribution Report, then remains.

Maratha Returns.

4. One general nominal Muster-roll, with the addition to the ordinary columns of one showing the village of each labourer, which will always be found very useful, and even at times invaluable for identification, and the settlement of disputes regarding pay.

One separate Muster-roll for Store Bills.

b. Receipts and issue of Materials and Store to general Works.

This document is kept by the storekeeper, and forwarded with the accounts: it contains an entry, in a tabular form, of all materials and stores received during the month. The numbers the left-hand column contain agree with those of the suppliers' bills or vouchers to which they refer. The last two horizontal columns below give the balance of materials and stock and their prices, and from this the Stock Balance-sheet is prepared.

Books to be kept in the Head-quarter Office.

6. Abstract

6. Abstract of monthly totals of labour, &c. &c.

Appendix (C.)

As the monthly Distribution Reports contain all the information required to draw up a yearly or compilation bill, so nothing more need be kept in the Head-quarter Office than an abstract of these office books as checks.

7. Day-book of labour in the present form taken from the Muster-rolls.

8. Daily Abstract, or figured Abstract of each description of labour taken from the above. The daily total of this should agree with the additions of the daily totals of labour in the Distribution Report, and the check is complete.

A continual check on material is found in the Stock Balance-sheet itself.

Nassick, 12 July 1851. I have, &c.
(signed) *W. Chapman*, Superintending Engineer.

(True copy.)
(signed) *P. M. Melville*, Lieut.-col., Secy. to Government.

(True copy.)
(signed) *R. J. H. Birch*,
Offic. Secy. to the Govt. of India in the Military Depart.

No. 1.

DISTRIBUTION REPORT OF LABOUR AND MATERIALS,

DATE.	Excavating Foundation.				Filling in Foundation.			
	Cubic Feet.	EXPENDITURE.			Cubic Feet.	EXPENDITURE.		
		Labour.	Materials.	TOTAL.		Labour.	Materials.	TOTAL.
1851:		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
February - 1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
Total - -								
Expenditure to end of last month -	59,140	612 12 7	72 2 10	684 15 5	20,035	890 2 3	2,441 3 10	3,333 6 1
GRAND TOTAL	59,140	612 12 7	72 2 10	684 15 5	20,035	890 2 3	2,441 3 10	3,333 6 1

- - - - - No. 1.
 - - - - - with Rates of Work performed, *Undwell* Bridge, for February 1851.

Abutments.				Abutment Stones.				
Cubic Feet.	EXPENDITURE.			Nos.	Cubic Feet.	EXPENDITURE.		
	Labour.	Materials.	TOTAL.			Labour.	Materials.	TOTAL.
	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>			<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
8,594	354 8 5	814 10 7	1,169 3 -	75	75	- - -	85 14 -	85 14 -
8,894	354 8 5	814 10 7	1,169 3 -	75	75	- - -	85 14 -	85 14 -

No. 1.—DISTRIBUTION REPORT of Labour and Materials,

DATE.	Building Facing Walls above Abutment.																		EXPENDITURE.								
	Cubic Feet.	No. of Coigns.	Biggaries.			Boys.	Masons.					Stone Cutters.					Labour.	Materials.	TOTAL.								
			2 a.	1 a. 3 p.	1 a.		7 a.	6 a. 6 p.	6 a. 4 p.	6 a.	5 a.	4 a.	7 a.	6 a. 11 p.	6 a. 6 p.	6 a. 3 p.				6 a.	5 a.	4 a.					
																							Rs. a. p.	Rs. a. p.	Rs. a. p.		
1851:																			Rs. a. p.	Rs. a. p.	Rs. a. p.						
February - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
3	-	-	4	3	2	2	1	-	-	-	-	1	1	-	-	-	-	-	2 15 8	-	2 15 8						
4	-	-	2	1	1	1	-	-	-	1	-	1	2	1	-	-	-	-	2 13 7	-	2 13 7						
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
6	-	-	5	3	-	1	2	-	-	-	-	1	2	1	-	1	1	-	4 8 1	-	4 8 1						
7	-	-	5	6	4	2	-	-	2	-	3	1	1	-	-	-	-	-	4 11 5	-	4 11 5						
8	-	-	8	6	4	2	2	-	-	-	2	1	-	-	-	-	-	-	4 4 6	-	4 4 6						
9	-	-	-	-	-	2	-	-	4	1	1	1	2	1	-	1	-	-	4 15 4	-	4 15 4						
10	-	-	12	5	2	-	-	1	2	-	-	1	-	-	-	-	1	-	3 13 7	-	3 13 7						
11	-	-	5	2	-	-	-	2	-	-	-	2	-	-	-	-	-	-	2 7 2	-	2 7 2						
12	-	-	14	5	2	-	-	2	-	2	-	-	-	-	4	-	-	-	5 2 11	-	5 2 11						
13	-	-	14	7	2	2	-	-	2	4	-	4	1	-	4	-	-	-	9 1 11	-	9 1 11						
14	-	-	21	8	4	-	-	4	2	-	-	4	1	-	2	-	-	-	9 1 9	-	9 1 9						
15	-	-	16	10	4	-	-	-	4	2	-	-	-	1	3	2	-	-	7 4 9	-	7 4 9						
16	-	-	-	-	-	-	-	-	4	2	-	2	1	1	-	-	-	-	3 12 7	-	3 12 7						
17	-	-	15	9	1	-	-	1	1	2	1	3	-	-	3	1	-	-	7 - 7	-	7 - 7						
18	-	-	20	9	4	3	-	-	4	2	-	3	-	-	3	1	-	-	9 10 3	-	9 10 3						
19	-	-	7	4	2	-	2	-	-	-	-	3	-	-	1	-	-	-	3 13 3	-	3 13 3						
20	-	-	11	6	2	-	-	2	2	-	-	1	2	1	-	-	-	-	5 3 6	-	5 3 6						
21	-	-	18	5	2	1	-	4	-	1	-	4	-	-	-	-	-	-	6 13 7	-	6 13 7						
22	-	-	12	3	1	3	-	1	-	-	-	1	1	1	-	-	-	-	4 12 6	-	4 12 6						
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
24	-	-	6	4	1	-	-	2	-	-	-	-	-	-	-	5	-	-	2 8 8	-	2 8 8						
25	-	-	5	2	2	-	-	-	2	-	1	3	-	-	1	-	-	-	3 9 6	-	3 9 6						
26	-	-	11	7	2	2	1	1	-	-	-	-	1	1	-	-	-	-	4 8 4	-	4 8 4						
27	-	-	20	6	2	2	-	-	2	1	1	2	1	-	1	-	-	-	6 15 5	-	6 15 5						
28	-	-	16	9	2	1	-	-	3	2	-	1	-	-	2	-	-	-	6 3 3	252 3 9	258 7 -						
TOTAL	2,775	64	247	120	49	24	8	20	34	20	4	32	22	10	5	24	8	1	126	4	1	252	3	9	258	7	10
Expenditure to end of last Month	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
GRAND TOTAL	2,775	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	126	4	1	252	3	9	258	7	10

No. 1.—DISTRIBUTION REPORT of Labour and Materials, - - - - -

DATE.	Foundation for Wing Wall.				Filling in Foundation.				Cubic Feet.	Number of Colours.
	Cubic Feet.	EXPENDITURE.			Cubic Feet.	EXPENDITURE.				
		Labour.	Materials.	TOTAL.		Labour.	Materials.	TOTAL.		
1851:		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>		
February - 1	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-
7	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-
TOTAL -	-	-	-	-	-	-	-	-	8,651	20
Expenditure to end of last Month	33,039	180 10 1½	22 15 0	209 0 10½	11,167	244 3 0	1,008 12 1	1,252 15 10	942	10
GRAND TOTAL	33,039	180 10 1½	22 15 0	209 0 10½	11,167	244 3 0	1,008 12 1	1,252 15 10	7,593	30

with Rates of Work performed, *Undwell Bridge*, for February 1851—*continued*.

Building Wing Walls.

2 a.	Biggaria.		Masons.						Stoncutters.						EXPENDITURE.				
	1 a. 3 p.	1 a.	7 a.	6 a. 6 p.	6 a. 4 p.	6 a. 8 p.	5 a.	4 a.	7 a.	6 a. 11 p.	6 a. 8 p.	6 a. 9 p.	6 a.	5 a.	4 a.	5 a. 3 p.	Labour.	Materials.	TOTAL.
																	Rs. a. p.	Rs. a. p.	Rs. a. p.
9	6	4	3	-	-	-	-	-	1	-	1	-	1	-	-	-	4 6 -	-	4 6 -
18	10	2	2	-	1	-	3	-	1	-	1	-	-	-	-	-	6 3 4	-	6 3 4
6	6	4	2	1	-	-	-	-	2	1	-	-	-	-	-	-	3 15 8	-	3 15 8
10	6	4	3	-	-	-	-	-	2	-	-	-	-	-	-	-	4 2 6	-	4 2 6
8	4	2	2	1	-	-	-	-	3	2	1	-	1	-	-	-	5 10 10	-	5 10 10
47	20	6	4	-	7	7	-	-	3	-	-	-	-	-	1	-	16 8 4	-	16 8 4
46	13	4	3	-	7	4	-	-	1	1	1	1	3	-	-	-	15 6 3	-	15 6 3
35	15	3	-	-	-	-	5	1	1	2	1	1	-	-	-	-	8 6 4	-	8 6 4
-	-	-	-	-	4	3	2	-	2	-	-	1	2	-	-	-	5 5 7	-	5 5 7
11	3	1	-	2	-	-	2	-	2	1	-	-	-	-	-	-	4 6 1	-	4 6 1
10	5	2	2	-	-	2	2	-	2	-	1	2	-	-	-	-	6 - 4	-	6 - 4
15	7	5	3	2	-	-	-	-	3	4	-	-	-	-	-	-	7 14 5	-	7 14 5
6	2	1	-	-	2	-	-	-	3	-	-	-	-	-	-	-	3 1 2	-	3 1 2
6	2	1	-	2	-	-	-	-	3	-	-	-	-	1	-	-	3 6 6	-	3 6 6
25	11	4	4	2	6	-	-	1	2	4	-	-	-	-	-	-	12 - 5	-	12 - 5
-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	1 1 -	-	1 1 -
22	10	4	1	-	5	3	2	-	4	1	-	-	-	-	-	-	10 1 4	-	10 1 4
20	8	-	-	2	6	-	-	-	4	-	-	-	-	-	-	-	8 - 8	-	8 - 8
32	10	5	-	-	7	5	-	-	4	1	-	2	-	-	-	-	12 10 -	-	12 10 -
22	8	3	4	2	2	-	-	-	2	2	-	-	-	-	-	-	8 10 6	-	8 10 6
15	9	2	3	2	-	-	-	-	4	1	-	-	-	-	-	-	6 15 5	-	6 15 5
21	8	4	2	2	1	4	-	-	3	8	-	-	2	-	-	-	10 10 1	-	10 10 1
17	6	4	3	2	4	-	-	-	2	4	1	2	-	-	-	-	10 5 6	-	10 5 6
28	9	-	4	-	5	-	-	-	4	-	2	-	-	-	-	-	10 3 1	-	10 3 1
15	5	2	3	-	3	-	-	-	4	3	-	-	-	-	-	-	7 15 -	-	7 15 -
35	10	2	1	2	4	2	3	-	3	1	2	1	-	-	1	-	12 15 10	-	12 15 10
20	8	2	3	1 1/2	5	4	-	-	2	4	1	1	-	-	1	-	13 2 1	480 6 2	493 8 3
493	200	71	52	23 1/2	69	34 1/2	19	2	40	57	12	11	16	2	1	2	219 8 3	480 0 2	699 14 5
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19 1 6	83 4 4	102 5 10
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	238 9 9	563 10 6	802 4 3

with Rates of Work performed, *Undwell* Bridge, for February 1851—*continued*.

Walls.			Laying Arch Facing Stones.									
EXPENDITURE.			Number of Stones.	Biggals.	Women.	Boys.	Masons.	Stonecutters.	EXPENDITURE.			
Labour.	Materials.	TOTAL.		2 a.	1 a. 3 p.	1 a.	7 a.	7 a.	6 a. 6 p.	Labour.	Materials.	TOTAL.
<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>							<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
-	-	-	-	21	4	-	1	2	-	4 4 -	-	4 4 -
-	-	-	-	10	2	1	1	1	-	2 5 6	-	2 5 6
-	-	-	-	16	1	-	1	1	-	2 15 3	-	2 15 3
-	-	-	-	20	2	1	1	1	-	3 9 6	-	3 9 6
-	-	-	-	21	2	2	2	1	-	4 3 6	-	4 3 6
-	-	-	-	25	2	1	1	1	-	4 3 6	-	4 3 6
-	-	-	-	-	-	-	1	1	-	- 14 -	-	- 14 -
1 2 10	-	1 9 10	-	18	3	1	1	1	-	3 6 9	-	3 6 9
1 8 -	-	1 8 -	-	21	2	-	1	1	-	3 10 6	-	3 10 6
1 9 6	-	1 9 6	-	13	2	1	1	1	1	3 2 -	-	3 2 -
1 13 10	-	1 13 10	-	18	1	1	1	1	-	3 4 3	-	3 4 3
1 10 2	-	1 10 2	-	18	1	1	1	1	-	3 4 3	-	3 4 3
1 10 6	-	1 10 6	-	18	-	-	-	-	-	2 4 -	-	2 4 -
2 5 -	-	2 5 -	-	-	-	-	1	1	-	- 14 -	-	- 14 -
1 10 9	-	1 10 9	-	21	1	1	-	-	-	2 12 3	-	2 12 3
2 8 1	-	2 8 1	-	19	2	1	2	1	1	4 5 -	-	4 5 -
1 8 9	-	1 8 9	-	12	-	-	-	-	-	1 8 -	-	1 8 -
1 14 2	-	1 14 2	-	7	-	-	-	-	-	- 14 -	-	- 14 -
1 3 6	-	1 3 6	-	-	-	-	-	-	-	-	-	-
- 12 6	-	- 12 6	-	10	-	-	-	-	-	1 4 -	-	1 4 -
- 2 -	-	- 2 -	-	-	-	-	-	-	-	-	-	-
- 14 9	-	- 14 9	-	14	-	-	-	-	-	1 12 -	-	1 12 -
- 12 6	-	- 12 6	-	8	-	-	-	-	-	1 - -	46 11 1	47 11 1
- 14 6	-	- 14 6	-	-	-	-	-	-	-	-	-	-
1 - 6	-	1 - 6	-	-	-	-	-	-	-	-	-	-
1 1 6	1 13 9	2 15 3	-	-	-	-	-	-	-	-	-	-
26 10 4	1 13 9	28 8 1	42	310	25	11	16	15	2	55 12 3	46 11 1	102 7 4
26 10 4	1 13 9	28 8 1	42	310	25	11	16	15	2	55 12 3	46 11 1	102 7 4

with Rates of Work performed, *Undwell Bridge*, for February 1851—*continued*.

Loading Arch.												
Cubic Feet.	Biggaries.	Women.	Boys.	Masons.						EXPENDITURE.		
	2 a.	1 a. 3 p.	1 a.	7 a.	6 a. 6 p.	6 a. 4 p.	6 a.	5 a.	4 a.	Labour.	Material.	Total.
										Rs. a. p.	Rs. a. p.	Rs. a. p.
-	6	-	-	-	-	-	2	-	-	1 8 -	-	1 8 -
-	12	4	3	-	2	2	-	-	-	3 0 8	-	3 0 8
-	20	10	-	1	-	7	7	-	-	7 2 2	-	7 2 2
-	18	6	2	2	-	-	3½	-	-	5 - 6	-	5 - 6
-	6	3	1	4	-	-	-	-	1	3 - 9	-	3 - 9
-	-	-	-	1	-	2	-	-	1	1 7 8	-	1 7 8
-	15	5	1	2	2	1	-	-	-	4 6 7	-	4 6 7
-	9	3	1	-	-	-	-	1	1	1 15 9	-	1 15 9
-	4	1	1	-	-	-	1	-	-	1 - 3	-	1 - 3
-	9	3	1	-	-	-	-	3	-	2 5 9	-	2 5 9
-	12	4	2	-	-	4	-	1	-	3 13 4	-	3 13 4
-	11	5	2	-	-	2	4	2	-	4 12 11	-	4 12 11
-	16	8	1	-	-	2	4	2	-	5 9 8	-	5 9 8
-	22	10	1	1	1	-	5	2	-	6 15 -	-	6 15 -
-	11	-	1	-	-	-	3	1	-	2 14 -	143 13 5	146 11 5
2,038	171	62	17	11	5	15	20½	12	3	55 10 -	143 13	109 7 5
2,038	-	-	-	-	-	-	-	-	-	55 10 -	143 13 5	109 7 5

No. 1.—DISTRIBUTION REPORT of Labour and Materials,

DATE.	Spandril facing Wall.												Laying or							
	Cubic Feet.	Biggaries.			Masons.				Stonecutters.			EXPENDITURE.			Number of Bond Stones.	Biggaries				
		2 a.	1 a. 3 p.	1 a.	7 a.	6 a.	5 a.	4 a.	7 a.	6 a.	5 a.	Labour.	Materials.	Total.		2 a.	1 a. 3 p.	Boys.		
1851:																				
February - 1												Rs. a. p.	Rs. a. p.	Rs. a. p.						
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17		5	3		2			1		1	2	7	9		2	7	9			
18																				
19		2	1	1		1				1	1	2	3		1	2	3			
20		6	2	2	1	1		1	1	2		3	2	6		3	2	6		
21		2			1					2		1	7		1	7				
22		5	2					2		2		2	2	6		2	2	6		
23																				
24		4	2	1	2				2			2	7	6		2	7	6		
25		5	2	1				2		3		2	9	6		2	9	6		
26		8		1				2	1		4		3	7		3	7			
27		3	3	3	2				2	2		3	4	9		3	4	9		
28		9	3	2	1			1	1	2		3	6	3	43	13	2	47	13	5
TOTAL	630	48	18	11	9	2	7	3	6	13	1	25	9	-	43	13	2	69	6	2
Excluded upto last month - f																				
GRAND TOTAL	630											25	9	-	43	13	2	69	6	2

with Rates of Work performed, *Undwell* Bridge, for February 1851—*continued.*

fixing Bond Stones.				Artificers' Work at Centering.													
Masons.				EXPENDITURE.			Biggales.				Carpenters.				EXPENDITURE.		
Stone-cutters.				Labour.	Material.	Total.	3 a.	6 a. 3 p.	2 a.	6 a.	Labour.	Material.	Total.	Labour.	Material.	Total.	
6 a.	5 a.	6 a.	5 a.	Rs. a. p.	Rs. a. p.	Rs. a. p.					Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
-	-	-	-	-	-	-	1	1	-	-	- 6 -	-	- 6 -	-	-	- 6 -	
-	-	-	-	-	-	-	1	2	-	1	1 4 -	-	1 4 -	-	-	1 4 -	
-	-	-	-	-	-	-	2	3	1	1	1 14 -	-	1 14 -	-	-	1 14 -	
-	-	-	-	-	-	-	3	8	1	1	2 - -	-	2 - -	-	-	2 - -	
-	-	-	-	-	-	-	5	3	2	1	2 6 -	-	2 6 -	-	-	2 6 -	
-	-	-	-	-	-	-	4	3	2	1	2 4 -	-	2 4 -	-	-	2 4 -	
-	-	-	-	-	-	-	2	1	-	1	1 - -	-	1 - -	-	-	1 - -	
-	-	-	-	-	-	-	4	3	2	1	2 4 -	-	2 4 -	-	-	2 4 -	
-	-	-	-	-	-	-	3	3	1	1	2 - -	-	2 - -	-	-	2 - -	
-	-	-	-	-	-	-	3	2	1	1	1 10 -	-	1 10 -	-	-	1 10 -	
-	-	-	-	-	-	-	1	1	1	1	1 - -	-	1 - -	-	-	1 - -	
-	-	-	-	-	-	-	-	2	1	-	- 14 -	-	- 14 -	-	-	- 14 -	
-	-	-	-	-	-	-	2	1	-	-	- 10 -	-	- 10 -	-	-	- 10 -	
-	-	-	-	-	-	-	2	1	-	-	- 10 -	-	- 10 -	-	-	- 10 -	
-	-	-	-	-	-	-	-	1	-	-	- 6 -	-	- 6 -	-	-	- 6 -	
-	-	-	-	-	-	-	1	1	-	-	- 8 -	-	- 8 -	-	-	- 8 -	
-	-	-	-	-	-	-	1	2	-	-	- 14 -	-	- 14 -	-	-	- 14 -	
-	-	-	-	-	-	-	1	2	-	-	- 14 -	-	- 14 -	-	-	- 14 -	
-	-	-	-	-	-	-	1	2	-	-	- 14 -	-	- 14 -	-	-	- 14 -	
-	-	-	-	-	-	-	-	2	-	-	- 12 -	-	- 12 -	-	-	- 12 -	
-	-	-	-	-	-	-	2	1	-	-	- 10 -	-	- 10 -	-	-	- 10 -	
-	-	-	-	-	-	-	1	1	-	-	- 8 -	-	- 8 -	-	-	- 8 -	
1	1	-	2	4 11 9	-	4 11 9											
3	-	2	2	6 - -	-	6 - -											
-	-	2	2	4 12 5	67 9 5	72 5 10											
4	1	4	6	15 8 2	67 9 5	83 1 7	39	41	12	10	25 8 -	-	25 8 -	-	-	25 8 -	
-	-	-	-	15 8 2	67 9 5	83 1 7	39	41	12	10	25 9 -	-	25 8 -	-	-	25 8 -	

No. 1.—DISTRIBUTION REPORT of Labour and Materials, - - - - -

DATE.	Contingencies.										Establishment.					GRAND TOTAL.							
	Biggaries.	Smiths.	Hammer Men.	Bellows Boys.	Carpenters.	EXPENDITURE.			Corkoon.	Chowkedar.	Maistry.	Maistry.	Muckadum.	TOTAL.									
						Labour.	Material.	Total.															
															2 a.		6 a. 6 p.	2 a. 6 p.	2 a. 6 p.	6 a.	6 a. 9 p.	2 a. 3 p.	11 a. 6 p.
1851:						<i>Rs. a.</i>	<i>p.</i>	<i>Rs. a.</i>	<i>p.</i>	<i>Rs. a.</i>	<i>p.</i>				<i>Rs. a.</i>	<i>p.</i>							
February - 1	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	1	2	2	1	6				
2	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	1	2	2	1	6				
3	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	1	2	2	1	6				
4	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	1	2	2	1	6				
5	-	1	1	1	-	- 11	0	-	-	- 11	0	1	1	1	1	2	2	1	6				
6	-	1	1	1	-	- 11	0	-	-	- 11	0	1	1	1	2	2	2	9	11				
7	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
8	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
9	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
10	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
11	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
12	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
13	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
14	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
15	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
16	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
17	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	1	2	2	1	6				
18	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	1	2	2	1	6				
19	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	1	2	2	1	6				
20	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
21	-	1	1	1	-	- 11	0	-	-	- 11	0	1	1	1	2	2	2	9	11				
22	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
23	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
24	-	1	1	1	-	- 11	6	-	-	- 11	6	1	1	1	2	2	2	9	11				
25	-	1	1	1	1	1	1	0	-	1	1	1	1	2	2	2	9	11					
26	2	1	1	1	1	1	5	0	-	1	5	0	1	1	1	1	2	2	1	6			
27	1	1	1	1	1	1	1	0	-	1	1	0	1	1	1	2	2	2	9	11			
28	1	1	1	1	1	1	1	0	-	10	6	0	1	1	1	2	2	2	9	11			
Total - -	4	28	28	28	4	21	14	-	-	40	3	-	28	28	28	47	56	68	0	11	2,427	4	9
Expenditure up to last Month	-	-	-	-	-	87	7	4	-	72	32	9	-	-	-	-	-	279	13	4	8,949	10	11
Gross Total.	-	-	-	-	-	108	5	4	-	110	7	9	-	-	-	-	-	348	7	3	11,376	15	3

with Rates of Work performed, *Undwell Bridge*, for February 1851—*continued*.

Rates for the foregoing Work.

ITEMS.	Quantity.	Rate.		Per	Amount.	TOTAL.		GRAND TOTAL.		
		Rs.	a. p.			Rs.	a. p.	Rs.	a. p.	
Centering (mud-rubble Masonry) - } <i> cub. ft.</i>	13,321	3	2 11 $\frac{13}{100}$	100 cubic feet	424	4	3			
Facing Wall above } <i> "</i>	2,775	13	10 $\frac{2}{100}$	ditto -	378	7	10			
Abutment - } <i> "</i>										
Wing Walls - - } <i> "</i>	6,651	10	8 $\frac{4}{100}$	ditto -	699	14	5			
Arch Facing Stones } <i> No.</i>	42	2	7 $\frac{1}{100}$	one -	102	7	4			
laid - - } <i> "</i>										
Arch Chips Buildings, <i> cub. ft.</i>	1,592	16	6 $\frac{6}{100}$	100 cubic feet	261	4	3			
Lodging Arch - - } <i> "</i>	2,038	9	12 $\frac{7}{100}$	ditto -	199	7	5			
Spandril Facing Walls } <i> "</i>	630	11	- $\frac{2}{100}$	ditto -	69	6	2			
Arch Bond Stones - } <i> No.</i>	15	5	8 $\frac{7}{100}$	one -	83	1	7			
Carpenters' Work at Centering - - -	-	-	-	-	25	8	-			
Pointing - - - } <i> sq. ft.</i>	1,450	1	15 $\frac{5}{100}$	100 square feet	28	8	1			
Filling in with Earth - } <i> cub. ft.</i>	12,308	-	6 -	100 cubic feet	46	2	0			
Contingencies - - -	-	-	-	-	40	3	-			
Establishment - - -	-	-	-	-	68	9	11			
TOTAL Rupees - - -						2,427	4	9		

I do hereby certify that I have measured the above Work.

(signed) *M. McNally*, Overseer.
W. Chapman, Superintending Engineer.

(True copy.)

(signed) *J. M. Melvill*, Lieut.-col., Secretary to Gov^t.

(True copy.)

(signed) *R. J. H. Birch*, Lieut.-col.,
Off^r Sec^y. to the Gov^t. of India, in the Military Department.

No. 2.

UNDWELL BRIDGE.

Cr.

BALANCE SHEET of Stock for February 1851.

Cr.

ITEMS.	Quantity.	Rate.		Per	Amount.	TOTAL.	GRAND TOTAL.	
		Rs. a. p.						Rs. a. p.
		Balance on Bond, 1st February 1851				- - -	1,533 15 11	
Heirday	20	1	-	10 picies	2	-		
Carriage of Materials, Cart	9	1	-	cart	9	-		
Grass	2,000	2	8	1,000	5	-		
Goor	120	7	8	120 seers	7	8		
Hemp	120	7	12	ditto	7	12		
Kanth	60	23	-	ditto	11	8		
Gond	60	25	-	ditto	12	8		
Gunny Bags	2	-	3 6	one	-	7		
Iron	87½	12	8	120 seers	9	1 10		
Powder	240	20	-	ditto	40	-		
Charcoal	80	9	8	20 maunds	38	-		
Rope Coir	122½	1	-	8 seers	15	5		
Ditto	25½	1	-	8½ ditto	3	- 11		
Oil	12	1	-	6 seers	2	-		
Mahratta Paper	½	5	-	ream	2	8		
Ditto	½	1	10	ditto	-	13		
Twine	10	1	-	4½ seers	2	1 8		
Iron	81	12	12	120 ditto	8	9 8		
Biggaries	1	-	1	one	-	1		
Carriage of Materials, Carts	15	-	12	ditto	11	4		
Bill of Truck Carts	-	165	10 10	lot	165	10 10		
Sealing Wax	¼	-	8	seer	-	4		
Pencil, Black Lead	1	1	-	dozen	1	-		
Steel Pens	¼	-	4	ditto	-	2		
Babool Wood Sheives	6	-	15 9	6	-	15 9		
Iron, Swedish	11½	1	-	4½ seers	2	6 4		
Ditto, English flat Bar	11½	1	-	6 seers	1	15		
Screws	6	-	2	dozen	-	12		
Babool Sheives	6	1	-	6 ditto	1	-		
Brass Sockets for Sheives	1 ⁷ / ₆	3	-	seer	4	11		
Hemp	120	8	8	120 ditto	8	8		
Rubber	1	-	8	piece	-	8		
Wafer	1	-	2 6	box	-	2 6		
Foolscap Paper	¼	-	0 6	quire	-	4 9		
French Paper	¼	-	3	ditto	-	1 6		
Chalk, White	1	1	-	5 seers	-	3 2		
Black Ink	1	-	3	bottle	-	8		
Red Ink	1	-	3	ditto	-	3		
Hemp	60	8	10	120 seers	4	5		
Baskets, Rattan	175	34	5 4	240 ditto	25	- 7		
Stationery Bill for Storekeeper	1	-	4 9	lot	-	4 9		
Gram Picies	133	1	-	8 picies	22	2 8		
Oil	11½	1	-	5½ seers	2	-		
Gond	80	1	-	7 ditto	11	6 10		
Heirday	25	1	-	10 picies	2	8		
Kanth	89	1	-	6 seers	14	13 4		
Goor	183	1	-	18 ditto	10	2 4		
Hemp	36	1	-	12 ditto	3	-		
Ditto	42	1	-	14 ditto	3	-		
Carriage of Wood from Thalghat	52	-	8	each cart	26	-		
Steel Blister	41½	48	-	50 seers	35	12 6		
Serjeant Brocks, four Bills for cutting large Wood	-	-	-	-	6	5 6		
Babool Wood	2	-	12	each	1	8		
Repairing Puckal	-	-	-	-	-	3		
Making Ropes	3	-	6	ditto	1	2		
Earthen Pots	23	-	7	each	-	13 5		
Ditto Vessel	3	-	8	ditto	-	2		
Dry Chunam	49½	4	-	candies	198	-		
Ditto	5	3	-	ditto	15	-		
Government Iron	17	1	-	8 seers	2	2		
Old Pickaxes	2	1	-	ditto	-	4		
					763	7 2		
				Carried forward	- - - Rs.	763 7 2	1,533 15 11	

Cr. No. 2.—UNDWELL BRIDGE.—Balance Sheet of Stock for February 1851—*continued.* *Cr.*

ITEMS.	Quantity.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
		Brought forward	- - - <i>Rs.</i>	- - -	783 7 2	1,533 15 11
Coigns - - - - -	63	58 9 -	63	58 9 -		
Chips - - - - -	441	132 13 9	441	132 13 9		
Stones collected - - - -	20,952	588 - 10	20,952	588 - 10		
Chunam, ground - - - -	94	350 - 9	94 candies -	350 - 9		
Government Bullocks, Pairs - -	140	58 7 2	140	58 7 2		
Arch Bond Stones, rough - - -	21	60 9 2	21	60 9 2		
Ditto - - - dressed - - -	36	125 2 10	36	125 2 10		
					1,373 11 6	2,137 2 8
				TOTAL Expense - - - <i>Rs.</i>		3,671 2 7
				Balance in hand - - - <i>Rs.</i>		2,327 14 11
						1,343 3 8

Dr. BALANCE SHEET of Stock for February 1851. *Dr.*

ITEMS.	Quantity.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
Dry Chunam - - - - -	49½	4 - -	candy -	198 - -		
Ditto - - - - -	5	3 - -	ditto -	15 - -		
					213 - -	
<i>Hemp :</i>						
Preparing Chunam - - - -	180	8 - -	120 seers -	12 - -		
Ditto - - - - -	92	7 12 -	ditto -	5 15 1		
Blasting Stones - - - -	17	7 12 -	ditto -	1 1 7		
Abutment Facing Walls - - -	7	7 12 -	ditto -	- 7 9		
Wing Walls - - - - -	4	7 12 -	ditto -	- 4 1		
Arch Facing Stones - - - -	5	8 10 -	ditto -	- 5 9		
Arch Chips - - - - -	12	8 10 -	ditto -	- 13 9		
Arch Facing Stones - - - -	36	1 - -	12 seers -	3 - -		
Ditto - - - - -	42	1 - -	14 seers -	3 - -		
					26 15 6	
<i>Gum :</i>						
Preparing Chunam - - - -	80	1 - -	7 seers -	11 6 10		
Ditto - - - - -	26	26 - -	120 ditto -	5 10 1		
					17 - 11	
<i>Kanth :</i>						
Preparing Chunam - - - -	89	1 - -	6 seers -	14 13 4		
Ditto - - - - -	12	24 - -	120 ditto -	2 6 5		
					17 8 9	
<i>Goor :</i>						
Preparing Chunam - - - -	170	1 - -	18 seers -	9 7 1		
					9 7 1	
<i>Heerdah :</i>						
Preparing Chunam - - - -	59	1 - -	10 piclies -	5 14 5		
					5 14 5	
<i>Carriage of Materials :</i>						
Preparing Chunam - - - -	5	1 - -	cart - -	5 - -		
Stones - - - - -	4	1 - -	ditto - -	4 - -		
Arch Bond Stones - - - -	52	- 8 -	ditto - -	26 - -		
Contingencies - - - - -	15	- 12 -	ditto - -	11 4 -		
					47 4 -	
<i>Gunny Bags :</i>						
Preparing Chunam - - - -	2	- 3 6	one - -	- 7 -		
					- 7 -	
<i>Government Bullocks :</i>						
Preparing Chunam - - - -	14	58 7 2	140	5 13 6		
Bringing Stones - - - -	112	58 7 2	ditto -	46 12 3		
Arch Chips - - - - -	14	58 7 2	ditto -	5 13 6		
					58 7 2	
				Carried forward - - - <i>Rs.</i>		396 11 10

Dr. No. 2.—UNDWELL BRIDGE.—Balance Sheet of Stock for February 1851—continued. Dr.

ITEMS.	Quantity.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
<i>Gharras:</i>			Brought forward	- - -	395 11 10	
Preparing Chunam	6	- - 7	one	- 3 6		
Wing Walls	7	- - 7	ditto	- 4 1		
Stones	10	- - 7	ditto	- 5 10		
					13 5 -	
<i>Repairing Pakhals:</i>						
Preparing Chunam	1	3 - -	one	- 3 -		
					- 3 -	
<i>Oil:</i>						
Preparing Chunam	5 $\frac{3}{4}$	1 - -	5 $\frac{3}{4}$ seers	1 - -		
Contingencies	5 $\frac{3}{4}$	1 - -	ditto	1 - -		
Use of Bullocks	12	1 - -	6 ditto	2 - -		
					4 - -	
<i>Powder:</i>						
Blasting Stones	120	15 - -	120 seers	15 - -		
Ditto	97	20 - -	ditto	16 2 8		
					31 2 8	
<i>Iron:</i>						
Stones	9	13 8 -	120 seers	1 - 2		
Arch Bond Stones, rough	5	13 8 -	ditto	- 9 -		
Ditto - - - dressed	5	13 8 -	ditto	- 9 -		
Arch Chips, rough	15	13 8 -	ditto	1 11 -		
Coigns	10	12 8 -	ditto	1 - 8		
Wing Walls	12	12 8 -	ditto	1 4 -		
Arch Bond Stones, rough	2 $\frac{1}{2}$	1 - -	8 seers	- 5 -		
Facing Walls above Abutment	9	12 8 -	120 seers	- 15 -		
Bond Stones	18	12 8 -	ditto	1 14 -		
Spandril	3	12 8 -	ditto	- 5 -		
Facing Walls			ditto	- 11 -		
Arch Facing Stones	6 $\frac{1}{2}$	12 12 -	4 seers	- 9 -		
Arch Bond Stones, rough	2 $\frac{1}{2}$	1 - -	4 $\frac{1}{2}$ ditto	- 6 4		
Stones	1 $\frac{1}{8}$	1 - -	8 ditto	2 2 -		
Arch Facing Stones	17	1 - -	120 ditto	- 10 -		
Arch Chips (built in)	6	12 8 -	ditto	3 1 2		
Arch Facing Stones	29 $\frac{1}{2}$	12 8 -			17 - 4	
<i>Steel:</i>						
Stones (rough building)	12 $\frac{1}{2}$	48 - -	56 seers	10 14 10		
Arch Bond Stones (preparing at Quarry)	3 $\frac{1}{2}$	1 - -	3 $\frac{1}{2}$ ditto	1 - -		
					11 14 10	
<i>Bill from Lieut. Chapman's Office for Truck Carts:</i>						
Stones				165 10 10	165 10 10	
Arch Bond Stones, rough	25	206 5 3	73	70 10 7		
Ditto	11	60 9 2	21	61 11 8		
					102 6 3	
<i>Charcoal:</i>						
Stones - - - Maunds	20	9 8 -	candy	9 8 -		
Arch Bond Stones, rough	5	9 8 -	20 maunds	2 6 -		
Ditto - - - prepared	2 $\frac{1}{2}$	9 8 -	ditto	1 3 -		
Coigns, prepared	2 $\frac{1}{2}$	9 8 -	ditto	1 3 -		
Arch Chips, prepared	10	9 8 -	ditto	4 12 -		
Facing Walls Abutment	2 $\frac{1}{2}$	9 8 -	ditto	1 3 -		
Arch Facing Stones	15	9 8 -	ditto	7 2 -		
Arch Bond Stones	2 $\frac{1}{2}$	9 8 -	ditto	1 3 -		
					28 8 -	
<i>Cair Rope:</i>						
Abutment Facing Walls	9	1 - -	8 seers	- 4 -		
Stones, rough	6	1 - -	ditto	- 12 -		
Arch Bond Stones	8	1 - -	ditto	1 - -		
Arch Facing Stones	67 $\frac{1}{2}$	1 - -	ditto	8 7 -		
Arch Chips	9	1 - -	ditto	1 2 -		
					11 0 -	
<i>Chips:</i>						
Chips	265	261 2 5	778	88 15 3		
					88 15 3	
			Carried forward	- - - Rs.	857 15 3	

Dr. No. 2.—UNDWELL BRIDGE.—Balance Sheet of Stock for February 1851—continued. Dr.

ITEMS.	Quantity.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
		Rs. a. p.		Rs. a. p.	Rs. a. p.	
<i>Stones:</i>						
			Brought forward	- - -	857 15 5	
Arch Chips (preparing at Quarry) -	997	588 - 10	20,952	27 15 9		
Coigns -	100	588 - 10	ditto	2 12 10		
Wing Walls -	6,651	588 - 10	ditto	186 10 9		
Facing Walls above Abutment -	2,775	588 - 10	ditto	77 14 2		
Arch Chips (built in) -	711	588 - 10	ditto	19 15 4		
Arch loading -	2,038	588 - 10	ditto	57 3 2		
Spandril Facing Walls -	630	588 - 10	ditto	17 10 11		
Centering -	5,661	588 - 10	ditto	158 14 2		
Ditto -	5,488	588 - 10	ditto	162 7 7		
					711 8 8	
<i>Baskets Rattan:</i>						
Abutment Facing Walls -	25	34 5 4	240	3 9 2		
Filling in with Earth -	25	34 5 4	ditto	3 9 3		
					7 2 5	
<i>Prepared Chunam:</i>						
Wing Walls -	83	446 8 5	134 candies	276 9 3		
Arch Facing Stones -	15	446 8 5	ditto	2 7 11		
Arch Chips Work -	16	446 8 5	ditto	53 5 1		
Arch loading -	26	446 8 5	ditto	86 10 3		
Spandril Facing Walls -	7½	446 8 5	ditto	25 13 3		
Bond Stones (built in) -	½	446 8 5	ditto	1 10 8		
Abutment Facing Walls -	27	3 6 11 ³⁴ / ₁₀₀	candy	92 11 3		
Ditto -	7	350 - 9	94 ditto	26 1 1		
Pointing -	½	350 - 9	ditto	1 13 9		
					567 2 6	
<i>Coigns:</i>						
Facing Walls above Abutment -	61	76 9 7	101	46 4 3		
Wing Walls -	20	76 9 7	ditto	15 2 8		
Facing Walls above Abutment -	3	58 9 -	63	2 12 7		
					64 3 6	
<i>Grass:</i>						
Government Bullocks -	4,400	2 8 -	1,000	11 - -		
					11 - -	
<i>Gram:</i>						
Government Bullocks -	133	1 - -	6 pelies	22 2 8		
					22 2 8	
<i>Twine:</i>						
Wing Walls -	1	1 - -	4½ seers	- 3 4		
					- 3 4	
<i>Earthen Vessels:</i>						
Facing Walls above Abutment -	8	- - 8	each	- 2 -		
					- 2 -	
<i>Nails:</i>						
Centering -	6	1 - -	5½ seers	1 1 5		
					1 1 5	
<i>Lead:</i>						
Arch Bond Stones -	6½	1 - -	3½ ditto	1 10 10		
					1 10 10	
<i>Babool Shieves:</i>						
Facing Stones -	6	- 15 9	6	- 15 9		
Ditto -	6	1 - -	ditto	1 - -		
					1 15 9	
<i>Screws:</i>						
Arch Facing Stones -	6	- 2 -	dozen	- 12 -		
					- 12 -	
<i>Brass Sockets for Shieves:</i>						
Arch Facing Stones -	1½	3 - -	seer	4 11 -		
					4 11 -	
			Carried forward	- - - Rs.	2,351 11 6	

Dr. No. 2.—UNDWELL BRIDGE.—Balance Sheet of Stock for February 1851—continued. Dr.

ITEMS.	Quantity.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
<i>Babool Wood :</i>				Brought forward - - -	2,251 11 6	
Arch Facing Stones - - -	2	- 12 -	piece -	1 8 -	1 8 -	
<i>Making Ropes :</i>						
Arch Facing Stones - - -	3	- 6 -	one - -	1 2 -	1 2 -	
<i>Wood brought from Thul Ghat for Triangles :</i>						
Arch Facing Stones - - Bills	4	6 5 6	lot - -	6 5 6	6 5 6	
<i>Mahratta Paper :</i>						
Contingencies - - - -	$\frac{1}{2}$	5 - -	ream -	2 8 -		
Ditto - - - -	$\frac{1}{2}$	1 10 -	ditto -	- 13 -	3 5 -	
<i>Carriage of Materials :</i>						
Contingencies - - - -	1	- 1 -	biggery -	- 1 -	- 1 -	
<i>Black Lead Pencils :</i>						
Contingencies - - - -	1	1 - -	dozen -	1 - -	1 - -	
<i>Steel Pens :</i>						
Contingencies - - - -	$\frac{1}{2}$	- 4 -	ditto -	- 2 -	- 2 -	
<i>Indian Rubber :</i>						
Contingencies - - - -	1	- 8 -	piece -	- 8 -	- 8 -	
<i>Foolscap Paper :</i>						
Contingencies - - - -	$\frac{1}{2}$	- 9 6	quire -	- 4 9	- 4 9	
<i>French Paper :</i>						
Contingencies - - - -	$\frac{1}{2}$	- 3 -	ditto -	- 1 6	- 1 6	
<i>Black Ink :</i>						
Contingencies - - - -	1	- 3 -	bottle -	- 3 -	- 3 -	
<i>Red Ink :</i>						
Contingencies - - - -	1	- 3 -	ditto -	- 3 -	- 3 -	
<i>Storekeeper's Stationery Bill :</i>						
Contingencies - - - -	1	- 4 9	lot - -	- 4 9	- 4 9	
<i>Arch Bond Stones, dressed :</i>						
Arch - - - -	15	305 14 8	75	61 2 11	61 2 11	
TOTAL Expense - - -					Rs. 2,327 14 11	

(signed) M. McNally, Engineer.

W. Chapman, Superintending Overseer.

Nassick, 1st March 1851.

(True copy.)

(signed) P. M. McNeill, Lieut.-col., Secy. to Govt.

(True copy.)

(signed) R. J. H. Birch, Lieut.-col.

Offg. Secy. to the Govt. of India in the Military Department.

No. 3.

UNDWELL BRIDGE.

BILL of PAYMENT of WORKPEOPLE employed, and MATERIALS used during the Month of February 1851.

ITEMS.	Numbers.	Rate.	Per	Amount.	TOTAL.
		Rs. a. p.		Rs. a. p.	Rs. a. p.
<i>Labour:</i>					
Carkoon	28	- 5 9	each	10 1 -	
Muckadums	66	- 2 10	"	9 14 8	
Chowkedar	28	- 2 3	"	3 15 -	
Mistry	28	- 11 5	"	19 15 8	
Ditto	47	- 8 5	"	24 11 7	
Smith	28	- 6 6	"	11 6 -	
Ditto	10	- 6 -	"	3 12 -	
Carpenter	47	- 6 -	"	17 10 -	
Ditto	12	- 2 -	"	1 8 -	
Hammerman	28	- 2 6	"	4 6 -	
Bellows Boy	28	- 2 6	"	4 6 -	
Biggaries	2,102	- 2 -	"	262 12 -	
Women	985	- 1 3	"	76 15 3	
Boys	279	- 1 -	"	17 7 -	
Masons	135	- 7 -	"	59 1 -	
Ditto	52½	- 6 6	"	21 5 3	
Ditto	184	- 6 4	"	72 13 4	
Ditto	202	- 6 -	"	75 12 -	
Ditto	108½	- 5 -	"	33 14 6	
Ditto	27	- 4 -	"	6 12 -	
Ditto	10	- 3 -	"	1 14 -	
Stonecutters	108	- 7 -	"	45 1 -	
Ditto	79	- 6 11	"	34 2 5	
Ditto	27	- 6 6	"	10 15 6	
Ditto	22	- 6 3	"	8 9 6	
Ditto	74	- 6 -	"	27 12 -	
Ditto	40	- 5 -	"	12 8 -	
Ditto	7	- 4 -	"	1 12 -	
Ditto	2	- 5 3	"	- 10 6	
					881 11 2
<i>Materials:</i>					
Material Bill					1,545 9 7
TOTAL Company's Rupees, two thousand four hundred and twenty-seven, annas four, and pies nine					2,427 4 9

(signed) M. M'Nally, Overseer.

W. Chapman, Supg. Engineer.

Camp, Undwell, 14 March 1851.

MATERIAL BILL.

Lieutenant W. Chapman, Engineers, First Assistant Superintendent Roads, &c. Dr.

The under-mentioned Articles supplied for the use of UNDWELL BRIDGE during the month of February 1851:

ITEMS.	Quantity or Number.	Rate.	Per	Amount.	TOTAL.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
Chunam - - - -	49½	4 - -	Candee -	198 - -	
Ditto - - - -	6	3 - -	" -	15 - -	
Hemp - - - -	180	8 - -	120	12 - -	
Ditto - - - -	120	7 12 -	120	7 12 -	
Ditto - - - -	17	8 10 -	120	1 3 6	
Ditto - - - -	36	1 - -	12	3 - -	
Ditto - - - -	42	1 - -	14	3 - -	
Goand - - - -	26	26 - -	120	5 10 1	
Ditto - - - -	80	1 - -	7	11 6 10	
Kath - - - -	12	24 - -	120	2 6 5	
Ditto - - - -	89	1 - -	6 seers	14 13 4	
Goor - - - -	170	1 - -	18	9 7 1	
Heerday - - - -	50	1 - -	10	5 14 5	
Carts hired - - -	10	1 - -	each -	10 - -	
Ditto - - - -	52	- 8 -	" -	26 - -	
Ditto - - - -	15	- 12 -	" -	11 4 -	
Bags - - - -	2	- 3 6	" -	- 7 -	
Bullocks, Pairs, Government	140	58 7 2	140	58 7 2	
Earthen Pots - - -	23	- 7 -	each -	- 13 5	
Puckal repaired - -	1	- 3 -	" -	- 3 -	
Oil - - - -	11½	1 - -	5½	2 - -	
Ditto - - - -	12	1 - -	6	2 - -	
Gunpowder - - - -	120	15 - -	120	15 - -	
Ditto - - - -	97	20 - -	120	16 2 8	
Iron - - - -	34	13 8 -	120	3 13 2	
Ditto - - - -	19½	1 - -	8 seers	2 7 -	
Steel - - - -	12½	48 - -	56	19 14 10	
Iron - - - -	87½	12 8 -	120	9 1 10	
Ditto - - - -	6½	12 13 -	120	- 11 -	
Ditto - - - -	2½	1 - -	4	- 9 -	
Ditto - - - -	1½	1 - -	4½	- 6 4	
Steel - - - -	3½	1 - -	3½	1 - -	
Hoozoor Bill for Truck-carts	1	165 10 10	each -	165 10 10	
Bond Stone - - - -	25	206 5 3	73	70 10 7	
Ditto - - - -	11	60 9 2	21	31 11 8	
Charcoal - - - maunds	60	9 8 -	20 maunds	28 8 -	
Coir Rope - - - -	92½	1 - -	8 seers	11 9 -	
Stones - - - - cub. ft.	10,563	588 - 10	20,952	549 1 1	
Ditto - - - - cub. ft.	6,488	977 4 9	33,011	162 7 7	
Cane Baskets - - -	50	34 5 4	240	7 2 5	
Chunam, grinding - -	27	3 6 11½	candee -	92 11 3	
Ditto - - - -	134	446 8 5	134	446 8 5	
Ditto - - - -	7½	350 - 9	94	27 14 10	
Preparing Coragus - -	81	76 9 7	101	61 6 11	
Ditto - - - -	3	58 9 -	63	2 12 7	
Chips, prepared - - -	265	261 2 5	778	88 15 3	
Grass (bundles) - - -	4,400	2 8 -	1,000	11 - -	
Grain (picules) - - -	133	1 - -	6	22 2 8	
Twine (seers) - - -	1	1 - -	4½	- 3 4	
Earthen Pots - - -	3	- 8 -	each -	- 2 -	
Nails (seers) - - -	6	1 - -	5½	1 1 5	
Lead (seers) - - -	6½	1 - -	3½	1 10 10	
Babble Shives - - -	6	- 15 9	6	- 15 9	
Ditto - - - -	6	1 - -	6	1 - -	
Carried forward - - -			<i>Rs.</i>	2,246 4 6	

No. 3.—UNDWELL BRIDGE.—MATERIAL BILL—continued.

Appendix (C.)

ITEMS	Quantity or Number.	Rate.		Per	Amount.		TOTAL.
		Rs. a. p.			Rs. a. p.	Rs. a. p.	
		Brought forward			- - -	2,240 4 6	
Screws (dozens)	6	- 2 -		dozen	-	12 -	
Socket Brass	1 1/2	3 -		each	-	4 11 -	
Bablee Wood	2	- 12 -		"	-	1 8 -	
Hempen Ropes	3	- 6 -		"	-	1 2 -	
Common Paper	ream	5 -		ream	-	2 8 -	
Ditto	gudee	1 10 -		gudee	-	- 13 -	
Biggaries	1	- 1 -		each	-	- 1 -	
Pencils (dozen)	1	1 -		dozen	-	1 -	
Steel Pens (dozen)	1/2	- 4 -		"	-	- 2 -	
Rubber Piece	1	- 8 -		each	-	- 8 -	
Foolscap Paper (quire)	1/2	- 9 6		quire	-	- 4 9	
French Paper (quire)	1/2	- 3 6		"	-	- 1 6	
Pint of Red Ink	1	- 3 -		each	-	- 3 -	
Pint of Black Ink	1	- 3 -		"	-	- 3 -	
Stationery of Stores Bills	1	- 4 9		"	-	- 4 9	
Bond Stone, preparing	15	305 14 8		75	-	61 2 11	
Wood conveyed from Thul Ghat, as per Bill	4	6 5 6		4	-	6 5 6	
							2,327 14 11
Deduct for the below (vide Bills No. 40 to 46)—							
Grinding Chnumam						293 4 3	
Stones						297 10 5	
Bond Cut Stones						6 13 -	
Repairing Bond Stones						104 2 3	
Ditto Coigns						5 - 6	
Repairing Chips						40 4 3	
Government Bullock Pairs						35 2 8	
							782 5 4

ABSTRACT of MATERIALS in different Works in Monthly Report.

Wing Wall Facing		480 6 2
Abutment ditto		252 3 9
Wing Wall, filling in Earth		3 9 3
Pointing		1 13 0
Arch Stone laid		46 11 1
Loading		143 13 5
Chips laid		164 13 5
Arch Facing		43 13 2
Bond Stones laid		67 9 5
Centering		322 7 2
Contingencies		18 5 -
		1,545 9 7
TOTAL - - - Rupees		1,545 9 7

(signed) M. McNally, Overseer.

W. Chapman, Superintending Engineer.

(True copies)

(signed) P. M. Melvill, Lieut.-col., Secty. to Govt.

(True copies)

(signed) R. J. H. Birch, Lieut.-col.,
Offg.-Secty. to the Govt. of India in the Military Department.

Camp, Undwell, 14 March 1851.

No. 5.

RECEIPT of MATERIALS supplied.—Nos. 1 to 39, and No. 47.

UNDWELL BRIDGE, February 1851.

(No. 1.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*

The under-mentioned Articles supplied for the use of First Assistant Superintendent Roads, &c., during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPT.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
120 seers	Goor	7 8	120 seers	7 8	- - -	(signed) Ramchunder Marwarree.
120 "	Hemp	7 12	"	7 12	- - -	
20 piclies	Hurdy	1 - -	10 piclies	2 - -	- - -	
60 seers	Coir Rope	23 - -	120 seers	11 8	- - -	
60 "	Goand	25 - -	"	12 8	- - -	
2 - -	Bags	- 3 6	each	- 7	- - -	
1 - -	Cart hired	1 - -	"	1 - -	- - -	The mark of Pandoo Tailce.
					42 11 -	
			TOTAL	- - - <i>Rs.</i>	42 11 -	

Nassick, 1 March 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:

(signed) *Itoujee Wd. Cachoojee*, Seersa.(signed) *Malapar Wd. Bappoo*, Kondec.(signed) *Nursoo Venkoo*, Overseer.(signed) *Dajee Sucharam*, Carcoon.(signed) *M. M'Nally*, Serjeant, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 2.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*The under-mentioned Articles shipped for the use of *Undwell* Bridge, under First Assistant Superintendent Roads, &c., during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPT.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
87½ seers	Iron	12 8	120 seers	9 1 10	- - -	(signed) Guzrathee.
					9 1 10	
			TOTAL	- - - <i>Rs.</i>	9 1 10	

Nassick, 1 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:

The mark of *Khundoo Wd. Sumbajee Majraj*.The mark of *Rama Wd. Marajee Sootar*.(signed) *Dajee Sucharam*, Carcoon.(signed) *Nursoo Venkoo*, Overseer.(signed) *M. M'Nally*, Serjeant, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

No. 5.—Receipt of Materials supplied—continued.

(No. 3.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. Dr.
The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the Month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1 palla	Gunpowder	20 - -	120 seers	20 - -	20 - -	The mark of Futtay Mahomed.
TOTAL				<i>Rs.</i>	20 - -	

Nassick, 1 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:
The mark of *Hurry Wd. Vaghajee*. (signed) *Ronjee Wd. Cuchoojee*, Peon.
(signed) *Nursoo Venkoo*, Overseer. (signed) *Dajee Sucharam*, Carcoon.
(signed) *M. M'Nally*, Serjeant, Overseer.
(True Translation.)
(signed) *W. Chapman*, Lieutenant Engineers.

(No. 4.)

Lieutenant Engineers, *W. Chapman*, First Assistant Superintendent Roads, &c. Dr.
The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1 candee	Charcoal	9 8 -	candees	9 8 -	- - -	The mark of Subbee Wd. Kbu-teeb.
1	Cart, hired	1 - -	each	1 - -	- - -	The mark of Appee Tarbe.
1	- ditto -	1 - -	"	1 - -	- - -	
TOTAL				<i>Rs.</i>	11 8 -	

Nassick, 1 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:
The mark of *Hurry Wd. Vaghajee*. (signed) *Ronjee Wd. Cuchoo*, Peon.
(signed) *M. M'Nally*, Serjeant, Overseer. (signed) *Dajee Sucharam*, Carcoon.
(signed) *Nursoo Venkoo*, Overseer.
(True Translation.)
(signed) *W. Chapman*, Lieutenant Engineers.

(No. 5.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. Dr.
The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPT.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1 pullah	Gunpowder	20 - -	120 seers	20 - -	20 - -	The mark of Tutty Mahomed.
TOTAL				<i>Rs.</i>	20 - -	

Nassick, 1st February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:
The mark of *Kadeerka Wd. Mahamedkha*. (signed) *Narrayen Wd. Hurry Lonary*.
(signed) *M. M'Nally*, Serjeant, Overseer. (signed) *Dajee Sucharam*, Carcoon.
(signed) *Nursoo Venkoo*, Overseer.
(True Translation.)
(signed) *W. Chapman*, Lieutenant Engineers.

No. 5.—Receipt of Materials supplied—*continued.*

(No. 6.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.*Dr.*The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
30½ seers	Coir Rope	1 - -	8 seers	3 12 6	- - -	} (signed) Goozathee.
16 "	ditto	1 - -	8½ "	1 15 -	- - -	
9½ "	ditto	1 - -	8½ "	1 1 11	- - -	
TOTAL				- - - <i>Rs.</i>	6 13 5	

Nassick, 1 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:

The mark of *Guttoo Wd. Bhenjee*, Peon.

(signed)

Ronjee Wd. Cuchoo, Peon.(signed) *M. M'Nally*, Serjeant, Overseer.

(signed)

Dajee Sucharam, Carcoon.

(signed)

Nursoo Venkoo, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 7.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.*Dr.*The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
12 seers	Oil	1 - -	6 seers	2 - -	2 - -	—
TOTAL				- - - <i>Rs.</i>	2 - -	

Nassick, 2 January 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:

The mark of *Vittoo Wd. Mahadoo*, Washerman.

(signed)

Ronjee Wd. Cuchoo, Peon.(signed) *M. M'Nally*, Serjeant, Overseer.

(signed)

Dajee Sucharam, Carcoon.

(signed)

Nursoo Venkoo, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 8.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.*Dr.*The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
½ ream	Paper	6 - -	ream	2 8 -	- - -	} The mark of Salamon Bhorree.
¼ "	ditto	1 10 -	ditto	- 13 -	- - -	
TOTAL				- - - <i>Rs.</i>	3 5 -	

Nassick, 2 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:

The mark of *Burjaice Majraj*.

(signed)

Ronjee Wd. Cuchoo.(signed) *M. M'Nally*, Serjeant, Overseer.

(signed)

Dajee Sucharam, Carcoon.

(signed)

Nursoo Venkoo, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

No. 5.—Receipt of Materials supplied—continued.

(No. 9.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
10½ seers	Cair Rope	1 - -	8 seers	2 1 6	- - -	(signed) Guzerathee.
10 "	Twine	1 - -	43 seers	2 1 8	- - -	
					4 3 2	
			TOTAL	- - - <i>Rs.</i>	4 3 2	

Nassick, 6 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:

The mark of *Narryen Wd. Hurry*. The mark of *Burjojee Wd. Subajee*.
(signed) *M. M'Nally*, Serjeant, Overseer. (signed) *Dajee Sucharam*, Carcoon.
(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)
(signed) *W. Chapman*, Lieutenant Engineers.

(No. 10.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
81	Iron	12 12 -	120 seers	8 9 8	- - -	(signed) Guzerathee.
1	-- Conveyance Iron from Bazar to in Store.	- - -		- 1 -	- - -	
					8 10 8	
			TOTAL	- - - <i>Rs.</i>	8 10 8	

Nassick, 6 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:

The mark of *Kadeerhha Wd. Mahomedhha*. The mark of *Nuthoo Wd. Hurry Bhajee*.
(signed) *M. M'Nally*, Serjeant, Overseer. (signed) *Dajee Sucharam*, Carcoon.
(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)
(signed) *W. Chapman*, Lieutenant Engineers.

(No. 11.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Carts supplied for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1	-- Government Cart.	- 12 -	each	- 12 -	- - -	(signed) <i>Abbajee Ruggoonath</i> .
					- 12 -	
			TOTAL	- - - <i>Rs.</i>	- 12 -	

Nassick, 6 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

(signed) *M. M'Nally*, Serjeant, Overseer. (signed) *Dajee Sucharam*, Carcoon.
(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)
(signed) *W. Chapman*, Lieutenant Engineers.

No. 5.—Receipt of Materials supplied—continued.

(No. 12.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.*Dr.*The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPT.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	(signed)
1	Charcoal	0 8 -	candee	9 8 -	- - -	<i>Apa Wd. Crustria Taily.</i>
1	Cart hired	1 - -	each	2 - -	- - -	<i>Essup Wd. Khurdlee (marked).</i>
					11 8 -	
				TOTAL	Rs. 11 8 -	

Nassick, 7 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:

The mark of *Vittooo Wd. Ball Moollee.*The mark of *Guttoo Wd. Bhenjee.*(signed) *Dajee Suckaram*, Carcoon.(signed) *Nursoo Venhoo*, Overseer.(signed) *M. McNolly*, Serjeant, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

RECEIPT, No. 1.

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.*Dr.*The under-mentioned Materials for preparing new Wheel Carts for the use of *Undwell* Bridge, during the month of November 1850.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPT.
<i>Mds.</i>		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
115	Charcoal	10 - -	candee	57 8 -	- - -	supplied articles.
1	Bablee Wood	3 8 -	lot	3 8 -	- - -	
1	Ditto	1 - -	lot	1 - -	- - -	by stock.
17	Iron	1 - -	4 seers	4 4 -	- - -	
1	Gairoo	1 - -	8 seers	- - 0	- - -	
49	Iron	1 - -	9 seers	5 7 1	- - -	(signed) <i>Abbajee Ruggoonath.</i>
25	Ditto	1 - -	4 seers	6 4 -	- - -	
3	Oil	1 - -	6 seers	- 8 -	- - -	suppliers.
500	Cakes Dung, Cow	1 - -	100	- 8 -	- - -	
	Sawajee	- - -	lot	- 8 -	- - -	
3	Cart Poles	- 12 -	each	2 4 -	- - -	
1	Common Paper	- 7 -	dusta	- 7 -	- - -	
	Ink	- - -	- - -	- - 6	- - -	
60	Iron, for Iron Rings	1 - -	13 seers	4 9 10	- - -	Government articles.
80	Iron	1 - -	12 seers	6 10 8	- - -	
160	Ditto	1 - -	12 seers	13 5 4	- - -	(signed) <i>Abbajee.</i>
					106 12 11	
				TOTAL	Rs. 106 12 11	

Nassick, 1 September 1850.

(signed) *Abbajee Ruggoonath*, Storekeeper.(signed) *Dajee Suckaram*, Carcoon.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

Receipt

No. 5.—Receipt of Materials supplied—continued.

RECEIPT, No. 2.

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.

Dr.

The marks mentioned Labour for preparing new Trucks for the use of *Undwell* Bridge, during the month of December 1850.

Number.	Items.	Rate.	Per	Amount.	TOTAL	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	The marks of—
4	Smiths	7	each	1 13		Tookaram.
4	Hammermen	2	"	8		Gunnor Wd. Luxamon.
4	Ditto	2	"	8		Toolia Wd. Bhad Seerka.
2	Bellows Boys	2	"	4		Suckaram Wd. Khundoo.
2	Carpenters	5	"	10		Rowjee Wd. Suckara.
2	Ditto	5	"	10		Suckaram Wd. Luxamon.
4	Ditto	5	"	1 4		
TOTAL					5 8	

Nassick, 6. December 1850.

(signed) *Abbajee Ruggoonath*, Storekeeper.

(signed) *Dujee Sucharam*, Carkoon.

(signed) *Nursoo Venkoo*, Overseer.

(signed) *M. M'Nally*, Serjeant, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 13.)

BILL of PAYMENT of WORKPEOPLE employed and STORES used for the *Undwell* Bridge, under First Assistant Superintendent of Roads and Tanks, during the month of November 1850.

PREPARING WHEEL CARTS.

Quantity or Number.		Rates.	Per	Amount.	TOTAL.	GRAND TOTAL.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
<i>Labour:</i>						
27	Smith	7	each	11 13		
30	Ditto	6	"	11 4		
44	Hammermen	2 6	"	6 14		
36	Ditto	2	"	4 8		
43	Bellows Boys	2	"	5 6		
13	Ditto	1 10	"	1 7 10		
25	Ditto	1 6	"	2 5 6		
11	Carpenter	6 3	"	4 4 9		
4	Ditto	5 4	"	1 5 4		
9	Ditto	5	"	2 13		
2 1/2	Ditto	5 3	"	13 2		
4	Biggaries	1 10	"	7 4		
					53 5 11	
<i>Materials:</i>						
Materials and Labour Receipts, Nos. 1 & 2, herewith attached -]				112 4 11	112 4 11	165 10 10
TOTAL					Rs.	165 10 10

Nassick, 1 December 1850.

(signed) *Abbajee Ruggoonath*, Storekeeper.

(signed) *Nursoo Venkoo*, Overseer.

(signed) *Dujee Sucharam*, Carkoon.

(signed) *M. M'Nally*, Serjeant, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

No. 5.—Receipt of Materials supplied—*continued.*

(No. 14.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.

Dr.

The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1 seer	Iron	8	Seer	4	} - - -	(signed) Goozerathee.
1 dozen	Pencils	1	1 dozen	1		
1 "	Steel Pens	4	1 dozen	2		
TOTAL				<i>Rs.</i>	1 6 -	

Nassick, 9 February 1851.

Witness:

(signed) *Abbajee Ruggoonath*, Storekeeper.The mark of *Kadeerbhoye Wd. Ahmeekha*.The mark of *Guttoo Wd. Bhemjee*.(signed) *M. McNally*, Serjeant, Overseer.(signed) *Dajee Sucharam* Carkoon.(signed) *Nursoo Venhoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 15.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.

Dr.

The under-mentioned Articles supplied, and for Labour for preparing Six Bablee Blocks for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1.	Bablee Wood	4	each	4	} - - -	(signed) Abbajee. The mark of Rowjee. The mark of Babjee, Katary. The mark of Kadeerkha.
2	Carpenter	3 6	"	5		
6	Catarys' Work	1	"	6		
	Oil			9		
TOTAL				<i>Rs.</i>	15 9	

Nassick, 10 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.(signed) *Dajee Sucharam*, Carkoon.(signed) *Nursoo Venhoo*, Overseer.(signed) *M. McNally*, Serjeant Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 16.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.

Dr.

The under-mentioned Articles supplied, and Conveyance for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1 candee	Charcoal	9 8	candee	9 8	} - - -	-- The mark of Eesub Wd. Khuteeb.
2	Carta, conveyance Charcoal.	1	each	2		
TOTAL				<i>Rs.</i>	11 8 -	
					11 8 -	

Nassick, 14 February 1851.

Witness:

(signed) *Abbajee Ruggoonath*, Storekeeper.The mark of *Narryen Wd. Hurry*.The mark of *Dugajee Sunbajee Mujray*.(signed) *M. McNally*, Serjeant, Overseer.(signed) *Dajee Sucharam*, Carkoon.(signed) *Nursoo Venhoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

No. 5.—Receipt of Materials supplied—*continued.*

(No. 17.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Carts for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1	Cart, Govern-ment articles, Conveyance.	- 12 -	each -	- 12 -	- 12 -	(signed) Abbajee.
				TOTAL - - -	<i>Rs.</i> - 12 -	

Nassick, 16 February 1851.

(signed) *M. M. Nally*, Serjeant, Overseer. (signed) *Abbajee Ruggoonath*, Storekeeper.
(signed) *Dajee Sucharam*, Carcoon. (signed) *Nursoo Venkoo*, Overseer
(True Translation.)
(signed) *W. Chapman*, Lieutenant Engineers.

(No. 18.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
11 1/4 seers -	Iron - -	1 - -	4 1/2 seers -	2 6 4	- - -	(signed) Goozerathee.
10 1/4 seers -	ditto - -	1 - -	6 seers -	1 15 -	- - -	(signed) ditto.
6 dozen -	Screws - -	- 2 -	dozen -	- 12 -	- - -	
				TOTAL - - -	<i>Rs.</i> 5 1 4	

Nassick, 16 February 1851.

(signed) *M. M. Nally*, Serjeant, Overseer. (signed) *Abbajee Ruggoonath*, Storekeeper.
Witness: The mark of *Buajee Wd. Sumbajee Majray*. The mark of *Nuthoo Wd. Harry Blayee*.
(signed) *M. M. Nally*, Serjeant, Overseer. (signed) *Dajee Sucharam*, Carcoon.
(signed) *Nursoo Venkoo*, Overseer.
(True Translation.)
(signed) *W. Chapman*, Lieutenant Engineers.

(No. 19.)

Lieutenant *W. Chapman*, Engineers, Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Articles supplied for the use of the *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1	Carpenter, mak- ing Wheels.	- 5 -	each -	- 5 -	- - -	The mark of Bhowanee.
1	Bablee Wood for Wheels.	- 5 -	each -	- 5 -	- - -	ditto - Amboo.
6	Wheels repaired by Katarce.	- 1 -	each -	- 6 -	- - -	(signed) Bahjee Katary.
				TOTAL - - -	<i>Rs.</i> 1 - -	

Nassick, 16 February 1851.

(signed) *M. M. Nally*, Serjeant, Overseer. (signed) *Abbajee Ruggoonath*, Storekeeper.
(signed) *Dajee Sucharam*, Carcoon. (signed) *Nursoo Venkoo*, Overseer.
(True Translation.)
(signed) *W. Chapman*, Lieutenant Engineers.

No. 20.—Receipt of Materials supplied.—continued.

(No. 20.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.

Dr.

The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Quantity or Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
1½	seers, Socket Brass	Rs. a. p. 3 - -	seer	Rs. a. p. 4 11 -	Rs. a. p. 4 11 -	(signed) Crustnaje.
TOTAL				Rs.	4 11 -	

Nassick, 16 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:

The mark of *Guttoo Bhenjee*.The mark of *Kadurkha Wd. Ahmedkha*.(signed) *M. M'Nally*, Serjeant, Overseer.(signed) *Dajee Sucharam*, Carcoon.(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 21.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.

Dr.

The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
½	pulla - Hemp	Rs. a. p. 8 8 -	pulla	Rs. a. p. 4 4 -	Rs. a. p. 4 4 -	(signed) Balaram.
TOTAL				Rs.	4 4 -	

Nassick, 16 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:

The mark of *Khundie Naghe Mahar*.The mark of *Narayan Wd. Hurry*.(signed) *Dajee Sucharam*, Carcoon.(signed) *M. M'Nally*, Serjeant, Overseer.(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.

Dr.

The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
1	candee - Charcoal	Rs. a. p. 9 8 -	each	Rs. a. p. 9 8 -	Rs. a. p. 9 8 -	(signed) Essub Wd. Khunatee.
1	Cart hired	1 - -	each	2 - -	11 8 -	Pandoo Tally (marked.)
TOTAL				Rs.	11 8 -	

Nassick, 10 February 1851.

(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:

Marked *Pandoo Wd. Kondoo Tailor*.The marked *Hurry Wd. Vaghajee*.(signed) *M. M'Nally*, Serjeant, Overseer.(signed) *Dajee Sucharam*, Carcoon.(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

No. 23.—Receipt of Materials supplied—*continued.*

(No. 23.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*

The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1	Rubber, piece	- 8 -	each -	- 8 -	- - -	} (signed) Guzarathee.
1	Box Waters -	- 2 6	- - -	- 2 6	- - -	
1	Foolscap Paper	- 9 6	each -	- 4 9	- - -	
1	French Paper	- 3 -	- - -	- 1 6	- - -	
29 seers	Coir Rope -	1 - -	8 seers -	3 10 -	- - -	
TOTAL - - -				<i>Rs.</i>	4 10 9	

Nassick, 19 February 1851.

Mark of *Guttoo Wd. Bhejee*.

(signed) *M. McNally*, Serjeant, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(signed) *Abhjee Ruggoonath*, Storekeeper.

Witness:

Dhondee Wd. Rayjee, marked.

(signed) *Dajee Sucharam*, Carcoon.

(signed) *Nursoo Venkoo*, Overseer.

(No. 24.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*

The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1	Chalk - -	1 - -	5 seers -	- 3 2	- - -	} (signed) Guzarathee.
TOTAL - - -				<i>Rs.</i>	- 3 2	

Nassick, 19 February 1851.

(signed) *M. McNally*, Serjeant, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(signed) *Abhjee Ruggoonath*, Storekeeper.

(signed) *Dajee Sucharam*, Carcoon.

(signed) *Nursoo Venkoo*, Overseer.

(No. 25.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*

The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1	Pint of Red Ink	- 3 -	each -	- 3 -	- - -	} (signed) Guzarathee.
1	ditto Black Ink	- 3 -	each -	- - -	- 6 -	
TOTAL - - -				<i>Rs.</i>	- 6 -	

Nassick, 23 February 1851.

(signed) *M. McNally*, Serjeant, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(signed) *Abhjee Ruggoonath*, Storekeeper.

(signed) *Dajee Sucharam*, Carcoon.

(signed) *Nursoo Venkoo*, Overseer.

No. 5.—Receipt of Materials supplied—continued.

(No. 26.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. Dr.The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
1	Hemp - Cart, hired -	<i>Rs. a. p.</i> 8 8 - - 12 -	pullah each -	<i>Rs. a. p.</i> 4 4 - - 12 -	<i>Rs. a. p.</i> - - - 5 - -	(signed) Ramchond. The mark of Abba Tailor.
TOTAL - - - <i>Rs.</i>					5 - -	

Forwarded 23 February 1851.

(signed) *M. M'Nally*, Serjeant, Overseer.(signed) *Abbajee Ruggoonath*, Storekeeper.(signed) *Dajee Sucharam*, Carcoon.(signed) *Nursoo Venkoo*, Carcoon, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 27.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. Dr.The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
45½ seers 60 seers	Coir Rope - Hemp -	<i>Rs. a. p.</i> 1 - - 8 10 -	8 seers - pulla -	<i>Rs. a. p.</i> 5 11 - 4 5 -	<i>Rs. a. p.</i> - - - - - - 10 - -	(signed) Balaram.
TOTAL - - - <i>Rs.</i>					10 - -	

Forwarded 23 February 1851.

The mark of *Buyajee Wd. Sumbajee Majray*.(signed) *M. M'Nally*, Serjeant, Overseer.(signed) *Abbajee Ruggoonath*, Storekeeper.

Witness:

The mark of *Kadeerkha Wd. Mahmedkha*.(signed) *Dajee Sucharam*.(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 28.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. Dr.The under-mentioned Cane Baskets supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
176 1 seer	Cane Baskets Coir Rope -	<i>Rs. a. p.</i> 84 5 4 1 - -	240 8 seers -	<i>Rs. a. p.</i> 25 - 7 - 2 -	<i>Rs. a. p.</i> - - - - - - 25 2 7	(signed) <i>Abbajee Ruggoonath</i> .
TOTAL - - - <i>Rs.</i>					25 2 7	

Forwarded 3 February 1851.

(signed) *M. M'Nally*, Serjeant, Overseer.(signed) *Abbajee Ruggoonath*, Storekeeper.(signed) *Dajee Sucharam*, Carcoon.(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

No. 5.—Receipt of Materials supplied—*continued.*

(No. 29.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.

Dr.

The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851, for Stationery.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
½ dostia	Common Paper	- 8 -	each - -	- 4 -	- - -	} (signed) Guzrathee.
Ink	Ink	- - -	- - -	- - 9	- - -	
					- 4 9	
			TOTAL	- - - <i>Rs.</i>	- 4 9	

Forwarded 28 February 1851.

(signed) *M. McNally*, Serjeant, Overseer.

(signed) *Ablajee Ruggoonath*, Storekeeper.

(signed) *Dajee Sucharam*, Carcoon.

(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 30.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.

Dr.

The under-mentioned Carts employed for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
2	Carts hired	- 8 -	each - -	1 - -	1 - -	The mark of Rama Wd. Kondajee.
					1 - -	
			TOTAL	- - - <i>Rs.</i>	1 - -	

5 February 1851.

(signed) *M. McNally*, Serjeant, Overseer.

(signed) *Dajee Sucharam*, Carcoon.

(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 31, of 1851.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.

Dr.

The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
16	candies	4 - -	candie -	64 - -	- - -	The mark of Rittoo Lonary. " Tookaram. " Sutwa. " Huavunta. " Maya.
4	"	4 - -	ditto -	16 - -	- - -	
15½	"	4 - -	ditto -	62 - -	- - -	
14	"	4 - -	ditto -	56 - -	- - -	
5	"	3 - -	ditto -	15 - -	- - -	
			TOTAL	- - - <i>Rs.</i>	213 - -	

28 February 1851.

(signed) *M. McNally*, Serjeant, Overseer.

(signed) *Dajee Sucharam*, Carcoon.

(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

No. 5.—Receipt of Materials supplied—continued.

(No. 32.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
133 piculies	Grain	1 - -	6 piculies	22 2 8	- - -	(signed) Bhowanee Sing. Blageeruth Sing.
11½ seers	Oil	1 - -	6½ seers	2 - -	- - -	
80 seers	Goand	1 - -	7 "	11 6 10	- - -	
25 piculies	Heerday	1 - -	10 piculies	2 8 -	- - -	
80 seers	Cair Rope	1 - -	6 seers	14 13 4	- - -	
188 "	Goor	1 - -	18 "	10 2 8	- - -	
					63 1 6	
			TOTAL	- - - <i>Rs.</i>	63 1 6	

10 February 1851.

(signed) *M. McNally*, Serjeant, Overseer.(signed) *Dajee Sucharam*, Carkeon.(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 33.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
36 seers	Head	1 - -	12 seers	3 - -	- - -	(signed) Nuthoo Wd. Ranjee Patel.
12 "	Hemp	1 - -	14 "	3 - -	- - -	
					6 - -	
			TOTAL	- - - <i>Rs.</i>	6 - -	

28 February 1851.

(signed) *M. McNally*, Serjeant, Overseer.(signed) *Dajee Sucharam*, Carkeon.(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 34.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*The under-mentioned Carts supplied for the use of *Undwell* Bridge, during the month of February 1851 (for conveying Wood from the *Thal* Quant to *Undwell*.)

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
0	Carts hired	- 12 -	each	4 8 -	- - -	The mark of Amunda Wd. Dhargee. Bhawoo Sing.
0	Ditto	- 12 -	"	4 8 -	- - -	
					9 - -	
			TOTAL	- - - <i>Rs.</i>	9 - -	

28 February 1851.

(signed) *M. McNally*, Serjeant, Overseer.(signed) *Dajee Sucharam*, Carkeon.(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 35.)

No. 5.—Receipt of Materials supplied—*continual*.

(No. 35.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*

The under-mentioned Carts supplied for the use of *Undwell* Bridge, during the month of February 1851 (conveying Wood from *Thul* Ghaut to *Undwell*).

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	(signed)
3	Ramjee Nuthoo - -	- 8 -	each -	1 8 -	- - -	Nuthoo Wd. Ramjee.
3	Esrām Wd. Ramjee -	- 8 -	" -	1 8 -	- - -	Esrām Ramjee.
7	Buherroo Wd. Lad Pateel -	- 8 -	" -	3 8 -	- - -	Buherroo Lad Pateel.
8	Bappoo Wd. Bhickajee -	- 8 -	" -	4 - -	- - -	Bappoo Bhickajee.
7	Bhawoo Sing - -	- 8 -	" -	3 8 -	- - -	Bhawoo Sing.
4	Govinda Ragh Nack -	- 8 -	" -	2 - -	- - -	Govinda Wd. Ram Nack.
7	Mhadoo Sonar - -	- 8 -	" -	3 8 -	- - -	Mhadoo Sonar.
4	Suddoo Nimba - -	- 8 -	" -	1 2 -	- - -	Suddoo Nimba.
3	Govind Wd. Ramaram -	- 8 -	" -	1 8 -	- - -	Govinda Ramaram.
4	Laxamon Ramjee - -	- 8 -	" -	2 - -	- - -	Laxamon Ramjee.
					25 - -	
				TOTAL - - - <i>Rs.</i>	25 - -	

(signed) *M. McNally*, Serjeant, Overseer.

(signed) *Dajee Sucharam*, Carcoon.

(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 36.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*

The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	(signed)
19½ seers	Steel - -	48 - -	56 seers -	16 14 10	- - -	Guzarathee.
					16 14 10	
				TOTAL - - - <i>Rs.</i>	16 14 10	

2 February 1851.

(signed) *M. McNally*, Serjeant, Overseer.

(signed) *Dajee Sucharam*, Carcoon.

(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 37.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*

The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	(signed)
22 seers	Steel - -	48 - -	56 seers -	18 13 8	- - -	Pharsee.
					18 13 8	
				TOTAL - - - <i>Rs.</i>	18 13 8	

18 February 1851.

(signed) *M. McNally*, Serjeant, Overseer.

(signed) *Dajee Sucharam*, Carcoon.

(signed) *Nursoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

No. 5.—Receipt of Materials supplied—*continued.*

(No. 38.)—Bill No. 1.

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.*Dr.*The under-mentioned Workpeople employed on cutting Wood for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
5	Biggaries -	- 2 3	each -	- 11 3		
1	Carpenter -	- 3 -	" -	- 3 -		
					- 14 3	
				TOTAL - - - <i>Rs.</i>	- 14 3	

(signed) *M. M'Nally*, Serjeant, Overseer.(signed) *Vinayekoorf Crustnaje Sucharam*, Storekeeper.(signed) *B. Broch*, Serjeant Overseer.(signed) *Dajee Sucharam*, Carkoon.(signed) *Narsoo Venkoo*, Overseer.

Bill No. 1	- - -	- 14 3
" No. 2	- - -	2 6 3
" No. 3	- - -	9 -
" No. 4	- - -	2 8 -

TOTAL No. 38 - - - 6 5 6

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 38.)—Bill No. 2.

Lieutenant *W. Chapman*, Engineers, Assistant Superintendent Roads, &c.*Dr.*The under-mentioned Workpeople employed on cutting Wood at *Thul* Ghaut for the use of *Undwell* Bridge, during the month of January 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPT.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
13	Biggaries -	- 2 3	each -	1 13 3		
3	Carpenters -	- 3 -	" -	- 9 -		
					2 6 3	
				TOTAL - - - <i>Rs.</i>	2 6 3	

60 Woods cut.

(signed) *Vinayekoorf Crustnaje Sucharam*, Storekeeper.(signed) *B. Broch*, Serjeant, Overseer.(signed) *M. M'Nally*, Serjeant, Overseer.(signed) *Dajee Sucharam*, Carkoon.(signed) *Narsoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 38.)—Bill No. 3.

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c.*Dr.*The under-mentioned Biggaries employed on putting a piece of Wood into Cart forwarded for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPT.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
4	Biggaries -	- 2 3	each -	- 9 -		
					9 -	
				TOTAL - - - <i>Rs.</i>	- 9 -	

(signed) *M. M'Nally*, Serjeant, Overseer.(signed) *Vinayekoorf Crustnaje*, Storekeeper.(signed) *B. Broch*, Serjeant, Overseer.(signed) *Dajee Sucharam*, Carkoon.(signed) *Narsoo Venkoo*, Overseer.

(True Translation.)

(signed) *W. Chapman*, Lieutenant Engineers.

(No. 38.)

No. 5.—Receipt of Materials supplied—*continued.*

(No. 38.)—Bill No. 4.

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Workpeople employed on cutting Wood for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
12	Biggaries -	- 2 3	each -	1 11 -		
4	Carpenters -	- 3 3	„ -	- 13 -	2 8 -	
TOTAL - - -				<i>Rs.</i>	2 8 -	

(signed) *M. M'Nally*, Serjeant, Overseer. (signed) *Venayehoorf Crustnaje Sucharam*, Storekeeper.
(signed) *B. Brock*, Serjeant, Overseer.
(signed) *Dajee Sucharam*, Carcoon.
(signed) *Nursoo Venkoo*, Overseer.
 (True Translation.)
 (signed) *W. Chapman*, Lieutenant Engineers.

(No. 39.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Articles supplied for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
2	Bablee Wood -	- 12 -	each -	1 8 -		The mark of Bappoo Wd. Kondajee. Dewoo Chamber. Mullary Mony. Hurry Wd. Luxamon. - - Vitto Wd. Crustna Coombur.
1	Puckhal repaired -	- 3 -	each -	- 3 -		
3	Hempen Ropes repaired -	- 6 -	each -	1 2 -		
2,000 bundles	Grass -	2 8 -	1,000 -	5 - -		
23	Earthen Pots -	- 7 -	each -	- 13 5 -		
3	Ditto -	- 8 -	each -	- 2 -	8 12 5	
TOTAL - - -				<i>Rs.</i>	8 12 5	

(signed) *M. M'Nally*, Serjeant, Overseer. (signed) *Dajee Sucharam*, Carcoon.
(signed) *Nursoo Venkoo*, Overseer.
 (True Translation.)
 (signed) *W. Chapman*, Lieutenant Engineers.

(No. 47.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Articles supplied for preparing Coigns for the use of *Undwell* Bridge, during the month of February 1851.

Number.	Items.	Rate.	Per	Amount.	TOTAL.	RECEIPTS.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
17	Iron -	1 - -	8 seers -	2 2 -		Government.
2	Ditto -	1 - -	8 seers -	- 4 -	2 6 -	
TOTAL - - -				<i>Rs.</i>	2 6 -	

(signed) *M. M'Nally*, Serjeant, Overseer. (signed) *Dajee Sucharam*, Carcoon.
(signed) *Nursoo Venkoo*, Overseer.
 (True Translation.)
 (signed) *W. Chapman*, Lieutenant Engineers.
 (True copies.)
 (signed) *P. M. Melvill*, Lieut.-col., Secy. to Govt.
 (True copies.)
 (signed) *R. J. H. Birch*, Lieut.-col.
 Offg. Secy. to the Govt. of India in the Military Department.

Appendix (C.)

STORE BILL, No. 1 (or Vouchers), from 40 to 46.

STORES entered in Stock, *Undwell* Bridge, February 1851.

(No. 40.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Labour and Materials used at the *Undwell* Bridge, during the month of
February 1851, for preparing 63 Coigns, mean size, 1' 7" x 15" x 15".

ITEMS.	Number.	Rate.	Per	Amount.	TOTAL.
<i>Labours:</i>		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
Stonecutters - - -	2	- 4 11	each - -	- 9 10	
Ditto - - -	24	- 4 6	" - -	6 12 -	
Ditto - - -	50	- 4 3	" - -	13 4 6	
Ditto - - -	28	- 4 -	" - -	7 - -	
Ditto - - -	44	- 3 -	" - -	8 4 -	
Ditto - - -	10	- 3 3	" - -	2 - -	
Ditto - - -	24	- 2 8	" - -	4 - -	
Ditto - - -	42	- 2 8	" - -	7 - -	
Biggaries - - -	13	- 2 -	" - -	1 10 -	
Boys - - -	11	- 1 -	" - -	- 11 -	
Smiths - - -	4	- 4 8	" - -	1 2 8	
Hammermen - - -	4	- 2 3	" - -	- 9 -	
Bellows Boys - - -	4	- 2 3	" - -	- 9 -	
					53 8 6
<i>Materials:</i>					
Iron - - -	10	12 8 -	120 seers	1 - 8	
Stones - - -	100 cub. ft.	588 - 10	20,932 cub. ft.	2 12 10	
Charcoal - - -	2½ maunds.	9 8 -	20 maunds	1 3 -	
					5 - 6
					TOTAL - - - Rs. 58 9 -

Rate - - - *Rs.* - 14 10 $\frac{3}{4}$ to each Stone cut, and conveyed on the spot.(signed) *M. McNally*, Serjeant, Overseer.(signed) *Dajee Sucharam*, Carloon.
(signed) *Nursoo Venkoo*, Overseer.

(No. 41.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Labour and Materials used at the *Undwell* Bridge, during the month of
February 1851, for repairing Chips, No. 441.

ITEMS.	Number.	Rate.	Per	Amount.	TOTAL.
<i>Labours:</i>		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
Stonecutters - - -	64	- 6 3	each - -	25 - -	
Ditto - - -	24	- 6 -	" - -	9 - -	
Ditto - - -	80	- 5 8	" - -	28 4 -	
Ditto - - -	55	- 4 -	" - -	13 12 -	
Ditto - - -	24	- 3 -	" - -	4 8 -	
Ditto - - -	18	- 4 8	" - -	5 4 -	
Ditto - - -	13	- 2 -	" - -	1 10 -	
Biggaries - - -	44	- 2 -	" - -	5 8 -	
Smiths - - -	3	- 4 8	" - -	- 14 -	
Hammermen - - -	3	- 2 3	" - -	- 6 9	
Bellows Boys - - -	3	- 2 3	" - -	- 6 9	
					92 9 6
<i>Materials:</i>					
Iron - - -	15	13 8 -	120 seers	1 11 -	
Charcoal - - -	10 maunds	9 8 -	20 maunds	4 12 -	
Stones - - -	997 cub. ft.	548 - -	20,932 cub. ft.	27 15 9	
Government Bullocks, pairs - - -	14	58 7 2	140	5 13 6	
					40 4 3
					TOTAL - - - Rs. 132 13 9

Rate - - - *Rs.* - 4 4 $\frac{3}{4}$ to each.(signed) *M. McNally*, Serjeant, Overseer.(signed) *Dajee Sucharam*, Carloon.
(signed) *Nursoo Venkoo*, Overseer.

(No. 42.)

STORE BILL, No. 1—continued.

Appendix (C.)

(No. 43.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Labour and Materials used at the *Undwell* Bridge, during the month of
February 1851, for rough Stones collected, 20,952 cubic feet.

ITEMS.	Number.	Rate.	Per	Amount.	TOTAL
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
<i>Labour:</i>					
Biggaries - - -	760	- 2 -	each - -	95 2 -	
Women - - -	130	- 1 3	" - -	10 2 6	
Boys - - -	101	- 1 -	" - -	6 5 -	
Biggaries (Minners) -	28	- 4 -	" - -	7 - -	
Ditto - ditto -	9	- 2 7	" - -	1 7 3	
Carpenters - - -	3	- 6 -	" - -	1 2 -	
Ditto - - -	1	- 2 -	" - -	- 2 -	
Smiths - - -	16	- 4 8	" - -	4 10 8	
Ditto - - -	6	- 6 -	" - -	2 4 -	
Hammermen - - -	16	- 2 3	" - -	2 4 -	
Bellows Boys - - -	16	- 2 3	" - -	2 4 -	
Minners - - -	543½	- 2 -	" - -	68 3 -	
Carts, Village - - -	179	- 8 -	" - -	89 8 -	290 6 5
<i>Materials:</i>					
Gunpowder - - -	120 seers	15 - -	120	15 - -	
Ditto - - -	97	20 - -	120	16 2 8	
Iron - - -	9	13 8 1	120	1 - 2	
Fine Steel - - -	12½ seers	48 - -	56	10 14 10	
Charcoal - - -	20 maunds	9 8 -	20 maunds	9 8 -	
Iron - - -	1½ ½	1 - -	4½ seers	- 6 4	
Earthen Pots - - -	10	- - 7	each - -	- 5 10	
Carts hired - - -	4	1 - -	" - -	4 - -	
Hemp - - -	17	7 12 -	120	- 1 7	
Coir Rope - - -	6	1 - -	8 seers	- 12 -	
Cart, prepared in Store, as per Abbajee's Bill	1	165 10 10	each - -	165 10 10	
Cart-conveyed Wood from Thul Ghaut to Undwell Bridge	52	- 8 -	" - -	26 - -	
Government Bullocks, pairs	112	58 7 2	140	46 12 2	97 10 5
TOTAL				Rs.	588 - 10

Rate - - - *Rs. 2 12 10 ½* per 100 cubic feet.

(signed) *M. M'Nally*, Serjeant, Overseer.

(signed) *Dajee Sucharam*, Carcoon.
(signed) *Nursoo Venho*, Overseer.

Appendix (C.)

STORE BILL, No. 1—continued.

(No. 43.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *D.*
 The under-mentioned Materials and Labour at *Undwell* Bridge, during the month of February 1851, for grinding Chunam, including Sand, Musula, &c., 94 candelies.

ITEMS.	Number.	Rate.	Per	Amount.	TOTAL.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
<i>Labour:</i>					
Biggaries - - - -	116	- 2 -	each - -	14 8 -	
Women - - - -	122	- 1 3	" - -	9 8 6	
Boys - - - -	44	- 1 -	" - -	2 12 -	
Bullocks, pairs, Village	96	- 5 -	" - -	30 - -	
Carpenter - - - -					56 12 6
<i>Materials:</i>					
Dry Chunam - - -	49½	4 - -	candee -	198 - -	
Ditto - - - -	5	3 - -	" - -	15 - -	
Hemp - - - -	180	8 - -	120 -	12 - -	
Ditto - - - -	92	7 12 -	120 -	5 15 1	
Gound - - - -	80	1 - -	7 seers -	11 6 10	
Ditto - - - -	26	26 - -	120 " -	5 10 1	
Kath - - - -	89	1 - -	6 " -	14 13 4	
Ditto - - - -	12	4 - -	120 " -	2 6 5	
Goor - - - -	170	1 - -	18 " -	9 7 1	
Hurdlay - - - -	25 pieles	1 - -	10 pieles -	2 8 -	
Ditto - - - -	34	1 - -	10 " -	3 6 5	
Carts, hired - - -	5	1 - -	each - -	5 - -	
Oil - - - -	5½ seers	1 - -	5½ seers -	1 - -	
Bags for Grain - -	2	- 3 6	each - -	- 7 -	
Government Bullock,					
Pairs, with Puckals -	14	53 7 2	140 seers -	5 13 6	
Earthen Pots - - -	6	- 7 -	each - -	- 3 6	
Puckals, repaired -	1	- 3 -	" - -	- 3 -	
					293 4 5
TOTAL - - -				Rs. 350 - 9	

Rate - - - *Rs. 3 11 7* to each candee.

(signed) *M. M. Nally*, Sergeant, Overseer.

(signed) *D. Jee Sankar*, *C. C. Karoon*,
 (signed) *Narasa Venker*, Overseer.

(No. 44.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *D.*
 The under-mentioned Labour and Materials used at the *Undwell* Bridge, during the month of February 1851, for Government Cattle "Feeding," 110 Pairs.

ITEMS.	Number.	Rate.	Per	Amount.	TOTAL.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
<i>Labour:</i>					
Cartmen - - - -	140	4 8 -	month -	22 8 -	
Women - - - -	10	- 1 3	each - -	- 12 6	
					23 4 6
<i>Materials:</i>					
Grass - - - -	103 pieles	1 - -	6 pieles -	22 1 8	
Grass (bundles) - -	2,400	2 8 -	1,000 -	6 - -	
Ditto - - - -	2,000	2 8 -	1,000 -	5 - -	
Oil - - - -	12	1 - -	6 seers -	2 - -	
					35 2 8
TOTAL - - -				Rs. 58 7 2	

Rate - - - *Rs. - 6 8 1/2* per pair.

(signed) *M. M. Nally*, Sergeant, Overseer.

(signed) *D. Jee Sankar*, *C. C. Karoon*,
 (signed) *Narasa Venker*, Overseer.

(No. 45.)

STORE BILL, No. 1—continued.

Appendix (C.)

(No. 45.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Labour and Materials used at the *Undwell* Bridge, during the month of
February 1851, for Bond Stone cut, 21, in size 3 × 3 × 2.

ITEMS.	Number.	Rate.	Per	Amount.	TOTAL.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
<i>Labour :</i>					
Stonecutters - - -	21	- 6 3	each - -	8 3 3	
Ditto - - - - -	6	- 6 -	" - - -	2 4 -	
Ditto - - - - -	16	- 6 11	" - - -	6 14 8	
Ditto - - - - -	12	- 4 -	" - - -	3 - -	
Ditto - - - - -	11	- 5 -	" - - -	3 7 -	
Ditto - - - - -	18	- 5 3	" - - -	3 14 6	
Ditto - - - - -	3	- 4 8	" - - -	- 14 -	
Ditto - - - - -	4	- 2 -	" - - -	- 8 -	
Beggaries - - - -	101	- 2 -	" - - -	12 10 -	
Women - - - - -	9	- 1 3	" - - -	- 11 3	
Boys - - - - -	18	- 1 -	" - - -	1 2 -	
Carts - - - - -	13	- 8 -	" - - -	6 8 -	
Smiths - - - - -	3	- 4 8	" - - -	- 14 -	
Hammermen - - -	3	- 2 3	" - - -	- 6 9	
Bellows Boys - - -	3	- 2 3	" - - -	- 6 9	
					53 12 2
<i>Materials :</i>					
Government Iron -	2 seers	1 - -	8 seers -	- 4 -	
Ditto - - - - -	2½ "	1 - -	8 " - -	- 1 -	
	2½ "	1 - -	4 " - -	- 9 -	
Ditto - - - - -	5 "	13 8 -	120 " - -	- 9 -	
Coir Rope - - - -	8 "	1 - -	8 " - -	1 - -	
Charcoal - - - - -	3 maunds	9 8 -	20 maunds	2 6 -	
Steel - - - - -	5½ seers	1 - -	3½ seers -	1 - -	
Cart, hired - - -	1	1 - -	- - - -	1 - -	
					6 13 -
TOTAL - - - <i>Rs.</i>					60 9 2

Rate - - - *Rs.* 2 14 1½ each, including conveyance at the Bridge.
(signed) *M. McNally*, Serjeant, Overseer. (signed) *Dajee Sucharam*, Carkoon.
(signed) *Nursoo Venkoo*, Overseer.

(No. 46.)

Lieutenant *W. Chapman*, Engineers, First Assistant Superintendent Roads, &c. *Dr.*
The under-mentioned Labour and Materials used at the *Undwell* Bridge, during the month of
February 1851, for Bond Stones dressed, 36 number, size 3' × 2' × 2'.

ITEMS.	Number.	Rate.	Per	Amount.	TOTAL.
		<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
<i>Labour :</i>					
Stonecutters - - -	13	- 6 3	each - -	5 1 3	
Ditto - - - - -	8	- 5 3	" - - -	2 10 -	
Ditto - - - - -	2	- 7 -	" - - -	- 14 -	
Ditto - - - - -	9	- 6 -	" - - -	3 6 -	
Ditto - - - - -	21	- 5 -	" - - -	6 9 -	
Ditto - - - - -	4	- 4 -	" - - -	1 - -	
Boys - - - - -	6	- 1 -	" - - -	- 6 -	
Smiths - - - - -	2	- 4 8	" - - -	- 9 4	
Hammermen - - -	2	- 2 3	" - - -	- 4 6	
Bellows Boys - - -	2	- 2 3	" - - -	- 4 6	
					21 - 7
<i>Materials :</i>					
Charcoal - - - - -	2½ seers	9 8 -	20 maunds	1 3 -	
Iron - - - - -	5 "	13 8 -	120 seers -	- 9 -	
Bond Stone for Jan. 1851	25	206 5 3	73	70 10 7	
Ditto for Feb. 1851	11	60 0 2	21	31 11 8	
					104 2 3
TOTAL - - - <i>Rs.</i>					125 3 10

Rate - - - *Rs.* 3 7 7½ each.
(signed) *M. McNally*, Serjeant, Overseer. (signed) *Dajee Sucharam*, Carkoon.
(signed) *Nursoo Venkoo*, Overseer.

(True copies.)

(signed) *P. M. Melvill*, Lieut.-col.,
Secy. to Govt. in the Military Department.

(True copies.)

(signed) *R. J. H. Birch*, Lieut.-col.,
Offg. Secy. to the Govt. of India in the Military Department.

Number.	BY WHOM SUPPLIED.	BY WHOM SUPPLIED.	
		Hemp Seers	120 Seers
	Balance last month	140	66
1	Abbajee Hagoonath, Store-keeper		20
2	Ditto - ditto		
3	Ditto - ditto		
4	Ditto - ditto		
5	Ditto - ditto		
6	Ditto - ditto		
7	Ditto - ditto		
8	Ditto - ditto		
9	Ditto - ditto		
10	Ditto - ditto		
11	Ditto - ditto		
12	Ditto - ditto		
13	Hoozoor Bill		
14	Abbajee Hagoonath Nassick, Storekeeper		
15	Ditto - ditto, Bill, No. 15		
16	Ditto - ditto		
17	Ditto - ditto		
18	Ditto - ditto		
19	Ditto - ditto, Bill, No. 20		
20	Ditto - ditto		
21	Ditto - ditto		
22	Ditto - ditto		
		100 Pikes	1
		Baskets, Bamboo No.	100 Pikes 2 8
		Gun Seers	120 Seers 17
		Iron - Ditto	4 Seers 1
		Steel ditto 100 seers per Rupee	
		Iron - Ditto	120 Seers 13 8
		Coor Ditto	120 Seers 8
		Pencils, Wooden Dozen	Each 6
		Chinam, Ground Canbica	Candy 3 6 11
		Cars conveyed Store	1 - -
		Good Seers	120 Seers 26
		Kath Seers	120 Seers 24
		Noonazur Seers	Seers 12
		Nails Seers	34 Seers
		Powder, Blasting Seers	120 Seers 15
		Grass Bundles	1,000 3 8
		Iron, Government Seers	8 Seers 1
		Chinam, Ground Canbica	446 8 5
		Stores, Rough Cubic Feet	977 4 9

No. 7. DAY BOOK OF LABOUR; and No. 8. DAILY (or Figured) ABSTRACT.

No. 7.
DAY BOOK OF LABOUR.

Date.	No.	ITEMS.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
1851:			<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
February 1	1	Carcoon	- 5 9	each	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	1	Ditto	- 8 5	"	- 8 5		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Smith	- 6 6	"	- 6 6		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Bellows Boy	- 2 6	"	- 2 6		
	1	Carpenter	- 6 -	"	- 6 -		
	1	Chowkedar	- 2 3	"	- 2 3		
	5	Masons	- 7 -	"	2 3 -		
	2	Ditto	- 6 6	"	- 13 -		
	4	Ditto	- 5 -	"	1 4 -		
	7	Ditto	- 6 4	"	2 12 4		
	7	Ditto	- 6 -	"	2 10 -		
	1	Ditto	- 4 -	"	- 4 -		
3	Stonecutters	- 7 -	"	1 5 -			
1	Ditto	- 6 6	"	- 6 6			
1	Ditto	- 6 -	"	- 6 -			
90	Biggaries	- 2 -	"	11 4 -			
33	Women	- 1 3	"	2 9 3			
12	Boys	- 1 -	"	- 12 -			
					29 12 1		
February 2	1	Carcoon	- 5 9	"	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	1	Ditto	- 8 5	"	- 8 5		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Smith	- 6 6	"	- 6 6		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Bellows Boy	- 2 6	"	- 2 6		
	1	Carpenter	- 6 -	"	- 6 -		
	1	Chowkedar	- 2 3	"	- 2 3		
	6	Masons	- 7 -	"	2 3 -		
	2	Ditto	- 6 6	"	- 13 -		
	3	Ditto	- 5 -	"	- 15 -		
	6	Ditto	- 6 4	"	2 6 -		
	7	Ditto	- 6 -	"	2 10 -		
	1	Ditto	- 4 -	"	- 4 -		
1	Ditto	- - -	"	- - -			
2	Stonecutters	- 7 -	"	- 14 -			
1	Ditto	- 6 6	"	- 6 0			
61	Biggaries	- 2 -	"	7 10 -			
23	Women	- 1 3	"	1 12 9			
7	Boys	- 1 -	"	- 7 -			
					23 8 3		
February 3	1	Carcoon	- 5 9	"	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	1	Ditto	- 8 5	"	- 8 5		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Smith	- 6 6	"	- 6 6		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Bellows Boy	- 2 6	"	- 2 6		
	1	Carpenter	- 6 -	"	- 6 -		
	1	Chowkedar	- 2 3	"	- 2 3		
	6	Masons	- 7 -	"	2 3 -		
	2	Ditto	- 6 6	"	- 13 -		
	4	Ditto	- 5 -	"	1 4 -		
	7	Ditto	- 6 4	"	2 12 4		
	7	Ditto	- 6 -	"	2 10 -		
	1	Ditto	- 4 -	"	- 4 -		
2	Stonecutters	- 6 11	"	- 13 10			
3	Ditto	- 7 -	"	1 5 -			
1	Ditto	- 6 6	"	- 6 6			
81	Biggaries	- 2 -	"	10 2 -			
35	Women	- 1 3	"	2 11 9			
15	Boys	- 1 -	"	- 15 -			
					29 7 5		
				Carried forward	- - - Rs.	32 11 9	

Appendix (C.)

No. 7.—DAY BOOK OF LABOUR—continued.

Date.	No.	ITEMS.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
			<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
1851:					Brought forward - - -	82 11 9	
February 4	1	Carcoon - -	- 5 9	each	- 5 9		
	1	Maistry - -	- 11 5	"	- 11 5		
	1	Ditto - -	- 8 5	"	- 8 5		
	2	Muckadums - -	- 2 10	"	- 5 8		
	1	Smith - -	- 6 6	"	- 6 6		
	1	Ditto - -	- 6 -	"	- 6 -		
	1	Hammerman - -	- 2 6	"	- 2 6		
	1	Bellows Boy - -	- 2 6	"	- 2 6		
	2	Carpenters - -	- 6 -	"	- 12 -		
	1	Chowkedar - -	- 2 3	"	- 2 3		
	5	Masons - -	- 7 -	"	2 3 -		
	2	Ditto - -	- 6 6	"	- 13 -		
	5	Ditto - -	- 5 -	"	1 9 -		
	7	Ditto - -	- 6 4	"	2 12 4		
	7	Ditto - -	- 6 -	"	2 10 -		
	1	Ditto - -	- 4 -	"	- 4 -		
	2	Stonecutters - -	- 6 11	"	- 13 10		
	4	Ditto - -	- 7 -	"	1 12 -		
	1	Ditto - -	- 6 6	"	- 6 6		
	83	Biggaries - -	- 2 -	"	10 6 -		
	35	Women - -	- 1 3	"	2 11 9		
	12	Boys - -	- 1 -	"	- 12 -		
						31 - 5	
February 5	1	Carcoon - -	- 5 9	"	- 5 9		
	1	Maistry - -	- 11 5	"	- 11 5		
	1	Ditto - -	- 8 5	"	- 8 5		
	2	Muckadums - -	- 2 10	"	- 5 8		
	1	Smith - -	- 6 6	"	- 6 6		
	1	Ditto - -	- 6 -	"	- 6 -		
	1	Hammerman - -	- 2 6	"	- 2 6		
	1	Bellows Boy - -	- 2 6	"	- 2 6		
	3	Carpenters - -	- 6 -	"	1 2 -		
	1	Chowkedar - -	- 2 3	"	- 2 3		
	1	Carpenter's Boy - -	- 2 -	"	- 2 -		
	5	Masons - -	- 7 -	"	2 3 -		
	2	Ditto - -	- 6 6	"	- 13 -		
	5	Ditto - -	- 5 -	"	1 9 -		
	7	Ditto - -	- 6 4	"	2 12 4		
	7	Ditto - -	- 6 -	"	2 10 -		
	1	Ditto - -	- 4 -	"	- 4 -		
	2	Stonecutters - -	- 6 11	"	- 13 10		
	4	Ditto - -	- 7 -	"	1 12 -		
	1	Ditto - -	- 6 6	"	- 6 6		
	1	Ditto - -	- 6 -	"	- 6 -		
	84	Biggaries - -	- 2 -	"	10 8 -		
	40	Women - -	- 1 3	"	3 2 -		
	12	Boys - -	- 1 -	"	- 12 -		
						32 6 8	
February 6	1	Carcoon - -	- 5 9	"	- 5 9		
	1	Maistry - -	- 11 5	"	- 11 5		
	2	Ditto - -	- 8 5	"	1 - 10		
	2	Muckadums - -	- 2 10	"	- 5 8		
	1	Smith - -	- 6 6	"	- 6 6		
	1	Ditto - -	- 6 -	"	- 6 -		
	1	Hammerman - -	- 2 6	"	- 2 6		
	1	Bellows Boy - -	- 2 6	"	- 2 6		
	3	Carpenters - -	- 6 -	"	1 2 -		
	1	Chowkedar - -	- 2 3	"	- 2 3		
	1	Carpenter's boy - -	- 2 -	"	- 2 -		
	6	Masons - -	- 7 -	"	2 3 -		
	2	Ditto - -	- 6 6	"	- 13 -		
	5	Ditto - -	- 5 -	"	1 9 -		
	7	Ditto - -	- 6 4	"	2 12 4		
	7	Ditto - -	- 6 -	"	2 10 -		
	1	Ditto - -	- 4 -	"	- 4 -		
		Carried forward - - -		Rs.	15 2 9	140 2 10	

No. 7.—DAY BOOK OF LABOUR—continued.

Appendix (C)

Date.	No.	ITEMS.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL
			<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
1851:		Brought forward - - -			15 2 9	146 2 10	
February 6 (cont'd).	2	Stonecutters	6 11	each	13 10		
	1	Ditto	5 -	"	5 -		
	4	Ditto	7 -	"	1 12 -		
	1	Ditto	6 6	"	6 6		
	1	Ditto	6 -	"	6 -		
	1	Ditto	4 -	"	4 -		
	70	Biggaries	1 3	"	8 12 -		
	35	Women	1 3	"	2 11 9		
	10	Boys	1 -	"	10 -		
						31 3 10	
February 7	1	Carcoon	5 9	"	5 9		
	1	Maistry	11 5	"	11 5		
	2	Ditto	8 5	"	1 - 10		
	2	Muckadums	2 10	"	5 8		
	1	Smith	6 6	"	6 6		
	1	Ditto	6 -	"	6 -		
	1	Hammerman	2 6	"	2 6		
	1	Bellows Boy	2 6	"	2 6		
	3	Carpenters	6 -	"	1 2 -		
	1	Chowkedar	2 3	"	2 3		
	2	Carpenter's Boys	2 -	"	4 -		
	5	Masons	7 -	"	2 3 -		
	2	Ditto	6 6	"	13 -		
	6	Ditto	5 -	"	1 9 -		
	7	Ditto	6 4	"	2 12 4		
	7	Ditto	6 -	"	2 10 -		
	1	Ditto	4 -	"	4 -		
	2	Stonecutters	6 11	"	13 10		
	2	Ditto	5 -	"	10 -		
	1	Ditto	6 3	"	6 3		
	4	Ditto	7 -	"	1 12 -		
	1	Ditto	6 6	"	6 6		
	3	Ditto	6 -	"	1 2 -		
	1	Ditto	4 -	"	4 -		
	82	Biggaries	2 -	"	10 4 -		
	36	Women	1 3	"	2 13 -		
	12	Boys	1 -	"	12 -		
						34 8 4	
February 8	1	Carcoon	5 9	"	5 9		
	1	Maistry	11 5	"	11 5		
	2	Ditto	8 5	"	1 - 10		
	2	Muckadums	2 10	"	5 8		
	1	Smith	6 6	"	6 6		
	1	Ditto	6 -	"	6 -		
	1	Hammerman	2 6	"	2 6		
	1	Bellows Boy	2 6	"	2 6		
	3	Carpenters	6 -	"	1 2 -		
	1	Chowkedar	2 3	"	2 3		
	2	Carpenter's Boys	2 -	"	4 -		
	5	Masons	7 -	"	2 3 -		
	2	Ditto	6 6	"	13 -		
	5	Ditto	5 -	"	1 9 -		
	6	Ditto	6 4	"	2 8 -		
	7	Ditto	6 -	"	2 10 -		
	1	Ditto	4 -	"	4 -		
	2	Stonecutters	6 11	"	13 10		
	2	Ditto	5 -	"	10 -		
	1	Ditto	6 3	"	6 3		
	4	Ditto	7 -	"	1 12 -		
	1	Ditto	6 6	"	6 6		
	3	Ditto	6 -	"	1 2 -		
	1	Ditto	4 -	"	4 -		
	87	Biggaries	2 -	"	10 14 -		
	36	Women	1 3	"	2 13 -		
	12	Boys	1 -	"	12 -		
						31 12 -	
		Carried forward - - -			<i>Rs.</i> 246 11 -		

Appendix (C.)

No. 7.—DAY BOOK OF LABOUR—*continued.*

Date.	No.	ITEMS.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
			<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
1851:			Brought forward		- - -	246 11 -	
February 9	1	Carcoon	- 5 9	each	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	2	Ditto	- 8 5	"	1 - 10		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Smith	- 6 6	"	- 6 6		
	1	Ditto	- 6 -	"	- 6 -		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Bellows Boy	- 2 6	"	- 2 6		
	1	Carpenter	- 6 -	"	- 6 -		
	1	Chowkedar	- 2 3	"	- 2 3		
	5	Masons	- 7 -	"	2 3 -		
	2	Ditto	- 6 6	"	- 13 -		
	3	Ditto	- 5 -	"	- 15 -		
	5	Ditto	- 6 4	"	1 15 8		
	7	Ditto	- 6 -	"	2 10 -		
	1	Ditto	- 4 -	"	- 4 -		
	2	Stonecutters	- 6 11	"	- 13 10		
	1	Ditto	- 5 -	"	- 5 -		
	1	Ditto	- 6 3	"	- 6 3		
	4	Ditto	- 7 -	"	1 12 -		
	1	Ditto	- 6 6	"	- 6 6		
	2	Ditto	- 6 -	"	- 12 -		
	2	Biggaries	- 2 -	"	- 4 -		
						17 9 8	
February 10	1	Carcoon	- 5 9	"	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	2	Ditto	- 8 5	"	1 - 10		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Smith	- 6 6	"	- 6 6		
	1	Ditto	- 6 -	"	- 6 -		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Bellows Boy	- 2 6	"	- 2 6		
	3	Carpenters	- 6 -	"	1 2 -		
	1	Chowkedar	- 2 3	"	- 2 3		
	2	Carpenter's boys	- 2 -	"	- 4 -		
	5	Masons	- 7 -	"	2 3 -		
	2	Ditto	- 6 6	"	- 13 -		
	4	Ditto	- 5 -	"	1 4 -		
	3	Ditto	- 6 4	"	1 3 -		
	7	Ditto	- 6 -	"	2 10 -		
	1	Ditto	- 4 -	"	- 4 -		
	2	Stonecutters	- 6 11	"	- 13 10		
	2	Ditto	- 5 -	"	- 10 -		
	1	Ditto	- 6 3	"	- 6 3		
	4	Ditto	- 7 -	"	1 12 -		
	1	Ditto	- 6 6	"	- 6 6		
	2	Ditto	- 6 -	"	- 12 -		
	1	Ditto	- 4 -	"	- 4 -		
	84	Biggaries	- 2 -	"	16 8 -		
	36	Women	- 1 3	"	2 15 6		
	11	Boys	- 1 -	"	- 11 -		
						22 9 6	
February 11	1	Carcoon	- 5 9	"	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	2	Ditto	- 8 5	"	1 - 10		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Smith	- 6 6	"	- 6 6		
	1	Ditto	- 6 -	"	- 6 -		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Bellows boy	- 2 6	"	- 2 6		
	3	Carpenters	- 6 -	"	1 2 -		
	1	Chowkedar	- 2 3	"	- 2 3		
	1	Carpenter's boy	- 2 -	"	- 2 -		
	5	Masons	- 7 -	"	2 3 -		
	2	Ditto	- 6 6	"	- 13 -		
	5	Ditto	- 5 -	"	1 9 -		
	6	Ditto	- 6 4	"	2 6 -		
	8	Ditto	- 6 -	"	3 - -		
	1	Ditto	- 4 -	"	- 4 -		
						22 9 6	
		Carried forward		<i>Rs.</i>	10 2 5	226 14 2	

No. 7.--DAY BOOK OF LABOUR--*continued.*

Appendix (C.)

Date.	No.	ITEMS.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
			<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
1861:		Brought forward	- - -	- - -	15 2 5	296 14 2	
February 11 (<i>contd.</i>)	2	Stonecutters	- 6 11	each	- 13 10		
	2	Ditto	- 5 -	"	- 10 -		
	1	Ditto	- 6 3	"	- 6 3		
	4	Ditto	- 7 -	"	1 12 -		
	1	Ditto	- 6 6	"	- 6 0		
	2	Ditto	- 6 -	"	- 12 -		
	1	Ditto	- 4 -	"	- 4 -		
	85	Biggaries	- 2 -	"	10 10 -		
	3 9	Women	- 1 3	"	3 - 9		
	1 1	Boys	- 1 -	"	- 11 -	34 8 9	
February 12	1	Carcoon	- 5 9	"	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	2	Ditto	- 8 5	"	1 - 10		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Smith	- 6 6	"	- 6 6		
	1	Ditto	- 6 -	"	- 6 -		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Bellows Boy	- 2 6	"	- 2 6		
	2	Carpenters	- 6 -	"	- 12 -		
	1	Chowkedar	- 2 3	"	- 2 3		
	1	Carpenter's Boy	- 2 -	"	- 2 -		
	5	Masons	- 7 -	"	2 3 -		
	2	Ditto	- 6 6	"	- 13 -		
	4	Ditto	- 5 -	"	1 4 -		
	7	Ditto	- 6 4	"	2 12 4		
	8	Ditto	- 6 -	"	3 - -		
	1	Ditto	- 4 -	"	- 4 -		
	4	Stonecutters	- 6 11	"	1 11 8		
	2	Ditto	- 5 -	"	- 10 -		
	1	Ditto	- 6 3	"	- 6 3		
	4	Ditto	- 7 -	"	1 12 -		
	1	Ditto	- 6 4	"	- 6 6		
	4	Ditto	- 6 -	"	1 8 -		
	1	Ditto	- 4 -	"	- 4 -		
	86	Biggaries	- 2 -	"	10 12 -		
	41	Women	- 1 3	"	3 3 3		
	11	Boys	- 1 -	"	- 11 -	36 2 5	
February 13	1	Carcoon	- 5 9	"	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	2	Ditto	- 8 5	"	1 - 10		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Smith	- 6 6	"	- 6 6		
	1	Ditto	- 6 -	"	- 6 -		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Bellows Boy	- 2 6	"	- 2 6		
	12*	Carpenters	- 6 -	"	- 6 -		
	1	Chowkedar	- 2 3	"	- 2 3		
	1	Carpenter's Boy	- 2 -	"	- 2 -		
	5	Masons	- 7 -	"	2 3 -		
	2	Ditto	- 6 6	"	- 13 -		
	4	Ditto	- 5 -	"	1 4 -		
	7	Ditto	- 6 4	"	2 12 4		
	7	Ditto	- 6 -	"	2 13 -		
	1	Ditto	- 4 -	"	- 4 -		
	4	Stonecutters	- 6 11	"	1 11 8		
	2	Ditto	- 5 -	"	- 10 -		
	1	Ditto	- 6 3	"	- 6 3		
	4	Ditto	- 7 -	"	1 12 -		
	1	Ditto	- 6 3	"	- 6 3		
	4	Ditto	- 6 -	"	1 8 -		
	1	Ditto	- 4 -	"	- 4 -		
	86	Biggaries	- 2 -	"	10 12 -		
	42	Women	- 1 3	"	3 4 6		
	11	Boys	- 1 -	"	- 11 -	35 10 8	
		Carried forward	- - -	- - -	<i>Rs.</i> 403 4 -		

* *Sic orig.*

Appendix (C.)

No. 7.—DAY BOOK OF LABOUR—continued.

Date.	No.	ITEMS	Rate.	Per	Amount	TOTAL	GRAND TOTAL
			<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
1861:			Brought forward			408 4 -	
February 14	1	Carkoon	5 9	each	5 9		
	1	Maistry	11 5	"	11 5		
	2	Ditto	8 5	"	1 10		
	2	Muckadums	2 10	"	5 8		
	1	Smith	6 6	"	6 6		
	1	Hammerman	2 6	"	2 6		
	1	Bellows Boy	2 6	"	2 6		
	2	Carpenters	6 -	"	12 -		
	1	Chowkedar	2 3	"	2 3		
	1	Carpenter's Boy	2 -	"	2 -		
	5	Masons	7 -	"	2 8 -		
	2	Ditto	6 6	"	13 -		
	4	Ditto	5 -	"	1 4 -		
	7	Ditto	5 4	"	2 12 4		
	6	Ditto	6 -	"	3 -		
	1	Ditto	4 -	"	4 -		
	4	Stonecutters	6 11	"	1 11 8		
	1	Ditto	5 -	"	5 -		
	1	Ditto	6 3	"	6 3		
	4	Ditto	7 -	"	1 12 -		
	1	Ditto	6 6	"	6 6		
	2	Ditto	6 -	"	12 -		
	85	Biggaries	2 -	"	10 10 -		
	43	Women	1 3	"	3 4 9		
	10	Boys	1 -	"	10 -		
						34 6 11	
February 15	1	Carkoon	5 9	"	5 9		
	1	Maistry	11 5	"	11 5		
	2	Ditto	8 5	"	1 10		
	2	Muckadums	2 10	"	5 8		
	1	Smith	6 6	"	6 6		
	1	Hammerman	2 6	"	2 6		
	1	Bellows Boy	2 6	"	2 6		
	1	Carpenter	6 -	"	6 -		
	1	Chowkedar	2 3	"	2 3		
	5	Masons	7 -	"	2 8 -		
	2	Ditto	6 6	"	13 -		
	4	Ditto	5 -	"	1 4 -		
	9	Ditto	5 4	"	3 9 -		
	8	Ditto	6 -	"	3 -		
	1	Ditto	4 -	"	4 -		
	4	Stonecutters	6 11	"	1 11 8		
	2	Ditto	5 -	"	10 -		
	1	Ditto	6 3	"	6 3		
	4	Ditto	7 -	"	1 12 -		
	1	Ditto	6 6	"	6 6		
	3	Ditto	6 -	"	1 2 -		
	65	Biggaries	2 -	"	10 10 -		
	43	Women	1 3	"	3 4 6		
	10	Boys	1 -	"	10 -		
						35 5 4	
February 16	1	Carkoon	5 9	"	5 9		
	1	Maistry	11 5	"	11 5		
	2	Ditto	8 5	"	1 10		
	2	Muckadums	2 10	"	5 8		
	1	Smith	6 6	"	6 6		
	1	Hammerman	2 6	"	2 6		
	1	Bellows Boy	2 6	"	2 6		
	1	Carpenter	6 -	"	6 -		
	1	Chowkedar	2 3	"	2 3		
	5	Masons	7 -	"	2 8 -		
	2	Ditto	6 6	"	13 -		
	3	Ditto	5 -	"	1 4 -		
	5	Ditto	5 4	"	1 15 8		
	7	Ditto	6 -	"	2 10 -		
	1	Ditto	4 -	"	4 -		
		Carried forward			19 8 1	478 - 3	

No. 7.—DAY BOOK OF LABOUR—continued.

Appendix (C.)

Date.	No.	ITEMS.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
			Rs. a. p.		Rs. a. p.	Rs. a. p.	Rs. a. p.
1851:		Brought forward	- - -		12 8 1	473 - 3	
February 16 (contd)	2	Stonecutters	- 6 11	each	- 13 10		
	1	Ditto	- 6 3	"	- 6 3		
	1	Ditto	- 5 -	"	- 5 -		
	4	Ditto	- 7 -	"	1 12 -		
	1	Ditto	- 6 6	"	- 6 6		
	2	Ditto	- 6 -	"	12 -		
	2	Biggaries	- 2 -	"	- 4 -		
						17 3 8	
February 17	1	Carcoon	- 6 9	"	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	1	Ditto	- 8 5	"	- 8 5		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Smith	- 6 6	"	- 6 6		
	1	Bellows Boy	- 2 6	"	- 2 6		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Carpenter	- 6 -	"	- 6 -		
	1	Chowkedar	- 2 3	"	- 2 3		
	5	Masons	- 7 -	"	2 3 -		
	2	Ditto	- 6 6	"	- 13 -		
	4	Ditto	- 5 -	"	1 4 -		
	7	Ditto	- 6 4	"	2 12 4		
	7	Ditto	- 6 -	"	2 10 -		
	1	Ditto	- 4 -	"	- 4 -		
	4	Stonecutters	- 6 11	"	1 11 8		
	2	Ditto	- 5 -	"	- 10 -		
	4	Ditto	- 7 -	"	1 12 -		
	1	Ditto	- 6 6	"	- 6 6		
	3	Ditto	- 6 -	"	1 2 -		
	90	Biggaries	- 2 -	"	11 4 -		
	42	Women	- 1 3	"	3 4 6		
	8	Boys	- 1 -	"	- 8 -		
						58 12 -	
February 18	1	Carcoon	- 5 9	"	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	1	Ditto	- 8 5	"	- 8 5		
	1	Smith	- 6 6	"	- 6 6		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Bellows Boy	- 2 6	"	- 2 6		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Carpenter	- 6 -	"	- 6 -		
	1	Chowkedar	- 2 3	"	- 2 3		
	5	Masons	- 7 -	"	2 3 -		
	2	Ditto	- 6 6	"	- 13 -		
	4	Ditto	- 5 -	"	1 4 -		
	7	Ditto	- 6 4	"	2 12 4		
	7	Ditto	- 6 -	"	2 10 -		
	1	Ditto	- 4 -	"	- 4 -		
	1	Ditto	- 3 -	"	- 3 -		
	4	Stonecutters	- 6 11	"	1 11 8		
	2	Ditto	- 5 -	"	- 10 -		
	4	Ditto	- 7 -	"	1 12 -		
	1	Ditto	- 6 6	"	- 6 6		
	3	Ditto	- 6 -	"	1 2 -		
	85	Biggaries	- 2 -	"	10 10 -		
	41	Women	- 1 3	"	3 3 8		
	8	Boys	- 1 -	"	- 8 -		
						33 8 9	
February 19	1	Carcoon	- 5 9	"	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	1	Ditto	- 8 5	"	- 8 5		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Smith	- 6 6	"	- 6 6		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Bellows Boy	- 2 6	"	- 2 6		
	2	Carpenters	- 6 -	"	- 12 -		
	1	Chowkedar	- 2 3	"	- 2 3		
		Carried forward	- - - Rs.		3 9 -	557 3 8	

Appendix (C.)

No. 7.—DAY BOOK OF LABOUR—continued.

Date.	No.	ITEMS.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
			<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
1851:		Brought forward			3 9 -	557 3 8	
February 19 (contd)	2	Masons	- 6 6	each	- 13 -		
	5	Ditto	- 7 -	"	2 3 -		
	3	Ditto	- 5 -	"	- 15 -		
	7	Ditto	- 6 4	"	2 12 4		
	7	Ditto	- 6 -	"	2 10 -		
	1	Ditto	- 4 -	"	- 4 -		
	1	Ditto	- 3 -	"	- 3 -		
	4	Stonecutters	- 6 11	"	1 11 8		
	2	Ditto	- 5 -	"	- 10 -		
	1	Ditto	- 6 3	"	- 6 3		
	4	Ditto	- 7 -	"	1 12 -		
	1	Ditto	- 6 6	"	- 6 6		
	3	Ditto	- 6 -	"	1 2 -		
	87	Beggars	- 2 -	"	10 14 -		
	46	Women	- 1 3	"	3 9 6		
	12	Boys	- 1 -	"	- 12 -		
						34 0 3	
February 20	1	Carcoon	- 5 9	"	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	2	Ditto	- 8 5	"	1 - 10		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Smith	- 6 6	"	- 6 6		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Bellows Boy	- 2 6	"	- 2 6		
	2	Carpenters	- 6 -	"	- 12 -		
	1	Chowkedar	- 2 3	"	- 2 3		
	5	Masons	- 7 -	"	2 3 -		
	2	Ditto	- 6 6	"	- 13 -		
	3	Ditto	- 5 -	"	- 15 -		
	8	Ditto	- 6 4	"	3 2 8		
	8	Ditto	- 6 -	"	3 - -		
	1	Ditto	- 4 -	"	- 4 -		
	1	Ditto	- 3 -	"	- 3 -		
	4	Stonecutters	- 6 11	"	1 11 8		
	2	Ditto	- 5 -	"	- 10 -		
	4	Ditto	- 7 -	"	1 12 -		
	1	Ditto	- 6 6	"	- 6 6		
	8	Ditto	- 6 -	"	1 2 -		
	87	Beggars	- 2 -	"	10 14 -		
	44	Women	- 1 3	"	3 7 -		
	12	Boys	- 1 -	"	- 12 -		
	1	Stonecutter	- 6 3	"	- 6 3		
						35 11 6	
February 21	1	Carcoon	- 5 9	"	- 5 9		
	1	Maistry	- 11 5	"	- 11 5		
	2	Ditto	- 8 5	"	1 - 10		
	2	Muckadums	- 2 10	"	- 5 8		
	1	Smith	- 6 6	"	- 6 6		
	1	Hammerman	- 2 6	"	- 2 6		
	1	Bellows Boy	- 2 6	"	- 2 6		
	2	Carpenters	- 6 -	"	- 12 -		
	1	Chowkedar	- 2 3	"	- 2 3		
	5	Masons	- 7 -	"	2 3 -		
	2	Ditto	- 6 6	"	- 13 -		
	4	Ditto	- 5 -	"	1 4 -		
	8	Ditto	- 6 4	"	3 2 8		
	7	Ditto	- 6 -	"	2 10 -		
	1	Ditto	- 4 -	"	- 4 -		
	1	Ditto	- 3 -	"	- 3 -		
	4	Stonecutters	- 6 11	"	1 11 8		
	2	Ditto	- 5 -	"	- 10 -		
	1	Ditto	- 6 3	"	- 6 3		
	4	Ditto	- 7 -	"	1 12 -		
	1	Ditto	- 6 6	"	- 6 6		
	3	Ditto	- 6 -	"	1 2 -		
		Brought forward			20 9 6	587 8 3	

No. 7.—DAY BOOK OF LABOUR—continued.

Appendix (C.)

Date.	No.	ITEMS.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
			<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
1851:		Brought forward			20 9 6	527 8 5	
February 21 (contd)	87	Biggaries	2	each	10 14 -		
	43	Women	1 3	"	3 5 9		
	12	Boys	1	"	- 12 -		
						35 9 3	
February 22	1	Carcoon	5 9	"	- 5 9		
	1	Maistry	11 5	"	- 11 5		
	2	Ditto	8 5	"	1 - 10		
	2	Muckadums	2 10	"	- 5 8		
	1	Smith	6 6	"	- 6 6		
	1	Hammerman	2 6	"	- 2 6		
	1	Bellows Boy	2 6	"	- 2 6		
	2	Carpenters	6	"	- 12 -		
	1	Chowkedar	2 3	"	- 2 3		
	5	Masons	7	"	2 3 -		
	2	Ditto	6 6	"	- 13 -		
	4	Ditto	5	"	1 4 -		
	8	Ditto	6 4	"	3 2 8		
	3	Ditto	6	"	3 9 -		
	1	Ditto	4	"	- 4 -		
	1	Ditto	3	"	- 3 -		
	4	Stonecutters	6 11	"	1 11 8		
	2	Ditto	5	"	- 10 -		
	4	Ditto	7	"	1 12 -		
	1	Ditto	6 6	"	- 6 6		
	4	Ditto	6	"	1 8 -		
	84	Biggaries	2	"	10 8 -		
	42	Women	1 3	"	3 4 6		
	12	Boys	1	"	- 12 -		
	1	Stonecutter	6 3	"	- 6 3		
						36 7 -	
February 23	1	Carcoon	5 9	"	- 5 9		
	1	Maistry	11 5	"	- 11 5		
	2	Ditto	8 5	"	1 - 10		
	2	Muckadums	2 10	"	- 5 8		
	1	Smith	6 6	"	- 6 6		
	1	Hammerman	2 6	"	- 2 6		
	1	Bellows Boy	2 6	"	- 2 6		
	1	Chowkedar	2 3	"	- 2 3		
	3	Biggaries	2	"	- 6 -		
	1	Carpenter	6	"	- 6 -		
						4 1 5	
February 24	1	Carcoon	5 9	"	- 5 9		
	1	Maistry	11 5	"	- 11 5		
	2	Ditto	8 5	"	1 - 10		
	2	Muckadums	2 10	"	- 5 8		
	1	Smith	6 6	"	- 6 6		
	1	Hammerman	2 6	"	- 2 6		
	1	Bellows Boy	2 6	"	- 2 6		
	1	Carpenter	6	"	- 6 -		
	1	Chowkedar	2 3	"	- 2 3		
	5	Masons	7	"	2 3 -		
	2	Ditto	6 6	"	- 13 -		
	4	Ditto	5	"	1 4 -		
	8	Ditto	6 4	"	3 2 8		
	8	Ditto	6	"	3 - -		
	1	Ditto	4	"	- 4 -		
	1	Ditto	3	"	- 3 -		
	4	Stonecutters	6 11	"	1 11 5		
	2	Ditto	5	"	- 10 -		
	2	Ditto	6 3	"	- 12 6		
	4	Ditto	7	"	1 12 -		
	1	Ditto	6 6	"	- 6 6		
	4	Ditto	6	"	1 8 -		
	83	Biggaries	2	"	10 6 -		
	43	Women	1 3	"	3 5 9		
	12	Boys	1	"	- 12 -		
						55 13 6	
		Carried forward			<i>Rs.</i> 739 7 7		

Appendix (C.)

No. 7.—DAY BOOK OF LABOUR—continued.

Date.	No.	ITEMS.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
			<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
1861:			Brought forward		- - -	739 7 7	
February 25	1	Carcoon - -	- 5 9	each	- 5 9		
	1	Maistry - -	- 11 5	"	- 11 5		
	2	Ditto - -	- 8 5	"	1 - 10		
	2	Muckadums - -	- 2 10	"	- 5 8		
	1	Smith - -	- 6 6	"	- 6 6		
	1	Hammerman - -	- 2 6	"	- 2 6		
	1	Bellows Boy - -	- 2 6	"	- 2 6		
	1	Carpenter - -	- 6 -	"	- 6 -		
	1	Chowkedar - -	- 2 3	"	- 2 3		
	5	Masons - -	- 7 -	"	2 3 -		
	2	Ditto - -	- 6 6	"	- 13 -		
	4	Ditto - -	- 5 -	"	1 4 -		
	7	Ditto - -	- 6 4	"	2 12 4		
	8	Ditto - -	- 6 -	"	3 - -		
	1	Ditto - -	- 4 -	"	- 4 -		
	1	Ditto - -	- 3 -	"	- 3 -		
	4	Stonecutters - -	- 6 11	"	1 11 8		
	2	Ditto - -	- 5 -	"	- 10 -		
	2	Ditto - -	- 6 3	"	- 12 6		
	4	Ditto - -	- 7 -	"	1 12 -		
	1	Ditto - -	- 6 6	"	- 6 6		
	4	Ditto - -	- 6 -	"	1 8 -		
	84	Biggaries - -	- 2 -	"	10 8 -		
	41	Women - -	- 1 3	"	8 3 3		
	12	Boys - -	- 1 -	"	- 12 -		
						35 6 8	
February 26	1	Carcoon - -	- 5 9	"	- 5 9		
	1	Maistry - -	- 11 5	"	- 11 5		
	1	Ditto - -	- 8 5	"	- 8 5		
	2	Muckadums - -	- 2 10	"	- 5 8		
	1	Smith - -	- 6 6	"	- 6 6		
	1	Hammerman - -	- 2 6	"	- 2 6		
	1	Bellows Boy - -	- 2 6	"	- 2 6		
	1	Carpenter - -	- 6 -	"	- 6 -		
	1	Chowkedar - -	- 2 3	"	- 2 3		
	5	Masons - -	- 7 -	"	2 3 -		
	1	Ditto - -	- 6 6	"	- 6 6		
	4	Ditto - -	- 5 -	"	1 4 -		
	7	Ditto - -	- 6 4	"	2 12 4		
	8	Ditto - -	- 6 -	"	3 - -		
	1	Ditto - -	- 4 -	"	- 4 -		
	1	Ditto - -	- 3 -	"	- 3 -		
	3	Stonecutters - -	- 6 11	"	1 4 9		
	2	Ditto - -	- 5 -	"	- 10 -		
	1	Ditto - -	- 6 3	"	- 6 3		
	4	Ditto - -	- 7 -	"	1 12 -		
	1	Ditto - -	- 6 6	"	- 6 6		
	5	Ditto - -	- 6 -	"	1 14 -		
	87	Biggaries - -	- 2 -	"	10 14 -		
	42	Women - -	- 1 3	"	3 4 6		
	12	Boys - -	- 1 -	"	- 12 -		
						34 7 10	
February 27	1	Carcoon - -	- 5 9	"	- 5 9		
	1	Maistry - -	- 11 5	"	- 11 5		
	2	Ditto - -	- 8 5	"	1 - 10		
	2	Muckadums - -	- 2 10	"	- 5 8		
	1	Smith - -	- 6 6	"	- 6 6		
	1	Hammerman - -	- 2 6	"	- 2 6		
	1	Bellows Boy - -	- 2 6	"	- 2 6		
	1	Carpenter - -	- 6 -	"	- 6 -		
	1	Chowkedar - -	- 2 3	"	- 2 3		
	6	Masons - -	- 7 -	"	2 3 -		
	2	Ditto - -	- 6 5	"	- 13 -		
	4	Ditto - -	- 5 -	"	1 4 -		
	7	Ditto - -	- 6 4	"	2 12 4		
	8	Ditto - -	- 6 -	"	3 - -		
	1	Ditto - -	- 4 -	"	- 4 -		
	1	Ditto - -	- 3 -	"	- 3 -		
		Carried forward - - -		<i>Rs.</i>	14 2 9	809 6 1	

No. 7.—DAY BOOK OF LABOUR—continued.

Appendix (C.)

Date	No.	ITEMS.	Rate.	Per	Amount.	TOTAL.	GRAND TOTAL.
			<i>Rs. a. p.</i>		<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>
		Brought forward	- - -		14 2 9	809 6 1	
February 27 (contd)	4	Stonecutters	- - 6 11	each	1 11 8		
	1	Ditto	- - 5 3	"	- 5 3		
	2	Ditto	- - 5 -	"	- 10 -		
	2	Ditto	- - 6 3	"	- 12 6		
	4	Ditto	- - 7 -	"	1 12 -		
	1	Ditto	- - 6 6	"	- 6 6		
	6	Ditto	- - 6 -	"	2 4 -		
	86	Biggaries	- - 2 -	"	10 12 -		
	41	Women	- - 1 3	"	8 3 3		
	12	Boys	- - 1 -	"	- 12 -		
						36 11 11	
February 28	1	Caroon	- - 5 9	"	- 5 9		
	1	Maistry	- - 11 5	"	- 11 5		
	2	Ditto	- - 8 5	"	1 - 10		
	2	Muckadums	- - 2 10	"	- 5 8		
	1	Smith	- - 6 6	"	- 6 6		
	1	Hammerman	- - 2 6	"	- 2 6		
	1	Bellows Boy	- - 2 6	"	- 2 6		
	1	Carpenter	- - 6 -	"	- 6 -		
	1	Chowkedar	- - 2 3	"	- 2 3		
	5	Masons	- - 7 -	"	2 3 -		
	13	Ditto	- - 6 6	"	- 9 9		
	3	Ditto	- - 5 -	"	1 1 6		
	7	Ditto	- - 6 4	"	2 12 4		
	8	Ditto	- - 6 -	"	3 - -		
	1	Ditto	- - 4 -	"	- 4 -		
	1	Ditto	- - 3 -	"	- 3 -		
	4	Stonecutters	- - 6 11	"	1 11 8		
	1	Ditto	- - 5 3	"	- 5 3		
	2	Ditto	- - 5 -	"	- 10 -		
	1	Ditto	- - 6 3	"	- 6 3		
	3	Ditto	- - 7 -	"	1 5 -		
	1	Ditto	- - 6 6	"	- 6 6		
	6	Ditto	- - 6 -	"	2 4 -		
	86	Biggaries	- - 2 -	"	10 12 -		
	42	Women	- - 1 3	"	3 4 6		
	11	Boys	- - 1 -	"	- 11 -		
						35 9 2	
TOTAL LABOUR - - -						Rs.	861 11 2
Materials, as per Stock Sheet - - -							1,545 9 7
GRAND TOTAL - - -						Rs.	2,427 4 9

(signed) W. Chapman, Lieutenant.

DAILY OF FIGURED ABSTRACT

LABOUR

DATE.	Carkoous.		Muckaduma.		Maistry.		Biggaries.		Women.		Boys.		Carts.
	No.	Rs. a. p.	No.	Rs. a. p.	No.	Rs. a. p.	No.	Rs. a. p.	No.	Rs. a. p.	No.	Rs. a. p.	
1851: February 1	1	- 5 9	2	- 5 8	2	1 3 10	90	11 4 -	33	2 9 3	12	- 12 -	-
2	1	- 5 9	2	- 5 8	2	1 3 10	63	7 10 -	23	1 12 9	7	- 7 -	-
3	1	- 5 9	2	- 5 8	2	1 3 10	81	10 2 -	35	2 11 9	15	- 15 -	-
4	1	- 5 9	2	- 5 8	2	1 3 10	83	10 6 -	35	2 11 9	12	- 12 -	-
5	1	- 5 9	2	- 5 8	2	1 3 10	84	10 8 -	40	3 2 -	12	- 12 -	-
6	1	- 5 9	2	- 5 8	3	1 12 3	70	8 12 -	35	2 11 9	10	- 10 -	-
7	1	- 5 9	2	- 5 8	3	1 12 3	82	10 4 -	36	2 13 -	12	- 12 -	-
8	1	- 5 9	2	- 5 8	3	1 12 3	87	10 14 -	36	2 13 -	12	- 12 -	-
9	1	- 5 9	2	- 5 8	3	1 12 3	2	- 4 -	-	-	-	-	-
10	1	- 5 9	2	- 5 8	3	1 12 3	84	10 8 -	38	2 15 6	11	- 11 -	-
11	1	- 5 9	2	- 5 8	3	1 12 3	85	- 10 10	59	3 - 9	11	- 11 -	-
12	1	- 5 9	2	- 5 8	3	1 12 3	86	10 12 -	41	3 3 3	11	- 11 -	-
13	1	- 5 9	2	- 5 8	3	1 12 3	86	10 12 -	42	3 4 6	11	- 11 -	-
14	1	- 5 9	2	- 5 8	3	1 12 3	85	10 10 -	43	3 5 9	10	- 10 -	-
15	1	- 5 9	2	- 5 8	3	1 12 3	85	10 10 -	42	3 4 6	10	- 10 -	-
16	1	- 5 9	2	- 5 8	3	1 12 3	2	- 4 -	-	-	-	-	-
17	1	- 5 9	2	- 5 8	2	1 3 10	90	11 4 -	42	3 4 6	8	- 8 -	-
18	1	- 5 9	2	- 5 8	2	1 3 10	85	10 10 -	41	3 3 3	8	- 8 -	-
19	1	- 5 9	2	- 5 8	2	1 3 10	87	10 14 -	46	3 9 6	12	- 12 -	-
20	1	- 5 9	2	- 5 8	3	1 12 3	87	10 14 -	44	3 7 -	12	- 12 -	-
21	1	- 5 9	2	- 5 8	3	1 12 3	87	10 14 -	43	3 5 9	12	- 12 -	-
22	1	- 5 9	2	- 5 8	3	1 12 3	84	10 8 -	42	3 4 6	12	- 12 -	-
23	1	- 5 9	2	- 5 8	3	1 12 3	3	- 6 -	-	-	-	-	-
24	1	- 5 9	2	- 5 8	3	1 12 3	83	10 6 -	43	3 5 9	12	- 12 -	-
25	1	- 5 9	2	- 5 8	3	1 12 3	84	10 6 -	41	3 3 3	12	- 12 -	-
26	1	- 5 9	2	- 5 8	3	1 12 3	87	10 14 -	42	3 4 6	12	- 12 -	-
27	1	- 5 9	2	- 5 8	3	1 12 3	86	10 12 -	41	3 3 3	12	- 12 -	-
28	1	- 5 9	2	- 5 8	3	1 12 3	86	10 12 -	42	3 4 6	11	- 11 -	-
March	28	10 1 -	56	9 14 8	75	44 10 3	2,102	262 12 -	986	76 15 3	279	12 7 -	-

(True copies)
(Signed) P. M. Meirid, Lieut.-col., Secretary to Government.

(True copies)
(Signed) R. J. H. Borel, Lieut.-col.,
Secy. to the Govt. of India, Military Dept.

DAILY OF FIGURED ABSTRACT.

LABOUR.

Masons' Sorts.		Carpenters.		Stonecutters' Sorts.		Smith.		Hammermen.		Bellows Boys.		Chowke drs.		Total Labour.
No.	Rs. a. p.	No.	Rs. a. p.	No.	Rs. a. p.	No.	Rs. a. p.	No.	Rs. a. p.	No.	Rs. a. p.	No.	Rs. a. p.	Rs. a. p.
26	9 14 4	1	- 6 -	5	2 1 6	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	29 12 1
24	9 3 -	1	- 6 -	3	1 4 6	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	23 8 3
26	9 14 6	1	- 6 -	6	2 9 4	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	29 7 5
27	10 3 4	2	- 12 6	7	3 - 4	2	- 12 6	1	- 2 6	1	- 2 6	1	- 2 3	31 - 5
27	10 3 4	4	1 4 -	8	3 6 4	2	- 12 6	1	- 2 6	1	- 2 6	1	- 2 3	32 6 8
27	10 3 4	4	1 4 -	10	3 15 4	2	- 12 6	1	- 2 6	1	- 2 6	1	- 2 3	31 3 10
27	10 3 4	5	1 6 -	14	5 6 7	2	- 12 6	1	- 2 6	1	- 2 6	1	- 2 3	34 8 4
26	- 13 -	5	1 6 -	14	5 6 7	2	- 12 6	1	- 2 6	1	- 2 6	1	- 2 3	34 12 -
23	8 12 8	1	- 6 -	11	4 7 4	2	- 12 6	1	- 2 6	1	- 2 6	1	- 2 3	17 9 8
22	8 5 -	5	1 6 -	13	5 - 7	2	- 12 6	1	- 2 6	1	- 2 6	1	- 2 3	32 9 6
27	10 3 -	4	1 4 -	12	5 - 7	2	- 12 6	1	- 2 6	1	- 2 6	1	- 2 3	34 8 9
27	10 4 4	3	- 14 -	17	6 10 5	2	- 12 6	1	- 2 6	1	- 2 6	1	- 2 3	36 2 5
26	10 1 4	2	- 12 -	17	6 10 5	2	- 12 6	1	- 2 6	1	- 2 6	1	- 2 3	35 10 8
27	10 4 4	3	- 14 -	13	5 5 5	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	34 6 11
29	11 1 -	1	- 6 -	15	6 - 5	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	35 5 4
23	8 12 8	1	- 6 -	11	4 7 7	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	17 3 8
26	9 14 4	1	- 6 -	14	4 10 2	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	33 12 -
27	10 1 4	1	- 6 -	14	4 10 2	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	33 3 9
29	9 12 4	2	- 12 -	15	6 - 5	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	34 9 7
26	10 8 8	2	- 12 -	15	6 - 5	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	35 11 6
28	10 7 8	2	- 12 -	15	6 - 5	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	35 9 3
30	11 6 8	2	- 12 -	16	6 6 5	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	36 7 -
-	- - -	1	- 6 -	-	- - -	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	4 1 5
29	10 13 8	1	- 6 -	17	6 12 8	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	35 13 6
28	10 7 4	1	- 6 -	17	6 12 8	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	35 6 9
27	10 - 7	1	- 6 -	16	6 5 6	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	34 7 10
23	10 7 4	1	- 6 -	20	7 13 11	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	36 11 11
27	10 1 7	1	- 6 -	18	7 - 8	1	- 6 6	1	- 2 6	1	- 2 6	1	- 2 3	35 9 2
719	271 8 1	59	19 2 -	354	144 6 11	38	15 2 -	28	4 6 -	28	4 6 -	28	3 15 -	881 11 2

Total Materials during the Month - - - 1,545 9 7

GRAND TOTAL - - - Rs. 2,427 4 9

(signed) W. Chapman, Lieutenant.

Appendix (G.)

Appendix (G.)

MINUTE by the Chief Engineer.

1. I would propose the following scheme for the future class of Assistants in the Engineer Department.

2. The grades to be three, and subdivided into two classes, with corresponding pays as follows:

		Pay per Mensem.	
Assistant Engineer	1st Class	- - Rupees, one hundred and fifty	- 150
	2d Class	- - - ditto, one hundred and twenty	- 120
Surveyors and Builders	1st Class	- - - ditto, one hundred	- 100
	2d Class	- - - ditto, eighty	- 80
Assistant Surveyors and Builders	1st Class	- - - ditto, sixty	- 60
	2d Class	- - - ditto, forty	- 40

3. The grade of each individual to be determined with reference to qualifications and conduct, and not to length of service.

4. The qualification to be as follows:—

Assistant Engineer.

A knowledge of a complete course (Hutton's) of arithmetic, logarithms, the simple elements of algebra and plane geometry; mensuration of planes and solids, plane trigonometry and mensuration of heights and distances; the use of the theodolite and spirit level; simple trigonometrical surveying.

The calculation, plotting and fair delineation of simple trigonometrical and topographical surveys; the delineation and finishing in shade and colour of designs in architecture and civil engineering; the calculation and estimating of the same, as also their lining out for execution; an acquaintance with the properties and qualities of building materials, and of the principles of simple training in carpentry.

Surveyors and Builders.

A knowledge of the arithmetic (Hutton's Course), to the end of logarithms, practical geometry, mensuration of planes and solids; the use of all ordinary drawing instruments, and the ordinary masons and road levels; surveying with the plane table, compass and chain, fair plotting, and delineation in lines and shades of such surveys; the delineation and shading in ink of simple designs in architecture and civil engineering; the calculation and estimating, as also the lining out of such simple designs for executions; a partial acquaintance with the properties of materials for buildings.

Assistant Surveyors and Builders.

A knowledge of arithmetic (Hutton's Course), integers and fractions to the end of the square root, the elements of practical geometry, mensuration of planes and solids, the use of compasses and scales; the delineations in ink of the simplest description of topographical drawings and designs in architecture and civil engineering; the lining out of the latter for execution; surveying with chain and cross-staff; the fair delineation of such simple surveys.

A practical acquaintance with the properties and qualities of the ordinary simple building materials.

5. Thus for each grade there is one scale of general professional attainment; but each is subdivided into two classes, with two corresponding scales of pay.

6. The qualifications above enumerated will be considered equally meritorious whether obtained and applied through the medium of English, or either of the two vernacular dialects under this Presidency of "Mahratta" or "Cannattee," in conformity with the rules laid down by Government for the late Government (Engineer) Institution, and which for twenty years have been attended with such advantages to Government in the employment as subordinates of the Engineer Department of the persons who were trained on the system pursued in that institution.

7. Candidates, when examined up on the foregoing scale of qualifications, will be allowed the use of their books for reference.

8. The examination of the candidates shall be conducted, registered and reported on by the Examiners of the Board of Education in committee with the Officers in Engineer, and Assistant Chief Engineer, or other two Engineer Officers, the Chief Engineer and Executive Officer, members of the Board, presiding.

9. Certificates of qualifications to be furnished by the Examiners, countersigned by the President of the Board of Education, the Chief Engineer and the Secretary to the Board.

10. In whatever department of Government the service and practice of engineering may be required (Revenue Survey to be included), a preference to employment in that department shall be given to those individuals who shall produce the prescribed certificates of qualification over all other applicants for employment therein who do not possess such testimonials.

11. An individual will be appointed to any particular grade according to his general attainments. The rank of First Class, however, in any grade, will be accorded to those only who by testimonials either from the Examining Committee, or from the functionaries under whom they have been employed, are reported deserving of such distinction.

12. No one will be admitted as a candidate for promotion from a lower to a higher grade, unless he shall have previously attained to the position of First Class of the grade he holds.

13. Classification and promotion shall be regulated according to proficiency, usefulness and good conduct, without reference of time of service.

14. Any candidates for promotion from a lower to a higher grade shall, on application, appear, when practicable and convenient to the public service, before the Committee of Examination, in order to undergo the prescribed examination.

15. Under circumstances by which the public service might be impeded by the absence from the sphere of his occupations of a candidate for promotion, the production by him of a certificate of the attainment of proficiency prescribed, and of usefulness and good conduct, granted either by a local committee, or by the head of the office in which the candidate is serving, shall entitle the said candidate to immediate promotion; provided always, that he shall, on the first favourable opportunity, appear before the Examining Committee at the Presidency, to obtain from them a confirmation of his merits, and in default thereof to be to the lower grade from which he was

16. The rates of pay allotted shall be considered solely as a remuneration for professional service. All extra charges for establishment or stores will be borne by the State.

17. Batta or travelling allowance will be granted according to the following rates:—

		<i>Rs. a. p.</i>	
Assistant Engineer	- 1st Class	1 2	- one rupee and two annas per diem.
Ditto	- - - - 2d Class	14 5	fourteen annas and five pies „
Surveyors and Builders,	1st Class	14 -	fourteen annas - - - „
Ditto	- - - - 2d Class	11 2	eleven annas and two pies „
Assistant Surveyors and	} 1st Class	8 5	eight annas and five pies „
Builders			
Ditto	- - - - 2d Class	6 5	six annas and five pies „

* The rates according to the scale laid down in the order of the Bengal Government of 6th July 1826 for batta to public servants: a tent and pony will be furnished by Government in particular instances, according to the exigencies of the case.

* To be applied in cases where a higher salary is allotted than that of the First Class Assistant's Engineer, as above.

18. The following are the rates for leave of absence: applications for leave of absence will be forwarded to the Military Board, who will grant or withhold it at their discretion, provided the period does not exceed three months; the authority of Government will be required for any longer period. Leave of absence may be granted for one month without any reduction of salary, and for any period above that to the extent of two months with the loss of one-third salary; and from that to three months with loss of half salary; when leave of absence is obtained for a longer period than three months, the proportion is in each instance according to period of absence and the circumstances of the case.

19. The rules for suspension (Appendix, No. 1), notified in the Government Gazette of the 28th December 1843, and likewise the Superannuation Pension Rules published under date the 8th September 1835, Jameson's Code, section XLII, Art. 200, page 652, shall be applied to this class of servants.

20. Individuals possessed of and displaying mental acquirements, practical skill and general usefulness (combined with good character) beyond the scale laid down in the 4th para., shall meet with special consideration, and their case shall be specially recommended to Government for remuneration. Pay in proportion to the degree of merit of each case.

6 May 1846.

(signed) G. Jervis, Lieut.-col.,
Chief Engineer.

(True copy.)
(signed) P. M. Melvill, Lieut.-col.,
Secretary to Government.

Appendix (K.)

STATEMENT of the Number of SURVEYORS and BUILDERS, inclusive of the ELPHINSTONE INSTITUTION STUDENTS.

BOMBAY.	No.	SOUTHERN PROVINCES.	No.	NORTHERN PROVINCES.	No.
Expecting discharge with Pension	1	Superintending Engineer - -	2	Superintending Engineer - -	2
Acting Gen. and Civil Architect	2	*Executive Engineer, Poona - -	4	Ex. Engineer, Surat and Broach	3
Engineer to the Dockyard - -	1	Ditto - - - Belgaum - -	4	Ditto - - Ahmedabad - -	2†
		Ditto - - - Dharwar - -	4	Ditto - - Deesa - -	1
		Ditto - - - Ahmednuggur - -	1		
		*Civil Engineer, Candesh - -	3		
		Ditto - - Sattara - -	2		
	4		20		9
SCINDE.	No.	COMMANDING ENGINEER, ADEN.	No.	ROAD AND TANK DEPARTMENT.	No.
Superintending Engineer, Scinde	-	Commanding Engineer - -	1	Superintendent Roads - -	1
Ex. Engineer, Lower Scinde - -	2	Executive Engineer - -	1	Lieutenant Chapman - -	1
Ditto - - Central Scinde - -	1			Lieutenant Scott - -	3
				Lieutenant Prevost - -	1
				Lieutenant Fuller - -	3‡
				Mr. R. Scott - -	2
				Mr. T. P. Armistead - -	1
				Captain Dennis - -	1
	3		2		13

Note.—Officers marked thus * have a Draftsman in their office in addition.
 † Includes Mr. T. Scott, temporarily attached to Captain Jopp, Commissioner Sirshee and Pahlunpoor.
 ‡ There is a Mr. Randall also in the office: he was educated at Poona, and taken into the service before any of the Elphinstone Class.
 § One is attached to the office Captain Cowper was recently in charge of, and to which Lieutenant Fuller has been appointed: two attached to Lieutenant Fuller's own office in the Tama Collectorate.

The following Surveyors, not above accounted for:—

Under Superintendent of Railway - - - - -	1	} 1. Mr. I. Edge, in charge Survey Department.
Under Collector of Land Revenue - - - - -	3	
Under Collector of Kaira - - - - -	1	
Under Superintendent, Guzerat Trigonometrical Survey - - - - -	1	
Under Collector, Surat - - - - -	2	
Under Settlement Officer, Deccan - - - - -	1	
Mr. R. Scott, a Second Assistant Superintendent Roads - - - - -	1	
Mr. T. Smagers, Second Assistant Grand Trigonometrical Survey - - - - -	1	
Mr. W. S. Price, Assistant Superintendent Revenue Survey - - - - -	1	
Under Superintendent Cotton Experiments, Candesh - - - - -	1	
Ditto - - - - ditto - - - - Surat - - - - -	1	
Total - - - - -	14	

ABSTRACT.

Bombay - - - - -	4
Southern Provinces - - - - -	20
Northern Provinces - - - - -	9
Scinde - - - - -	3
Aden - - - - -	2
Road and Tank Department - - - - -	13
Attached to other offices, and holding special appointments - - - - -	14
Mr. Randall at Aden - - - - -	1
GRAND TOTAL - - - - -	66

(True copy.)
 (signed) P. M. Melvill, Lieut.-col.,
 Secretary to Government.

(True copies.)
 (signed) R. J. H. Birch, Lieut.-col.,
 Offg. Secy., India, Military Department.

Appendix (M.)

Appendix (M.)

MILITARY DEPARTMENT.

(No. 2,971.)

From Lieutenant-colonel *P. M. Melvill*, Secretary to Government, to the Secretary to the Government of India, dated 11 November 1851.

Sir,

ADVERTING to my letter, No. 2,961, of the 10th instant, forwarding the Report of the Commission on Public Works for submission to the Government of India, I am directed by the Right honourable the Governor in Council to transmit the annexed papers, marginally noted, and to request you will be pleased to bring to special notice the services rendered by Captain Gaisford, as Secretary to the Commission, together with the respectful recommendation of this Government that those services may be compensated by a salary of (300) three hundred rupees per mensem during the period the Commission continued engaged in its important labours, deducting therefrom the additional batta and boat allowance which have been drawn under the ordinary regulations.

1. Letter from Capt. Gaisford, dated 4 Sept.
2. Report of the Auditor-general, dated 23 Sept.
3. Min. of the Commission, dated 5 Aug.

I have, &c.
(signed) *P. M. Melvill*, Lieut.-colonel,
Secretary to Government.

Bombay Castle,
11 November 1851.

(1.)

From Captain *Thomas Gaisford* to *J. G. Lumsden*, Esq., Secretary to Government, Bombay, dated 4 September 1851.

Sir,

I HAVE the honour to request that you will solicit the orders of Government respecting the allowances I may be permitted to draw while deputed as a member of the Public Works Commission, and acting as secretary to the same.

I left Ahmednuggar for the above duty on the 14th April. The Report was finished on the 1st instant. I have received my garrison pay and official salary while thus employed, but have abstained from drawing any batta, Presidency house-rent, or boat allowance.

I have, &c.
(signed) *T. Gaisford*, Captain Artillery.

Ahmednuggar,
4 September 1851.

(2.)

REPORT by the Auditor-general, No. 348, dated 23 September 1851.

CAPTAIN GAISFORD has been in receipt of the full allowances of his appointment, as Director of the Artillery Depot of Instruction at Ahmednuggar during the period embraced in his application; viz.—

	<i>Rs.</i>	<i>a.</i>	<i>p.</i>
Staff Pay, rupees six hundred	600	-	-
Pay and Garrison Allowances, three hundred and ninety-two and five annas	392	5	-
Nine hundred and ninety-two and five annas	Rs. 992	5	-

And this officer will further be entitled to receive the additional batta of his rank, or *Rs. 91 5 a.* (ninety-one and five annas) per mensem, with *Rs. 23* (twenty-three) for boat allowance, between Panwell and Bombay.

2. But from the nature of the duty that devolved on Captain Gaisford, that of secretary and member of the Commission on the Public Works Department, and the concurring testimony of the Commissioners to his valuable and important services, I would respectfully recommend a salary of *Rs. 300* (three hundred) per mensem for the consideration of your Lordship in Council, and that of the Government of India, to whom the subject will have to be referred.

(signed) *G. Moore*, Colonel,
Military Audr. Genl.

23 September 1851.

21.

P

(3.)

Appendix (M.)

(8.)

MINUTE of the Commission, dated 5 August.

On the completion of our Report on the Public Works Department, I propose we should submit for the consideration of the Right honourable the Governor in Council the subject of remuneration to our Secretary, who, by the Government letter dated 26 March 1851, was specially appointed to such duty, in addition to that of a member of this Commission.

It must be apparent, from the Report, with its Appendices, the very great amount of labour and research that has devolved on Captain Gaisford in the arrangement and condensation of the opinions and reports this Commission has received from the civil and military officers who were consulted on the important subject of our inquiry, and the attention of Government should be drawn thereto.

I consider Captain Gaisford's valuable services in the Commission justly entitle him to an adequate compensation beyond the amount of his official salary which he would have otherwise drawn for the ordinary duty of Director of the Depot of Instruction.

5 August.

(signed) G. Moore.

I concur fully.

(signed) J. D. Inverarity.
H. B. Turner.

(True copies.)

(signed) P. M. Melvill, Lieut.-colonel, Secretary to Government.

(True copies.)

(signed) R. J. H. Birch, Lieut.-colonel,
Officg. Secy., Govt. of India, in the Military Department.

MILITARY DEPARTMENT.

(No. 38.)

From Colonel J. Stuart, C. B., Secretary to the Government of India, Military Department, with the Governor-general, to the Officiating Secretary to the Government, India, Military Department, Calcutta, dated 3 January 1852.

Sir,

In returning the original enclosures of your despatch, No. 401 of the 16th ultimo, I am directed to acquaint you, for the information of the honourable the President in Council, that as the Report of the Commission assembled at Bombay to report on the system of Public Works at that Presidency must be taken into consideration in connexion with the Report of the Bengal Committee, it will be desirable to have it examined and epitomised by his Lordship's arrival in Calcutta.

2. The Governor-general thinks that the allowance proposed for the Secretary is reasonable.

I am, &c.

(signed) J. Stuart, Colonel,
Sec. to the Gov. of India, Military Department,
with the Governor-general.Camp, Chowbeepore,
3 January 1852.

(True copy.)

(signed) R. J. H. Birch, Lieut.-colonel,
Officg. Sec. to the Gov. of India, in the Military Department.

(No. 401.)

From Major J. S. Banks, Officiating Secretary to the Government of India, Military Department, to Colonel J. Stuart, C. B., Secretary to the Government of India, Military Department, with the Most noble the Governor-general; dated 16 December 1851.

Sir,

* Letter from the Officiating Secretary to Government, Military Department, Calcutta, No. 401, dated 18 April 1851.

With reference to the correspondence* noted in the margin, I am desired to forward for submission to the Most noble the Governor-general the accompanying despatches, No. 2,961 of the 10th, and No. 2,971 of the 11th November 1851, from the Secretary to the Government, Military Department, Bombay; the former submitting the Report of the Commission appointed to inquire into the existing system of Public Works at that Presidency, and the

Letter conveying the recommendation of the Bombay Government, that Captain Gaisford and your Reply thereto, No. 101, dated 30 July 1851, may be remunerated for services rendered as Secretary to the said Commission.

I have, &c.
(signed) *J. S. Banks*,
Offg. Sec. to the Gov. India, Military Department.

Council Chamber, Fort William,
16 December 1851.

(True copy.)
(signed) *R. J. H. Birch*, Lieut.-colonel,
Offg. Sec. to the Gov., India, Military Department.

(No. 829.)

From Lieutenant-colonel *P. M. Melvill*, Secretary to Government, to Lieutenant-colonel *R. J. H. Birch*, c. b., Officiating Secretary to the Government, *India*, in the Military Department, Bombay Castle, 25 March 1852.

Sir,
With reference to my despatch, No. 2,981, dated 10th November last, I am directed to transmit the accompanying extract, Section VI. of the Report of the Commission appointed to inquire into the existing system of Public Works, together with a letter from the Military Board, No. 1,795, dated 1st instant, and to request that, in laying them before the Most noble the Governor-general of India in Council, you will be pleased to submit the request of the Right honourable the Governor in Council, that the expenditure stated in the Military Board's letter as necessary, in order to carry out the proposed plan for extending the Sappers' School at Poona, may receive the sanction of his Lordship in Council.

I have, &c.
(signed) *P. M. Melvill*, Lieut.-colonel,
Sec. to Government.

SECTION VI.

ENGINEER SCHOOLS.

108. AFTER the Government Institution had been some years abolished, the Quartermaster-general's Department felt the want of qualified persons as draftsmen and surveyors. To remedy this, Government, in 1840, sanctioned a plan by Lieutenant Wemyss, who then commanded at head quarters of the Engineer Corps (now called the Sappers and Miners), for remodeling the Regimental School, so as to qualify recruit boys for filling those situations.

109. The number was fixed at 40 boys, of whom the best were to be appointed to the Corps of Guides, and the remainder, if eligible, were to be permitted to enlist in the ranks on attaining the age of 18 years.

110. At present 27 boys attend this school, 10 of whom belong to the Sappers, and 17 to other native corps. They are instructed by an English teacher, a Sapper, and two Mahratta Pundits, on stipends of *Rs. 30*, *Rs. 15*, and *Rs. 3*, respectively.

111. The subjects of instruction, and the students' allowances, are as follows:

CLASS.	Number of Boys.		Monthly Allowances.	SUBJECTS TAUGHT.
	Established.	Actual.		
1st - -	10	- -	<i>Rs.</i> 6	Plane trigonometry and surveying.
2d - -	10	5	5	Geometry, mensuration, plane drawing.
3d - -	20	22	3½	Mahratta and English reading, writing, &c.

112. The Quartermaster-general informs us, that the lads entertained in his department from this school have all been found capable on joining of carrying on an ordinary road survey with perambulator and compass, keeping a field-book, and plotting neatly. Thirteen of these young men are now employed, whereof five have been promoted to draftsmen, on salaries varying from 30 to 50 rupees, all of them drawing with neatness and correctness, able to read and write English with tolerable facility, and to use the plane table and theodolite.

Appendix (M.)

theodolite. Lieut.-colonel Holland considers that this Engineer School adequately fulfils the purpose for which his predecessor supported in 1810 the late Captain Wemyss' plan.

113. The East Indian youths permitted, by Article 64, p. 311, Jameson's Code, to be entertained as apprentices to the European artificers, seem to be tacitly declined. The Regimental School, when enlarged, may supply lads more suitable for apprenticeship to maistries; but we are dissident of engineer maistries being thus produced from any class; they should rather spring from among the operatives of the country. We prefer, therefore, to advise, that young workmen approving themselves by skill in handicraft already attained, and by superior intelligence, should be recommended by executive engineers for instruction in the Sapper School, and there allowed ordinary wages for a certain period, with a view to their acquiring practice in accounts, and ability to work from a plan; or where, from distance, this would be inconvenient, we recommend their being attached to the Engineer's own office for instruction by the officer himself, or by his establishment, as circumstances might admit, on the same terms.

114. We have visited the Sapper Schools. The Europeans have a creditable knowledge of plane drawing, writing and accounts: they are all instructed in surveying, levelling and estimating.

115. We found the older native boys tolerably instructed in English reading, writing and accounts. Reflecting on what we had thus far seen, we were all disposed to question whether it was not a mistake to give up so much time to English instruction, particularly as a correct knowledge of the vernacular is commonly found wanting in lads who from an early age have been taught through the medium of a foreign tongue.

116. Considering the Public Work Department only, and not that of the Quartermaster-general, we were at first inclined to think, that, instead of teaching the many natives a difficult language like English, the few Europeans should rather have instruction in Mahratta, whereby not only might all the subordinates communicate one with another, but the Europeans, as overseers, would become a far more efficient body.

117. However, having since consulted Major Candy, Superintendent of the Poona College, and having witnessed what the scholars at that institution can do, we are satisfied that a competent knowledge of English may be required from candidates for the Public Works Department without the slightest apprehension of deficient numbers offering, or that this additional qualification will at all impair their fitness for that portion of engineering business which is conducted in Mahratta.

118. We would, therefore, exchange the 6th clause from Colonel Jervis's scheme, and require from every grade of surveyors and builders a thorough acquaintance with English. There are various institutions all deserving a share of such encouragement, from which competitors for employment will come forward.

119. We find that the Poona College alone is capable of supplying, in any numbers likely to be wanted, young men, most Brahmins, thoroughly grounded in mathematics and English, and needing only the superstructure of engineering knowledge to become qualified as surveyors and builders.

120. From these sources the present deficiencies of the branch may be replenished without long delay, and its future wants may certainly be supplied at Poona from a class of willing lads preferable to those bred in Bombay, from their moderate expectations, harder training, and better fitness, as Decannees, to fare abroad in the districts.

121. Major Candy is of opinion that Rs. 7 per mensem would be a sufficient rate of subsistence for students while under instruction in the Sapper School.

122. Colonel Jervis's rules, in the Appendix, containing all the main provisions that will not be better left to the officer who will direct the engineering institution than attempted by us, the only arrangements remaining for us to name as requisite for improving the present means of instructing engineer subordinates, are as follows:

122-3. To accommodate classes of European overseers, native surveyors and maistries, an appropriate building must be erected: the present school-rooms are not more than sufficient for the recruit boys: a competent English teacher, not liable to be moved for the upper classes, with a native assistant, drawn perhaps from among the present surveyors, must be appointed: general supervision of the whole will appropriately rest with the Commanding Officer of the Sappers. Before determining his scheme, that officer should communicate with the principal of the Civil Engineering College at Roorkee, whence may probably be obtained a course of instruction made ready to his hand.

PUBLIC WORKS.

(No. 1,795 of 1852.)

To the Right honourable Lord Viscount Falkland, G. C. H., Governor and President in Council.

My Lord,

With reference to Secretary Lieutenant Colonel Melvill's letter, No. 2,962, dated 10th November last, and its accompanying extract from the report by the Commission upon Public Works, proposing a re-modelling of the Sapper School at Poona, in view to obtaining qualified persons for the Department of Public Works, we have the honour to report, that we approve of the proposition, and think it offers a fair chance of success. The only point

on

on which we entertain any doubt, is the propriety of giving the instruction in English; but in making the foregoing remark, we do not wish that the proposals of the Commission should be hindered or altered. We strongly recommend that they be carried into effect as early as possible.

2. On receipt of Secretary Lieutenant-colonel Melvill's letter, we addressed Captain Studdert, commanding Sappers and Miners, and Major Candy, Superintendent of the Poona College, requesting the former officer's opinion as to the buildings that would be requisite, and requesting him to furnish rough plans, and approximate estimate of the same, and requesting the favour of the opinion of the latter as to the salary of the European teacher and his assistant.

3. Major Candy, in reply, has stated, "I do not think that a well-educated man, competent to teach the upper classes of the proposed Institution, could be procured from Great Britain under a salary of Rs. 300 per mensem. This sum I should look on as the minimum amount of stipend to be given; Rs. 400 per mensem would be a more suitable sum: a Native Assistant Teacher might, I think, be procured on a salary of from Rs. 75 to Rs. 100 per mensem.

"As two or three hours a day would probably be sufficient for the instruction of the upper classes, I would suggest that this work might, with advantage to the economical working of the Institution, be committed to some competent person, who would not be entirely dependent for support on the remuneration received for it. The professor of mathematica in the Poona College, for instance, could give a couple of hours or so to this work, without trenching on his duties in the College, and I am authorized by him to say that he would be happy to do so for a remuneration of Rs. 200 or Rs. 150 per month."

4. Captain Studdert has submitted (under date 30th January) an estimate of the probable cost of constructing a school-room capable of accommodating 30 students, which amounts to Rs. 3,527.

5. The expenditure involved in the contemplated extension of the Sapper School at Poona will thus be as follows:

	Rs.
The erection of School-rooms	3,527
Monthly Expenses:	
Head Teacher	150 or 200
Native Assistant	75

6. The Commission seems to have considered that it would be necessary to subsist the youths, whilst under instruction, at a cost of about Rs. 7 per mensem for each. The expense of such subsistence, were it found necessary, would, of course, depend on the number of the students: it is difficult to make a satisfactory calculation as to what this number should be; but, supposing the course of instruction to average two years, thirty students of both classes (surveyors and builders and maistries) might be assumed as the average of a good many years: perhaps 15 as maistries, and the same number of the superior class, might be considered as the complement of the school, or the number under instruction might be left undetermined, and only five appointments of the superior class and five as maistries assured per annum; but we think that the grant of subsistence would be an unnecessary expenditure, and we recommend that at least the attempt be made to obtain students without any such grant.

We have, &c.

(signed) C. Waddington,
Lieut.-colonel Commandant, Chief Engineer.

Bombay, Military Board Office,
1 March 1852.

J. Swanson, Major.

(True copies.)

(signed) P. M. Melvill, Lieut.-colonel,
Secretary to Government.

(True copies.)

(signed) R. J. H. Birch, Lieut.-colonel,
Offic. Secy. to Govt., India, in the Military Department.

(No. 1,996.)

From J. G. Lumsden, Esq., Secretary to Government, to Secretary to the Government of India, Bombay Castle, 9 August 1852.

Sir,

I am directed by the Right honourable the Governor in Council to transmit the accompanying copies of a letter from the Military Board, No. 7,527, dated 22d ultimo, and its enclosures, relative to the want of surveyors experienced by the Superintending Engineer Southern Provinces, and to request, under the urgency of the applications, that, in submitting them, you will be pleased to move the Government of India to favour this Govern-

Appendix (M.) ment with a decision on the subject submitted in the letter from this department, dated the 25th of March last, No. 823.

Military Department, Bombay Castle,
9 August 1852.

I have, &c.
(signed) *J. G. Lumsden*,
Secretary to Government.

(No. 7,527 of 1852.)

To the Right honourable Lord Viscount Falkland, G. C. H., Governor and President in Council, dated 22 July 1852.

My Lord,

WE have the honour to submit the accompanying letter, No. 2,764, of the 26th June 1852, from the Superintending Engineer, Southern Provinces, and to state, that it is the result of a correspondence regarding the want of surveyors.

2. The want of this class of public servants is great; but we can make no further definite recommendations to remedy the want pending the decision on the proposed institution at Poona, which formed the subject of reference by your Lordship in Council, under date the 10th November 1851; in Secretary Lieutenant-colonel Melvill's letter, No. 2,962, on which we reported in our letter, No. 1,795, of 1st March 1852.

3. We strongly recommend that the proposals of the Public Works Commission on this subject be put in force as early as possible.

Bombay, Military Board Office,
22 July 1852.

We have, &c.
(signed) *C. Waddington*,
Lieut.-colonel Commandant, Chief Engineer.
J. Swanson, Major.

(No. 2,764 of 1852.)

From Lieutenant-colonel *Walter Scott*, Superintending Engineer, Southern Provinces, to the Secretary Military Board, Bombay, dated 26 June 1852.

Sir,

WITH reference to your memorial, No. 4,818, of 30th April last, I have now the honour to report, that I have received several applications from young men educated at the Poona College for appointments: generally speaking, their mathematical acquirements are beyond, and some very much beyond, what is required.

2. They all, however, labour under the fatal objection of want of practical knowledge; and I submit, that in an executive office the use of instruments and the rudimentary portion of surveying could not be imparted without delays injurious to the conduct of Public Works.

3. If they were well grounded in the rudimentary part of practical surveying, they would improve in practice; but without some preliminary knowledge, they would occasion great and vexatious delays.

4. I believe that by the time a class for field instructions has been established for 12 months, we should be able to obtain from 12 to 15 young men, not perfect surveyors, but able to undertake simple surveys, and who would improve themselves by real practice.

5. I have been disappointed with respect to East Indians. I had hoped that with so many European pensioners in Belgaum, Captain North would have been able to obtain some; but he has not yet reported any applications.

6. As I understand that the subject has been discussed by the Commission of Public Works, I will not again trouble you with my views, which, of course, are less matured than theirs, and the proposition of different schemes distracts attention.

7. I believe, however, in urging the speedy establishment of a field surveying class, I am in accordance with them.

8. The extreme urgency of our wants is so great, that I trust I may be excused agitating this matter.

S. E. O. S. P., Poona,
26 June 1852.

I have, &c.
(signed) *Walter Scott*, Lieut.-colonel,
Supg. Engineer, S. P.

(True copies.)
(signed) *J. G. Lumsden*, Secretary to Government.

(True copies.)
(signed) *R. J. H. Birch*, Lieut.-colonel,
Offic. Secy, Govt. of India, Military Department.

(No. 403.)

Appendix (M.)

From Lieutenant-colonel *R. J. H. Birch*, c. b., Officiating Secretary to the Government of India in the Military Department, to Lieutenant-colonel *P. M. Melvill*, Secretary to Government, Military Department, *Bombay*, dated 2 October 1852.

Sir,

In reply to your despatch, No. 1,906, of the 9th August last, I am directed to acquaint you, for the information of the Right honourable the Governor in Council of Bombay, that the Most noble the Governor-general of India in Council is pleased, under the circumstances stated, to sanction the expenditure necessary for carrying out the proposed plan for extending the Sapper School at Poona to the extent set forth in the Bombay Military Board's letter, No. 1,795, of the 1st March 1852.

I have, &c.

(signed) *R. J. H. Birch*, Lieut.-colonel,
Offg. Secy. to Govt. of India, Military Department.

Council Chamber, Fort William, 2 October 1852.

(True copy.)

(signed) *R. J. H. Birch*, Lieut.-colonel,
Offg. Secy. to Govt. of India, in the Military Department.

(No. 570.)

From Lieutenant-colonel *R. J. H. Birch*, c. b., Officiating Secretary to the Government of India, Military Department, to Lieutenant-colonel *P. M. Melvill*, Secretary to Government, Military Department, *Bombay*, dated 28 May 1853.

Sir,

Your despatch, No. 2,971, of the 11th November 1851, having been submitted to the Government of India, I am desired to state, that, in compliance with the recommendation of the Bombay Government, the Most noble the Governor-general of India in Council is pleased to sanction the grant of salary of *Rs. 300* (three hundred) per mensem to Captain Gaisford, for the period during which he performed the duties of Secretary to the Commission on Public Works at Bombay, deducting therefrom the additional batta and boat allowance which it appears have been already drawn by him under the ordinary regulations.

The report of the Commission, received with your letter, No. 2,961, of the 10th of November, and the subject of your despatch, No. 529, of the 25th March 1852, are under consideration.

I am &c.

(signed) *R. J. H. Birch*, Lieut.-colonel,
Offg. Secy. to Govt. of India, Military Department.

Council Chamber, Fort William, 28 May 1853.

(True copy.)

(signed) *R. J. H. Birch*, Lieut.-colonel,
Offg. Secy. to the Govt. of India, in the Military Department.

(True copies.)

(signed) *T. L. Peacock*,
Examiner of India Correspondence.

East India House, 17 January 1854.

PUBLIC WORKS (BENGAL, &c.)

COPIES of the REPORT of the COMMISSIONERS on PUBLIC WORKS at *Dumka*, in the Year 1851-52; with the MINUTES of the Members of the GOVERNMENT, and ORDERS or DESPATCHES of the COURT of DIRECTORS relating thereto.

(*Mr. Hunt*)

Ordered, by The House of Commons, to be Printed,
6 February 1854.

[*Price 1s. 5d.*]

PUBLIC WORKS (INDIA).

RETURN to an Order of the Honourable The House of Commons,
dated 14 February 1854 :—for,

COPIES "of the REPORTS of the COMMISSION on PUBLIC WORKS at *Bombay*,
and of the SECOND REPORT of the COMMISSIONERS on PUBLIC WORKS at
Madras, together with the MINUTES or REPORTS of the Governor and
Members of Council at *Madras*, to the Governor-General or Court of
Directors, respecting those Reports :"

"Of all MINUTES or REPORTS of the Governor-General to the Court of
Directors in answer to or respecting those Reports :"

"Of any MEMORIALS from the Commissioners on Public Works at *Madras* to
the Court of Directors, respecting those Reports :"

"And, of any of the ANSWERS of the Court of Directors to the said Memorials,
Minutes, and Reports."

Note.—The Report of the Commission on Public Works at *Bombay* has been presented to,
and printed by, both Houses of Parliament. (House of Lords Paper, No. 17 of Session 1853-4 ;
House of Commons Paper, No. 21 of Session 1853-4.) The Second Report of the Commis-
sioners on Public Works at *Madras*, has not yet been received in this country.

East India House, }
2 May 1854. }

JAMES C. MELVILL.

(*Mr. Hume.*)

Ordered, by The House of Commons, to be Printed,
4 May 1854.

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East India House,
2 May 1854. }

T. L. Peacock,
Examiner of India Correspondence.

COPIES of the REPORTS of the COMMISSION ON PUBLIC WORKS at *Bombay*, and of the SECOND REPORT of the COMMISSIONERS ON PUBLIC WORKS at *Madras*, together with the MINUTES or REPORTS of the Governor and Members of Council at *Madras*, to the Governor-General or Court of Directors, respecting those Reports;—Of all MINUTES or REPORTS of the Governor-General to the Court of Directors in answer to or respecting those Reports;—Of any MEMORIALS from the Commissioners on Public Works at *Madras* to the Court of Directors, respecting those Reports;—And, of any of the ANSWERS of the Court of Directors to the said Memorials, Minutes, and Reports.

[THE Court's Despatch of 30th January 1850, directing the formation of Commissions on Public Works at the several Presidencies of India, has already been laid before Parliament (Sessional Paper, No. 622 of 1851, pp. 146-154), but it appears essential to the completeness of this Return to give Extracts of so much of it as relates to the Presidency of Madras.]

EXTRACT Public Letter to India, dated 30 January (No. 2) 1850.

Para. 1. SEVERAL very important and intimately connected questions in relation to the superintendence and management of public works have been brought under our consideration in letters from all the Presidencies. We have thought it desirable to embrace the subject in one view, and to communicate our opinion on it to your Government.

2. We shall notice these questions, and the subjects from which they have arisen, in the following order.

* * * * *

3. The District Roads of Madras.

* * * * *

Madras District Roads:

18. The letters noted in the margin from the Government of Fort St. George relate chiefly to the formation and maintenance of roads under that Presidency. The letter dated 3d January 1849, transmits a general report of the Road Department from its establishment to the 1st May 1848, and the orders passed thereon by the Government.

19. The whole of the proceedings referred to in these letters, lead to the following conclusions:

20. The roads in some instances, from want of previous survey and other causes, have not been well planned with respect to the line, so that a road on a new line becomes desirable, and even necessary for permanent traffic.

21. They have been carried below the level of tanks, when they might have been carried above it, and embankments have been broken and bridges carried away by inundations which, on the higher line, would have been comparatively innocuous.

22. They have been constructed without due provision for their permanent maintenance, so that either the entire road has gone to decay, or one portion of it has become unserviceable, while another portion was in progress of construction.

23. In many parts of the Presidency it is impossible, from the want of local materials, to construct metalled roads, except at an altogether disproportionate cost.

24. The carts generally used are constructed on a principle calculated to destroy the roads. This principle was introduced about 50 years ago, and it may be, therefore, presumed that the people would not object to the introduction of an improved form.

25. To construct a system of trunk and branch roads on a permanent and generally useful principle would require a greater outlay than can be afforded by Government, unless aided by one or all of three modes of contribution: the levy of tolls, the levy of a cart tax, the requisition of village labour. The objections to the first of these methods are clearly and forcibly stated by Captain Best, who advocates the second and third. He calculated that the requisition of a day's labour at the rate of one cooly per cawny from places within two miles of a road, and of a commutation of two annas per cawny from places within that distance, and of one anna per cawny from places at a greater distance, would yield 34,00,000 days' labour, and 3,18,750 rupees per annum; but he does not state by what machinery, at what cost, and with what checks and securities against exaction and oppression, these very minute contributions of labour and money could be levied.

26. Captain Best appears also to regret the prohibition of a fourth mode of assistance, convict labour, which he thinks not liable in the Madras territory to the objections which were taken to it in Bengal.

27. Labourers require vigilant superintendence, and there is a great deficiency of practical knowledge in local overseers. Lord Tweeddale, in his minute of 25th January 1848, dwelt very strongly on the necessity of having men of practical experience to do justice to the science which is abundantly possessed by the engineers of the Presidency. The letter from the Government, dated 4th February, No. 3 of 1848, requested that two practical overseers, who understood the business of road-making in all its branches, should be sent out from England for the purpose of instructing the local overseers and operatives.

* * * * *

29. With respect to the chief superintending authorities, the present practice at the several Presidencies is different.

* * * * *

61. Under the Presidency of Madras, the control of all works connected with the land revenue, especially all works of irrigation, is intrusted to the Board of Revenue in the Department of Public Works, which consists of the ordinary members of the Board, with the addition of the chief engineer, and with a distinct establishment, at the head of which is placed an engineer officer as secretary; all other works are placed under the superintendence of the Military Board.

* * * * *

63. It is most important that the system of the superintendence of public works should be assimilated at all the Presidencies; but considering that the opinion of the Governor-General has not yet been given on the division of public works in Bengal; considering also the unsatisfactory working of the system at Madras, which formed the subject of our despatch to that Presidency, 29th May (No. 12) 1845, and the great differences of opinion in relation to the change of system at Bombay, the subject is not brought before us in a state for final decision; it is desirable that the entire question in relation to all the Presidencies should first pass under the deliberate review of your Government.

64. In forming a judgment of the system of superintendence, it is necessary to have a clear view of the actual state of all the work which is the subject of superintendence; this, in the districts, and especially in the district roads, embraces a most extensive field of operations. The documents which we have examined exhibit many proofs of cost and labour thrown away, of work done over again and again without a good final result, of great excess of expenditure

over

over estimates; in short, an extensive admission of defects, and a great diversity of opinion as to the mode in which those defects should be remedied.

65. We think it desirable that you should select two or three competent officers from persons already at the Presidency, and whose services can be either wholly or partially spared for the purpose, to form a temporary commission to inquire into the whole subject of the superintendence and execution of public works, not omitting any subject noticed in this despatch; that similar commissions should be formed at the other Presidencies; that they should make full and detailed reports to their respective Governments, embodying such suggestions as may appear to them advisable; that these reports should be submitted to you, and that we should receive from you such a distinct opinion on the whole of the questions herein considered, as shall place it in our power to come to a decision respecting them.

* * * * *

67. We do not consider that any great public advantage would result from the engagement of two practical overseers thoroughly conversant with road-making in all its branches, as proposed in Lord Tweeddale's minute of January 1848, especially as it would be impossible to send out persons possessing the essential qualification of a knowledge of the native languages.

68. Of all other applications and suggestions for purposes of permanent utility, but not of immediate temporary necessity, we shall postpone the consideration till we are in possession of the opinions with which we have required you to supply us.

EXTRACT Military Letter from Bengal, dated 9 September (No. 231) 1853.

3. We have received from the Government of Fort St. George, with the documents herewith transmitted as per margin, the First Report of the Commission for inquiry into the Department of Public Works at Madras, with an intimation that five copies of the printed report referred to have been forwarded direct for your information.

Cons. 4 March
1853, No. 705.
Cons. 3 June 1853,
No. 33/41.

4. Your Honourable Court will observe (Cons. 3 June 1853, No. 41) that we have deferred the consideration of the report and documents until favoured with a full exposition of the views of the Government of Fort St. George on the subject.

Home Department, No. 69 of 1853, dated 7 October.

To the Honourable the Court of Directors of the East India Company.

Honourable Sirs,

WITH reference to your Honourable Court's Despatch, No. 32, dated 24 May last, we have the honour to forward the accompanying communication from the Government of Fort St. George, promising shortly to submit their final proceedings on the First Report of the Commission appointed to inquire into the whole subject of the superintendence and execution of Public Works under the Madras Presidency.

Home Cons. 5 Aug.
1853, No. 56 to 59.
Home Cons. 26 Aug.
1853, No. 25 & 26.
Home Cons. 7 Aug.
1853.

2. The reports of the Commissions appointed at the three Presidencies have been received, and are now under consideration in the Military Department, but no decision on the subject can be arrived at until we are in possession of the minutes of the Madras Government on the report from that Presidency.

We have, &c.
(signed) *Dalhousie.*
J. Lewis.
J. Doon.
J. Low.

Fort William, 7 October 1853.

PUBLIC WORKS DEPARTMENT.

No. 118.

EXTRACT from the Minutes of Consultation, under date the 6th April 1852.

READ again letter from the Commissioners for inquiring into the system of Public Works in the Madras Presidency, dated 21 November, and recorded in Cons. 16 December 1851.

Read also the following papers:

Extract from the proceedings of the Board of Revenue, D.P.W.
(Here enter 15 January 1852, No. 31.)

Memorandum by the Right Honourable the President.
(Here enter 27 February 1852.)

Minute by the Honourable Mr. Thomas.
(Here enter 6 March 1852.)

Memorandum by the Right Honourable the President.
(Here enter 15 March 1852.)

The Right honourable the Governor in Council is of opinion that there are serious objections to the proposition recommended by the Commissioners, and supported by the Board of Revenue in the Department of Public Works, of replacing the trunk roads under the Board's charge, and resolves to defer the consideration of the subject until the final report of the Commissioners on the Department of Public Works generally, which may shortly be expected, is laid before him.

2. In regard, however, to the recommendation for the appointment of an assistant to the secretary to the Board in the Department of Public Works, the Governor in Council, satisfied on the representation of the Commissioners that that officer needs additional aid to enable him efficiently to discharge his duties, will be prepared to recommend the appointment to the Government of India, on the Board submitting an application in the prescribed form, showing the charge which the measure will involve.

(signed) *H. C. Montgomery*, Chief Secretary.

(True copy.)

(signed) *H. C. Montgomery*, Chief Secretary.

(True copy.)

(signed) *R. J. H. Birch*, Lieutenant-Colonel,
Officiating Secretary to the Government of India
in the Military Department.

No. 889.

From Lieutenant-colonel *R. J. H. Birch*, c.B., Officiating Secretary to the Government of India in the Military Department, to Lieutenant-Colonel *C. A. Braene*, Secretary to Government in the Military Department, Fort St. George.

Sir,

THE Chief Secretary to the Government of Fort St. George having, with his letters to the Secretary to the Government of India in the Home Department, No. 121, of the 13th April 1853, forwarded a printed copy of the "First Report of the Public Works Commission," with correspondence regarding the subject under investigation by that Commission, the whole of the documents have, under the

RETURNS RELATING TO PUBLIC WORKS, INDIA. 7

the orders of the Supreme Government, been transferred to this department, from which instructions for the assembly of the Commission were originally issued.

2. The printed report and the other papers have been laid before the Most noble the Governor-General in Council, who would at once have entered upon the consideration of the report and papers, in order to be prepared for the further communications from the Government of Madras, which are promised, were it not for the terms of the minute by the Honourable Mr. Thomas, dated the 12th April 1853, regarding the imputations against the proceedings of Government contained in the report of the Commissioners. In the sentiments recorded in that minute the Right honourable the Governor entirely concurred (*see* his minute of the 13th April), and added: "I shall endeavour at some future period to show my reasons for the opinion I have formed that this first report of the Commissioners is one-sided; that it misrepresents the actuating motives and real feelings of Government, with regard to its measures for the improvement and amelioration of the country, and therefore that it is not entitled to that confidence, though some facts set forth in it may be well supported, which such a document should command, to render it of any general practical use."

Under these circumstances, the Most noble the Governor-General of India in Council will defer the consideration of any part of the report or documents until a full exposition of the views of the Madras Government shall have been submitted.

I have, &c.
(signed) *R. J. H. Birch*, Lieutenant-Colonel,
Officiating Secretary to the Government of India
in the Military Department.

Council Chamber, Fort William, 28 May 1853.

(True copy.)
(signed) *R. J. H. Birch*, Lieutenant-Colonel,
Officiating Secretary to the Government of India
in the Military Department.

No. 353.

From Sir *H. C. Montgomery*, Bart., Chief Secretary to the Government of Fort St. George, to *G. Plowden*, Esq., Officiating Secretary to the Government of India.

Sir,

I AM directed, in reply to Mr. Couper's letter of the 20th ultimo, to state for the information of the Most noble the Governor-General in Council, that the Honourable Mr. Elliott and the Honourable Mr. Thomas have recorded their opinions at considerable length on the First Report of the Commissioners for inquiring into the system of Public Works at this Presidency, and that the Right honourable the Governor has nearly concluded his review of the subject. These papers being voluminous, it has occurred to the Government to be desirable that, together with the final proceedings of Government, they should be laid before the Most noble the Governor-General in Council in a printed form. They are now in the press for this purpose; and I am instructed to notify that it is expected they will be despatched to Calcutta before the termination of the present month.

I have, &c.
(signed) *H. C. Montgomery*, Chief Secretary.

Fort St. George, 13 September 1853.

VIEWS and Proceedings of the Madras Government on the First Report of the Commission on Public Works.

PUBLIC WORKS DEPARTMENT.

No. 407.

EXTRACT from the Minutes of Consultation, under date the 8th November 1853.

READ again the First Report from the Public Works Commissioners, dated 23 December 1852, and entered in Diary to Consultation, 15th April 1853.

Read also the following Minutes :

Minute by the Honourable Mr. Elliott, with Postscript.

(Here enter 19th July and 19th September 1853.)

Minute by the Honourable Mr. Thomas.

(Here enter 23 August 1853.)

Minute by the Right honourable the President.

(Here enter 29 October 1853.)

The above Minutes having been printed, ordered, that five copies be forwarded to the Government of India with the following letter.

Ordered also, that 30 copies of the same be forwarded to the Honourable the Court of Directors, with a copy of the letter addressed to the Government of India.

To the Secretary to the Government of India, in the Military Department.

(Here enter 8 November 1853, No. 408.)

To the Secretary at the India House.

(Here enter 8 November 1853, No. 409.)

(True extract.)

H. C. Montgomery, Chief Secretary.

PUBLIC WORKS DEPARTMENT.

No. 408.

From Sir *H. C. Montgomery*, Bart., Chief Secretary to the Government of Fort St. George, to the Secretary to the Government of India in the Military Department.

Sir,

Para. 1. In continuation of my letter of the 13th April last, and with reference to the intimation contained in my further letter of the 18th ultimo, I am now directed to lay before the Most noble the Governor-General in Council the proceedings in print of this Government on the First Report of the Commissioners appointed under the orders of the Supreme Government to inquire into the system of Public Works in the Madras Presidency.

2. These embrace minutes recorded by the Right honourable Sir Henry Pottinger and the Honourable Messrs. Elliott and Thomas.

3. The subjects adverted to by the Commissioners have, it will be observed, been discussed in detail in these documents, and as the individual opinions of the members of this Government do not in some points coincide, it is necessary to solicit the particular attention of his Lordship the Governor-General in Council to the respective views enunciated in these minutes, as well as to the appendices annexed in support of them.

4. The

4. The Commissioners in their concluding remarks (page 270) state that their chief recommendations are addressed to three main objects.

1st. The past neglect of even the existing works of irrigation and the high expediency of repairing past omissions, and entering vigorously on the task of both restoring the old works to their highest point of efficiency, and of greatly extending irrigation by new works.

2d. The absolute necessity of taking measures without delay to form a general system of internal communications; and,

3d. As an essential means to both these objects, the necessity of greatly enlarging and improving the engineer establishments.

5. The allegations of past neglect of existing works the Governor in Council believes to be, if not a mis-statement, very greatly exaggerated by the Commissioners, who in other parts of their Report (*vide* paras. 241, 245, 252 and 271), instance the benefits this Presidency has secured by attention to irrigation in the districts of Tinnivelly, South Arcot, Tanjore and Rajahmundry. But while admitting that in some instances possibly more might have been effected, the Commissioners, in page 110, para. 275, afford ample justification for any supposed and asserted neglect on the part of this Government in the following remarks:—

“ Indeed we fully believe that this neglect by the Government of undertakings so remunerative, is to be accounted for in a great measure by the extreme paucity of engineers. Superficially and imperfectly as those officers are compelled to perform even their ordinary and routine duties, these are yet quite sufficient to engross all their time, and to leave them none to attend to new undertakings. Here and there indeed an officer is found with energy to take up the investigation of great projects, but this cannot be done except by the neglect of the ordinary duties of his charge; and this is no slight evil, though perhaps the lesser of the two. In the case of the Godavery works, not only were the ordinary duties of the division entirely neglected, as we learn from Colonel Cotton's own correspondence, but other divisions were deprived of no inconsiderable part of their far too scanty establishments, in order to provide for carrying on that one undertaking, and still the number of officers employed upon it was far too small, and the progress in consequence very slow.”

6. The Right honourable the Governor in Council fully concurs with the Commissioners as to the benefits that must result from a greatly increased expenditure in works of irrigation, provided the means of superintendence under able and judicious direction is available, but without this indispensable requisite it is manifestly impracticable to entertain projects for the improvement of the country, either as regards irrigation or internal communications on any extensive scale. At the present moment, works which have received the sanction of this Government and of the Government of India are indefinitely and necessarily postponed because efficient supervision is wanting.

7. To the proposed plan of obtaining the increased agency for supervision of works solely by enlargement of the engineer corps, the Governor in Council is not able to record his assent. It appears to him inexpedient that Government should continue wholly dependent on the military corps of engineers for the supply of officers for civil engineering. In again recommending, therefore, that the military corps should be increased, the Governor in Council would suggest that the increase need not be carried to the extent required to provide for all the appointments which should be filled by scientific officers, but that a proportion might be left to be supplied by civil engineers sent from England, and by officers of the artillery and the line, and any qualified persons that may be found out of the service.

V. letter to Government of India, under date 9 June 1853, No. 605.

8. The Governor in Council does not support the proposal of the Commissioners for specifying any particular sum to be annually laid out on public works. He is of opinion that the amount to be expended on works of all descriptions, would most conveniently and properly be left to be fixed within a certain limit by the local government when proper supervision is forthcoming. He does not however object to a prospective estimate of the expenditure intended to be made within the year being submitted to the Government of India, that the amount may be known to that authority, and that it may see that the authorised limit

is not exceeded, but he is fully of opinion with the Commissioners, for the solid reasons they advance in para. 492, page 198, that whatever the admitted amount of annual expenditure may be, it should be placed at the unfettered and exclusive disposal of the local government.

Board of Revenue
D. P. W.
Military Board.
Superintendent of
Roads.

9. On the subject of the controlling agency for the Department of Public Works, it will be observed there is a difference of opinion. The Right honourable the President and the Honourable Mr. Thomas are opposed to the adoption of the recommendation of the Commissioners for the constitution of a new Board to have control over public works of all kinds, in lieu of the three distinct authorities now existing. They are in favour of continuing the trunk roads throughout the Presidency, until finally completed, under the superintendence, as at present, of a separate officer corresponding direct with Government, and combat the opinion that the existing system, as the Commissioners assert, has failed. The Honourable Mr. Thomas considers that a new Board would be a cumbrous and expensive machinery, especially objectionable as excluding individual responsibility, and he would advocate the division of the Presidency into four divisions with a general superintendent to each. The Right honourable Sir H. Pottinger concurs in these views, believing that a Board on the principle proposed would prolong the present evil system; whereas the superintendence suggested would comprise personal inspection, individual responsibility, and vastly improved efficiency. The Honourable Mr. Elliott agrees with the Commissioners as to the composition of the proposed Board, except that he thinks that it will be sufficient to appoint one engineer officer to be a member of the Board besides the chief engineer, who is to have a seat in it *ex officio*. Mr. Elliott, in a postscript to his minute (page 33), has stated his reasons at length for preferring a Board consisting of an able and experienced revenue officer, and a select officer of engineers, eminent for his professional skill and experience, and thoroughly conversant with the practice of the department, to an individual officer for the control of the Department of Public Works at this Presidency, or to dividing this control by arranging the district in four grand divisions, with a superintendent to each, with reference especially to the union of the management of the Maramut with the administration of the Land Revenue.

10. To the arguments in support of these separate views I am instructed to solicit especial attention, as the controlling agency for the Maramut Department must ever be a matter of vital concern to the future prosperity of this Presidency, where the existence of the land revenue so much depends upon irrigation. But though the Government of Madras are not unanimous on the question of the future controlling agency of the Public Works Department, they agree fully on the impolicy of continuing any portion of it in the hands of the Military Board. The Honourable Mr. Thomas pronounces that delay and ineffectual supervision are marked characteristics of this Board, and he strongly advises that it should be abolished at the earliest possible date, and the Right honourable the Governor declares it to be worse than useless.

11. In paras. 173 to 181 of his minute, the Honourable Mr. Elliott has carefully reviewed the subordinate agency proposed by the Commissioners, and with the modifications suggested by Mr. Elliott the Governor in Council is inclined to recommend it on the proposed scale, but is of opinion that such details as are referred to by the Commissioners, must be left to be carried out gradually by the local government.

12. The Commissioners, in paras. 606 to 626, have largely discussed the subject of training a succession of subordinate officers, European and native, for the Department of Public Works. This subject has long engaged the attention of this Government, and the Government of India will remember that a project has been already submitted for raising a Government institution for this purpose, on the foundation of the existing school for the instruction of artificers established by Major Mainland.

13. The Right honourable the Governor in Council would again urge this project on the attention of the Most noble the Governor-General in Council. Anticipating the approval of the Government of India, the Governor in Council has lately authorised the extension to the Department of Public Works of the system of entertaining apprentices under the district civil engineers, which had been found to be so successful in the Road Department.

14. The

14. The Governor in Council will not in this communication further follow the Commissioners through their very lengthened and reiterated discussions, as the principal points of their report have been fully treated of in the minutes recorded, but he directs me in conclusion, to bring prominently to the notice of the Supreme Government the tone which the Commissioners have used in reference to proceedings and orders of Government, and the principles and views ascribed to it; and the exaggerations and misrepresentations with which they have endeavoured to support the studied reflections they have cast upon its conduct in many instances, which an exact statement of the case would have shown to be unfounded.

I have, &c.
(signed) *H. C. Montgomery,*
Chief Secretary.

Fort St. George, 8 November 1853.

MINUTE by the Honourable *D. Elliott, Esq.*

Section I.

1. THE attention of the committee was directed to "the whole subject of the superintendence and execution of Public Works" under this Presidency.
2. The public works of this Presidency, the Commission point out, "are carried on under three distinct and independent departments; viz, 1st, the Public Works Department of the Board of Revenue; 2d, the Superintendent of Roads; 3d, the Military Board. Para. 3.
3. The Board of Revenue has the control of all irrigation works, all civil buildings in the provinces, and all roads and bridges not included in the trunk roads, nor in military cantonments, and all canals, &c.
4. The superintendent of roads has the sole superintendence of the great lines of communication which have been classed under the term Trunk Roads; he proposes all new roads on these lines, as well as all repairs and improvements, and he and his subordinates execute the greater part of the work.
5. The Military Board have the superintendence of the construction and repair of fortifications, of all public buildings, both military and civil, at the Presidency, the Government roads and bridges at the Presidency, all military buildings and forts in the provinces, and roads and bridges, &c. in military cantonments; as well as the roads, bridges, and civil buildings and works in the Saugor Division.
6. Besides these the work at the Paumbem Channel is under the sole superintendence of the chief engineer.

Section II.

7. IN the 2d section of their Report the Commission treat of the department of Public Works under the Board of Revenue.
8. In this department the civil members of the Board of Revenue are assisted by the chief engineer, who has a seat at the Board, and their secretary is an officer of engineers.
9. The general charge of the works under the superintendence of the Board of Revenue is vested in the collectors, assisted by professional officers designated as civil engineers.
10. The Commission represent the 20 collectorates under this Presidency as distributed into eight principal divisions, to each of which a civil engineer stands appointed, and one sub-division, in which an assistant civil engineer of the first class performs the same duties as the civil engineers in the other divisions. Para. 11. When they wrote, the first division (exclusive of the sub-division) comprised the three collectorates of Rajahmundry, Masulipatam, and Guntoor. But these districts have since been formed into two divisions, called the Godavery and the Kistna divisions, and placed respectively under the civil engineers charged with the amcuts on these rivers and the subsidiary works for the irrigation of the country

12 / RETURNS RELATING TO PUBLIC WORKS, INDIA.

3d Division, Bel-
lary, Canara, Kur-
nool.

country dependent on them. There are, therefore, under the orders of the Board of Revenue nine civil engineers and one first-class assistant civil engineer, with distinct charges. In general each civil engineer has to attend to two districts. In one only the charge of the civil engineer extends to a third district; but the second district of this division has no artificial irrigation, and the third is a small one.

Paras. 13 to 16.*

11. The nature of the works of irrigation in this Presidency is described by the Commission. The revenue immediately dependent on those belonging to Government is estimated by them at *135 lacs of rupees per annum, besides †15 lacs alienated as Enam. The custody of the works on which this revenue depends, the Commission observe, "devolves primarily on the collectors and tahsildars; then on the civil engineer department, whose more special province it is to give advice and assistance to the collector in preventing danger and repairing damage."

Para. 17.

Para. 20.

12. All repairs and alterations of works of irrigation, and of the other works above specified as appertaining to this department, are made under the orders of the Board of Revenue, which receives and discusses all projects for constructing new works or improving and enlarging old ones. Estimates for such works are submitted to the Board by the local officers, and if approved, are laid by the Board before Government. The Board receives and examines and submits to Government the bills for work done; distributes and transfers the assistants and other subordinate officers of the civil engineer; and exercises a general control over every part of the department, whether under the civil engineers or under the collectors.

13. These duties involve a vast deal of business, which, owing, as the Commission think, to the inadequacy of the office establishment, it has not been possible to discharge without arrear. It is stated that from the heavy pressure of business in the office, bills for work done can rarely be examined in less than a year after receipt, and a still longer time sometimes elapses between the completion of a work and the transmission of the bill for it to the Board.

14. The Commission omit to mention that the office establishment was strengthened by the appointment of an assistant secretary long before the date of their report; and that the establishment under the secretary was increased to the extent that seemed to be sufficient to enable it to carry on the current business without arrear, while a separate provision was made for the disposal of arrears at a much earlier period.

Para. 22.

15. The Commission represent that "the Board have done their best with the aid in general of a highly efficient secretary, but with a very inadequate office establishment, to deal with the business brought before them; but they have attempted very little beyond that, and have rarely taken the initiative in suggesting improvements." The Board not having done more, the Commission attribute to the full occupation of the civil members with their proper revenue duties, and to circumstances which prevent the chief engineer from giving much of his time to the general business of the department. The result, the Commission allege, is, that "the secretary alone has long been the real head of the department;" and this, they say, is more emphatically the case in consequence of a late despatch from the Court of Directors, implying that they held the secretary responsible for the sufficiency of the estimates recommended by the Board, whereupon the secretary claimed the right of recording his dissent from the opinion of the Board, a right which it is stated the Board conceded, and which he has exercised.

Para. 23.

16. Upon this state of matters the Commission remark, that it "appears to them very objectionable; it being obviously contrary to good policy that a Board should

* This estimate excludes Malabar and Canara, which have no artificial irrigation, also Kurnool and the five Northern Circars. The latter are omitted on account of the large proportion of them under Zemindary settlement; but large tracts have reverted to Government of late years. By the latest statement, the revenue from irrigated lands in Kurnool and the Northern Circars was close upon 15 lacs (14,04,004 rupees), raising the total to 150 lacs.

† This is a mere conjecture much short of the mark, I conceive.

should be so weak or so encumbered as to be obliged to leave the disposal of business wholly to the secretary, and still worse that a secretary, whose duty it is to carry into effect the orders of the Board, should be placed in the mixed and anomalous position of also sharing their responsibility, and therefore of discussing and disputing their orders."

17. The Commission conclude that "the Board of Revenue is of necessity, Para. 25. and from the very nature of the case, unequal to the control of the Maramut Department," and that it is "absolutely necessary that this duty should be transferred to a different body."

18. The Commission give a brief abstract of the present system of carrying on work in the provinces. The work connected with irrigation is shown to be divided into three classes, "Emergent," "Ordinary," and "Occasional." The "Emergent" work is that which cannot be postponed, as when a tank or channel is breached and must be repaired immediately to save the crops and the revenue of the year. This is done immediately by the collector, on his own responsibility. The "Ordinary" works are those repairs to tanks and water-courses, &c., which are necessary to keep the works in efficient condition, the estimates for which, for the most part, are made by the civil engineer (or his subordinates) at the suggestion of the collector or tahsildars, or of his own motion, from his personal knowledge of what is requisite, and the rest by the tahsildars. The collector decides upon the works to be executed, and enters them in an annual list, and then issues his orders to the tahsildars to commence the works, advancing to them for the purpose about half or a third of the amount of the estimates. The tahsildar causes engagements to be made with workmen, ordinarily through the officers of the village where the work is to be done; advances are made and renewed from time to time. The work is marked out and explained by the talook maistry, who visits it while in progress, and reports on it. Many of the works are also visited, while in progress, by some officer of the civil engineer's department; when finished, the work is measured by the tahsildar's department and the maistry, and in many cases by the civil engineer's department, and the accounts are then made up. The estimates for ordinary works are not previously submitted to the Board, but are ordered to be executed by the collector on his own responsibility. "Occasional"* estimates are such as are designed for the improvement or extension of existing works, or for the construction of new works. They are made almost chiefly by the civil engineer, though often on suggestion or recommendation from the collector. They require the previous sanction of Government before execution, and are submitted through the Board of Revenue. They are executed generally in the same manner as ordinary estimates, but the larger and more important works are now often executed under the superintendence of European overseers.

19. The rules for "occasional" works of irrigation are applied to estimates for roads, bridges, and buildings. The work is done in most cases by the tahsildar's department, aided, when necessary, by the instructions of the civil engineer. Larger works are often executed under the superintendence of an European overseer.

20. Thus it appears that the execution is almost entirely in the hands of the tahsildars, under the control of the collectors, while the duties of the civil engineer's department are, first, projecting and estimating, and, secondly, directing and inspecting.

21. With respect to the civil engineer's branch of the department, the Commission pronounce that its present and chief want is an increase of engineer officers, Paras. 34 to 36.

* Note.—The Commission remark that of late years some sorts of work have been required to be included in the occasional list, which are merely "ordinary" in their character. I am not aware of this. I have known objections made to works "occasional" in their character, that is, for the improvement or extension of existing works being included in ordinary estimates for repairs; but I do not recollect instances the reverse of this. Perhaps they allude to the large expenditure for maintaining the Godavery Anicut, &c., which is somewhat exceptional, respecting which it was ordered, under date the 8th May 1852, that while the practice in regard to ordinary estimates generally should not be altered, any expenditure sanctioned by the Board on account of the anicut, ordinary or emergent, should be immediately reported to Government.

officers, in order both to the efficient discharge of the ordinary and routine work of the department, and to the development of the resources of the country, and the increase of the revenue, by the restoration of works that have gone to decay, the improving and enlarging of existing works, and the formation of new works, and also with a view to the improvement of the roads.

Para. 37.

	Rs.	
*Salary - - - -	30	- -
Allowances when detached from the office - -	49	- 8
	79	- 8

*Salary - - - -	65	- -
Field allowances - -	76	4 -
	141	4 -

*First - - - -	100	- -
Second - - - -	140	- -

(with field allowances as above.)

22. The subordinates of the department are of two classes, the revenue surveyors and the overseers; the former have, with one exception, been invariably East Indians. The term surveyor is an improper designation, as their duties are not confined to surveying; they are employed by the civil engineer in all the various duties of the department; besides surveying and taking levels, they project small works, make estimates, and inspect works performed by the collector's department, and are occasionally employed in the superintendence of important works in execution. They are instructed, mostly, in what is called the "Survey School" attached to the office of the Public Works Department, from which, after passing a certain examination, they are advanced to be sub-assistant surveyors, and placed under the civil engineers, with an allowance of Rs. 79. 0. 8.* a month, to which is added Rs. 24. 8. tent allowance, when reported qualified for detached duty. After seven years from entering the school, their allowances are raised to Rs. 141. 4.,^b on their being recommended to it by the civil engineer, and two further advances^c of salary are open to them after certain terms of service, on the same recommendation. There are now in the department 26 revenue surveyors of different grades.

Paras. 38 to 41.

23. The Commission have formed an unfavourable opinion of this class, but their defects seem to be capable of amendment; they seem at first joining to have a foundation of professional knowledge, which, with good practical instruction and experience afterwards, ought to make them gradually serviceable; and it appears that, in fact, their services do, by such training, become useful at an early period, and that the best of them are found by the civil engineers to be "extremely useful" after they have been seven or eight years in the department.* It is desirable to know what proportion of those of this standing are considered to merit such high praise.

Para. 39.

Para. 40.

24. They are represented to be in general intelligent, and for the most part both honest and sober; the testimony to the general integrity of the class is said to be very uniform. The defects ascribed to them are indolence, a want of activity and energy, an over estimate of their own importance, and a false estimate of what constitutes respectability, which makes them regard it as a degradation to put their own hands to any work. A better early training would, probably, in a great measure, cure these defects; such a training, for example, as the youths in the institution under Major Maitland are now subjected to. The remedy proposed by the Commission, of amalgamating them with the Europeans, I doubt not would be very efficacious, and, as at present advised, I see no objection to it.

25. The overseers appear to be all Europeans, drafted from the Sappers.† The number now belonging to the Maramut Department is stated to be 25, viz., seven in the first division, and one or two in each of the other divisions; there are also 11 under the superintendent of roads. They have been employed almost exclusively on superintending work in execution, occasionally in making surveys and taking levels, and in a few instances in inspecting works done. Their acquirements on first joining seem to be, in general, a good deal inferior to those of the surveyors, but they vary greatly. The Commission state that the results of the employment of this class have been most satisfactory, and they adduce testimonies in

* Note.—I am informed by the secretary to the Board D. P. W. that of 31 surveyors educated at the school, only six have turned out very inefficient.

† Note.—The order of the Government of India, dated 19 September 1851, expressly sanctions the employment of non-commissioned officers of the Sappers exclusively. But I am informed that Sappers not being available, vacancies are now supplied from the artillery and infantry, which cannot be expected to furnish men nearly so well qualified, and I understand that in fact many of those lately brought into the department have failed to give satisfaction.

in support of this statement; they also mention some very marked instances of direct saving produced by their vigilant and energetic superintendence, not only by the prevention of fraud, but by obtaining more and better work from the people employed, by saving in material, &c.

26. The Commission represent that the men of this class have been "unfairly treated by Government." In this report, dated 23 December 1852, they allege that "not one has yet been advanced from the lowest step of rank and pay," and that they are "without any prospect of improvement;" and they express their hope "that Government will now be induced to take up the subject, and to relieve this very deserving class from the causes of discontent from which they suffer;" which representation they make in the face of a communication addressed to them, under date 14 June 1851, in which they were apprised that the Government had applied to the Government of India to promote nine out of the 27 overseers in the department, or one-third of the whole, both in rank and pay, and that the Government desired to have their opinion upon the proposition of the Board of Revenue for extending the employment of non-commissioned officers of the Sappers and Miners, before they decided upon it. With this reference before them, the Commission were not warranted in the comments they have introduced into their report; and if the comments were penned, as is intimated in a note, before they were informed of what the Government had done, there was ample time to modify them according to the truth in the 18 months that elapsed before the report was closed. By the promotion sanctioned, two of the overseers had their allowances, including their military pay, increased to Rs. 107. 12. 8, one had his increased to Rs. 102. 8. 3, and the rest had an increase which raised their allowances, on the aggregate, the highest to Rs. 90. 11. 1, and the lowest to Rs. 85. 3. 5.

Paras. 52 to 54.

Sanctioned by Government of India, 19 Sept. 1851.

27. The Government of India, on the 14th June 1852, at the recommendation of this Government, granted tent allowance to three of the overseers while employed on special duty. The Board of Revenue afterwards applied to Government to allow the tentage of a sub-assistant surveyor to be drawn by any overseer whom the civil engineer of any division may find it necessary to employ in the duties of inspection properly pertaining to the Survey Department. The Government did not think it proper to assent to so general a proposition, but intimated that they would not object, on the Board bringing any special case to their notice, to apply for the sanction of the Government of India to the allowance of tentage for a specified period.

29 Nov. 1852.

28. It appeared to me at the time, and I think still, that a general discretion might be given to the Board to authorise tentage to overseers when the duties on which they are employed call for it; that is, when they render it necessary for them to move about the country.

29. The Commission next speak more fully of the execution of works in the Revenue Department, in which they regard the tahsildars as the executive officers, and the collector as the controlling authority over them, describing the jurisdiction and general duties of the tahsildar and the officers under him, pointing out the several steps towards the execution of work after the collector has given his orders to the tahsildar, and explaining the duties of the talook maistry; also setting forth the manner in which accounts are kept of the details of work, which form the materials from which the tahsildar makes up bills to be submitted to the collector, and examined in his office, and finally sent through the civil engineer to the Board of Revenue, and eventually to Government for sanction.

Para. 55.

Para. 56.

Para. 57.

Para. 58.

30. In commenting upon the existing system as described by them, the Commission point out that one of the chief inconveniences of it is dilatoriness, particularly in the smaller works which are executed by village officers; they do not think that the delay is owing to malversation; but chiefly to the procrastinating bent of the native character. Whatever* frauds there may have been formerly

Para. 59.

* The late Captain Best, superintendent of roads, previously employed for a long time in the Maramut Department, and one of our very best engineers, made the following statements in a letter dated 22 August 1850: "There were formerly cases of gross carelessness in estimating, gross neglect

formerly in misapplying advances, they are assured that they are now rare. The accounts they represent as being kept irregularly, especially the daily accounts, with regard to which even in great works there is in general great laxity. But precautionary measures they observe are taken in some districts, particularly Canara and Trichinopoly, which are calculated to prevent the accounts being tampered with. It is stated that the opinions of the collectors vary as to the degree of credit due to these daily accounts—some think they are generally authentic, but the majority express the opinion that they are not very faithful, or exactly kept, and the civil engineers express the same conviction. As to the final accounts of works, some of the collectors think that they are fairly made up from the daily accounts, while others, and all the civil engineers, express their belief that they also are garbled.

31. The Commission suggest the means by which these evils may be corrected, all of which seem to me advisable, except the use of English in the daily accounts as a general rule. The Commission recommend this “for the figures certainly, and probably at no distant period for the headings and remarks also.” The use of English in the accounts would no doubt facilitate check by the civil engineers in their inspections, and, where it is practicable, it would be well to introduce it, but I conceive it would be very rarely practicable. It is a suggestion, I think, worthy of note, that “strict agreement between estimate and bill ought not to be insisted on, as that directly encourages tampering with accounts.”

32. The Commission discuss the question how far the existing rates of labour are sufficient, how far the labour employed in public works is voluntary, and how far otherwise. On these points, they say, opinions are various. In Malabar and Canara the people in general are stated to be too independent to work for insufficient wages, yet the Commission come to a conclusion which appears to contradict this, in stating that, “on the whole there appears to be no district in which labour is not more or less obtained by compulsion.”* They observe that “little coercion is used, but it is known that it will be used if required, and indeed the workpeople themselves, from long custom, consider themselves under a sort of obligation to work for Government on the established terms; but where the remuneration is inadequate they work unwillingly and slowly.”

33. They state what they consider to be the causes of this practical insufficiency of the hire, and suggest the means of remedying it. In some districts they conceive the rate of hire to be too low, but more generally they believe the people would be content with the rate if they got full and prompt payment, to secure which is the great object; and this the Commission think will be best secured by the extended employment of European overseers.

34. Without adopting the extreme opinion of the Commission as to the impossibility of inducing native functionaries to pay for work punctually, an opinion which, if well founded, goes to destroy all confidence in native agency generally, and would reduce one to despair of a good administration in any department, since in none can native agency be dispensed with, I agree with them that the extended employment of Europeans as overseers would have a beneficial effect in the manner specified by them.

35. The present practice of retrenchments from the cost of works, in consequence of inspections by the civil engineer or one of his officers, appears to be liable to the objections of the Commission. But I do not feel competent to form an opinion of the fitness of the rules proposed for limiting such retrenchments and fixing responsibility. A reference should be made to the department on the subject. I observe that Government, under date the 11th October 1849, in deciding

in executing, and gross frauds in charging for these works, pervading whole districts, and repeated from year to year; but such have never come to my knowledge. And I do not hesitate to state my belief that in no department under Government has there been anything like so great improvement within recollection as in this. Year after year the works are better chosen, better done, more fairly paid for, and more honestly charged for.

* In a late report, Major Cotton, in charge of the Godavery works of irrigation, states that he has 14,000 labourers who have come voluntarily for employment. Some degree of compulsion was necessary at first to procure the amount of labour required; but there is now not only no necessity for compulsion, but the demand for work by the labouring classes is so great that employment cannot always be given to all that seek it.

deciding upon objections made by the civil engineer of the 4th division to accounts of work done in Chingleput, disallowed the objections for reasons similar to those advanced by the Commission.

36. The subject treated in these paras. is of much importance. There can be no doubt of the expediency of improving so valuable a class of servants as the district and talook maistries. That there is great room for improvement is unquestionable. I take it to be clearly necessary both to improve their personal qualifications and to give them a more independent and respectable position, with better pay. Paras. 75 to 89.

37. The successful experiment of Captain Best of taking youths as apprentices for instruction, with an allowance of seven rupees a month during their apprenticeship, ought to be carried out in the Maramut Department in the manner proposed by the Commission. If a school shall be hereafter instituted on the plan recommended by the Commission, or on the foundation of that established by Major Maitland for the instruction of the Ordnance artificers, as this Government has proposed to the Government of India, the apprentice system might merge in it. But in the meantime much might be done towards the improvement of the department by the instruction of apprentices under the civil engineer and their principal assistants. I think it expedient that this be ordered at once. Para. 81.
Para. 82.

38. The question whether the talook maistries should be under the tahsildars or the collector, is hardly worthy of consideration until we have better qualified maistries. Paras. 83 to 85.

39. I am strongly in favour of increasing the pay of both the superintendents and the maistries as duly qualified persons are found. I think it is not an unreasonable suggestion of the Commission that the superintendent should be put on the footing of a tahsildar in regard to pay. Indeed this is the case already in some districts. The rates proposed for maistries rising from 15 to 40 rupees do not appear to be excessive. The highest rate of course would not be attainable without a long service and superior qualification. Para. 86.

40. That the number of the maistries also needs be increased appears to me to be demonstrated.

41. The Commission give their views upon certain rules proposed by Government for modifying the present system for the conduct of the department. Paras. 91 to 106.

42. The Commission entirely overlook that these rules were proposed as a temporary provision to make the most of the existing establishment "until the thorough reform of the Department of Public Works which had been submitted for the consideration of the Government of India should be authorised." It is evident from the discussions which issued in the Minute of Consultation, wherein the rules in question were proposed, that the Government fully recognised that the grand defect of the system was the want of officers. It being impossible with the present establishment to give a civil engineer to each district, the question was how to employ the officer having the charge of two or more districts so as to admit of his concentrating his attention upon the principal works in each district, and how he might be enabled to superintend more closely the execution of those requiring professional skill, with a view to fixing a greater responsibility upon him. I beg to refer to my minute on the subject, in which, after having expressed my opinion that every district should have its own engineer, I assented to the suggestion that until Government should be empowered to extend the establishment, the engineer in charge of each division should be required to remain in one of the districts composing it, six or eight months consecutively in alternate years, explaining my views as follows: "I concur in the principle of this suggestion, viz., that the engineer shall concentrate his energies upon one district for the greater part of every year, in executing, or directing and superintending the execution of the works of importance enough to require his personal attention, which have been sanctioned, and in planning and estimating for new works to be executed in a future year, employing the rest of the year in inspections, &c., in the other district, as far as his time will permit, for thus, I conceive, the work which is the proper business of the engineer (that is, the work requiring professional direction) may be as

well done in quality as if each district had its own officer, and Government will have the satisfaction of finding the plans submitted to them bear the marks of mature deliberation and careful elaboration and adjustment, and will have assurance in sanctioning them that they will be well executed. There can be no doubt, however, that though what is done may be expected to be better done than at present, the quantity of work performed will be much less, and certainly short of the demand. This, however, applies only to works classed as 'Occasional,' and it is of more importance that every work of this sort should be well executed than that a greater number of such works should be executed in a less efficient manner. While therefore the department is not of sufficient strength to admit of an engineer being attached to each district, I am inclined to think that its actual strength will be turned to the best account in the manner suggested. But it must be understood that this is only an expedient, and that to get work better done, by insisting on a closer attention to the planning in the first instance, and enforcing a more direct responsibility for the execution, it will be necessary to leave much undone, which will be a check to the improvement of the country."

43. With regard to "ordinary" works, however, it was expected that these would be expedited by dispensing with the intervention of the engineer, and that not less, but more, would be done in this branch.

Para. 98.

From Board of Revenue, 10 April 1851, paras. 13 to 20.

44. The Commission say that the remarks of the Board of Revenue on the 3d rule, which embodies the suggestion I am now considering, appear to them to show convincingly that it is impracticable, and if put in operation would produce more harm than good. The Board did not assert that it was impracticable, but submitted that it would be found difficult in practice, assuming that Government did not intend that the planning or superintendence of works should be partly entrusted to the assistant civil engineer, implying that if this was intended their objection would not hold. It was, however, certainly presumed that the civil engineer of the division would so employ his assistant as most effectually to fulfil the design of Government that he should himself be occupied the greater part of every year in one district, in pursuance of which the assistant would naturally be employed in the district in which the civil engineer was not engaged, and when the civil engineer passed from one to the other before the completion of works begun under his direction, he would of course place them in charge of the assistant. This explanation seems to meet the particular objection of the Board. But they would still apparently prefer the existing practice, by which the civil engineer having two districts under his charge, "does for the most part confine himself to one district, and employ his assistant in the other, visiting it only when his presence is necessary for the determination of a professional question which may be too difficult for the unaided judgment of a less experienced officer, and for general inspection." This arrangement gives arbitrarily the advantage of an engineer of superior qualifications to one district, and one of inferior qualifications to another. As it may be hoped that the establishment will shortly be increased to an extent which will admit of a civil engineer being put in charge of each district, the question which is the best arrangement for the meantime is not of much practical importance, and I should be disinclined to insist upon the rule against the judgment of the Board.

Para. 98.

45. It was not, as the Commission suppose, forgotten that the civil engineer is not under the existing system an executive officer, except to a very trifling extent. This was distinctly considered, and it was judged to be expedient that more should be required of him in this line of duty.

From Board of Revenue, as above, paras. 22 to 29.

46. The 4th rule is that by which it was intended to give to the civil engineer the relief requisite to enable him to give that greater personal attention to the execution of works which Government thought expedient. The Board say they are sensible of the importance of relieving the civil engineer from the duty of attending to petty works, but submit that an unconditional money limit to the sphere of that officer's superintendence would not be found to answer. The reasons they give for this opinion appear to me to be valid, and I would yield to their suggestion, that "the intention of Government would be best accomplished if the civil engineer, while relieved from the duty of attending to petty works, should be allowed to use his own discretion in determining what are properly such, and not be restricted to a money limit." The Commission point

point out that of 4,339 estimates for works of irrigation sanctioned in 1850, amounting to 6,68,368 rupees, only 96 estimates, to the amount of 1,71,251 rupees, were above 1,000 rupees each.

47. In commenting upon the 1st rule, which requires that no new work or renewal of a work, to cost above 2,000 rupees, shall be submitted to Government till the collector or sub-collector has made inquiry on the spot in person, and satisfied himself of the data on which the expected return from the work has been calculated, the Commission overlook the proviso, leaving it to the collector to depute his assistant in less important cases to report to him, the responsibility for the recommendation of the work resting with the collector. In most districts there is a head assistant competent to take charge of two talooks, and another assistant of sufficient experience to take charge of one talook. When works above the limit of 2,000 rupees are proposed in those talooks, the collector will naturally devolve upon the assistant in charge the duty of making the inquiry contemplated by the Government, except in the case of works of extraordinary importance. In the talooks under his own charge he will take the opportunities that offer in the course of his jumabundy tour and at other times to make the necessary local inquiries. The sub-collector will do likewise. It is an erroneous assumption that a collector in the annual jumabundy "can only visit the chief place in each talook." He will very ill perform his duty and transgress the instructions for his guidance, if he does not stay at several places in each talook for the purpose of meeting the ryots in order to the settlement, and for the delivery of their puttahs, and in passing from one halting place to another he can easily arrange to make the necessary visitations. When it is considered that, as shown by the Commission, the whole number of estimates above 1,000* rupees, in 1850, was only 97 in the 20 collectorates, it will be obvious how they have exaggerated the difficulty of carrying this rule into effect. Of the propriety of the rule I have no doubt.

Para. 94.

*The rule refers to estimates above 2,000 rupees.

48. The remarks of the Commission on the second rule do not seem worthy of notice. Those of the Board of Revenue appear to deserve attention, particularly the doubt they express "of the advantage of a rule which connects the expectation with a return of the whole capital expended, rather than of interest thereupon." They "recommend that projects for which a return of 10 per cent. upon the outlay is certain (as far as certainty is possible in such cases) to be realised should be favourably entertained. I am inclined to support this recommendation, taking the 10 per cent. to be clear of what is necessary to be allowed for repairs and superintendence, which Captain Collyer, I observe in his estimate for the Palar Anicut, &c., reckons at 10 per cent. This allowance will vary with the nature of the work. A net return of 10 per cent. on the outlay will provide for interest on the capital until it is redeemed, and at the same time constitute a fund for its redemption, which being effected, it will remain as a permanent addition to the revenue. On the term "certain," I would observe that the Government in requiring it to be declared that the supply of water is "certain," meant nothing more than that it is to be depended upon in ordinary seasons.

Para. 97.

From Board of Revenue, as above, para. 8.

49. With reference to the general remarks of the Commission in this para. I would observe that I do not think Government meant to intimate that ill-considered plans are commonly sent up: I believe that little more was meant, than is admitted by the Commission. The following are my remarks on this point in the Minute before quoted: "After all, as far as I know, the cases are rare in which the Government have been led into error in yielding to recommendations submitted by the Board of Revenue on a too implicit reliance on the reports of the engineers, supported as these must be by the collectors, at least in which it has been ascertained that the works sanctioned were not conducive to the improvement of the country, although perhaps some of them might have been spared."

Para. 105.

50. In closing the recapitulation of this section of the report, the Commission recommend for immediate adoption some of the suggestions offered by them. One is the suggestion that in every large work in which an overseer is employed, he should be charged with the payment of the workpeople and the keeping of the accounts; that he should be empowered to reject inferior materials and determine the price of all, subject to an appeal to the civil engineer; and that whenever practicable, the materials should be provided by him. The last two propositions appear to me questionable. The overseer ought to report to the engineer

Para. 644.

Para. 50.

when he considers the prices excessive, if his objections to them are not admitted by the local officer, and if the engineer concurs with him, he should hand up the report to the collector, with his opinion to that effect. I see many objections to the overseer providing materials himself, but it might be allowed occasionally, when unnecessary difficulties were made by the tahsildar or his officers. With respect to the rest, without laying down an absolute rule to the effect proposed, I think the Board should be instructed to cause the suggestion to be followed out whenever the officer responsible for the execution of the works felt sufficient confidence in the overseer. Another suggestion relates to the reform of the accounts, which I have adverted to above. The attention of the Board, I think, should be called to the subject, in order to the introduction of a uniform system, in accordance with the recommendation of the Commission.

Section III.

51. In the third section the Commission treat of the Roads and the working of the Road Department.

Para. 110.

52. In this para. the Commission mention the greatly extended use of wheel-carriages in this Presidency for the traffic between the inland districts and the coast, the last returns in 1848 showing 90,000 bandies, an estimate supposed to be much too low. There could not be a more convincing proof that the roads have been to a considerable extent much improved, but it is undeniable that there is great room for further improvement, indeed that the want of roads is our great and crying want. It is true also that the river navigation of the country has not been improved, and that canals for traffic have only been attempted on the very smallest scale.

Para. 111.

Para. 125.

Report, paras. 125
to 143.

53. Without stopping to inquire whether the Commission have fully exhibited all that was done in this department prior to 1846, when, as they justly observe, a new era commenced in the history of the roads of the country, I take up the subject at this point of time, just noticing that increased attention had been lately given to it, particularly under the administration of Lord Dalhousie, so that while the yearly expenditure on roads during the first ten years of the period from 1826 to 1845 had averaged 84,503 rupees, the average during the last ten years had been 1,79,348 rupees. In 1845 a separate department was constituted for the superintendence of the roads, and early in 1846 the Government received the sanction of the Court of Directors to the appropriation of 4 lacs of rupees annually to the formation, maintenance, and repair of the main or trunk roads, exclusive of the expenditure on minor roads still left under the collectors and civil engineers, to be provided for separately under instructions issued at the same time, among which the Commission notice a very important one, whereby they observe collectors were authorised "to disburse money for the repair of made roads of this class, on the responsibility of the civil engineer for the necessity of the outlay, to an amount not exceeding 50 rupees a mile annually." On referring to the order of Government, I find it more restricted than is to be understood from the words of the Commission. It authorised collectors, "during the monsoon season, to disburse a fixed annual amount for emergent repairs, or for keeping up a temporary establishment for the preservation of the roads, and especially of the ghauts, on the distinct understanding that such charges were to be confined within the narrowest limits, or emergency demand, never to exceed 50 rupees the mile, and to be reported without delay for the sanction of Government." From some oversight, this order it appears has not been acted upon. It should now, I think, be repeated.

M. C. 27 January
1849, para. 14.

54. In sanctioning this scheme for the Road Department, the Court of Directors, it is to be observed, established a precedent for vesting a subordinate government with discretion to lay out money for certain purposes within a certain annual limit, without a previous reference to the Supreme Government to obtain sanction for the plans of improvement projected.

55. The charge of the superintendent of roads, as laid down in the instructions for his guidance, was far too extensive, and extremely able, zealous, energetic, and active as Captain Best was, it was impossible for him to compass what was prescribed as his duty. It was intended that he should be executive as well as superintending. But endeavouring to inspect himself the many lacs of road
over

over which his superintendence extended, he was obliged to be almost always travelling, and of course was unable to give any considerable attention to the execution of particular works. Early in 1851 the Government felt it to be necessary to direct him to concentrate his efforts, "laying it down as a general rule, that the superintendent of roads should confine himself to the execution and completion of such great lines of road only as he can personally and efficiently inspect," and expressing the opinion, "that a system of superintendence based upon this principle, by which the energies of the superintendent and his department will be concentrated, will in the end be found the most economical and effective, and better calculated to yield permanently beneficial effects, than by the plan now pursued by that officer of passing hurriedly throughout the whole Presidency, leaving the works in progress to his assistants without his frequent supervision." Para. 138.

56. The superintendent of roads had been previously authorised, so early as August 1847, to avail himself of the aid of the civil engineers occasionally, for the formation of portions of the trunk roads, the construction of bridges, &c., for which he could not provide by means of his own establishment; and this aid was pretty largely called for, and very zealously and ably afforded. Para. 136.

57. Undoubtedly the orders of January 1851 reduced the Road Department to a much narrower immediate sphere of action than was originally contemplated; but it is not to be admitted that the effect was, as alleged by the Commission, "that all the trunk roads, excepting the lines to which specially the personal attention of the superintendent was to be confined, were left worse off than the cross roads, and far worse off than they themselves were before the Road Department was formed," for the order remained in force which authorised the superintendent to call for the assistance of the civil engineers to do for them what, from the information they rendered to him, he judged to be immediately requisite, and thus much work was done on the trunk roads beyond the limits within which the superintendent's personal supervision was thenceforward exercised. Para. 140.

58. My own opinion was, that the superintendent was too much confined by the above orders; I thought it was not in accordance with the intention of Government, in constituting the office of superintendent, that he should be personally employed in road making, though I deemed it indispensable that he should closely overlook the work in progress under his assistants. Entertaining this opinion, I considered it unnecessary to defer the commencement of other roads, besides those particularly mentioned by Government, the construction of which it would be possible for the superintendent to overlook personally. My idea was that the great roads in hand should be completed with all possible expedition, laying out upon them annually until they were finished, as much of the four lac fund as could be profitably employed in their execution with the means available, so that the superintendent might be able the earlier to transfer his attention to other lines of road, taking up in order the lines which, while they were recommended by the importance of the traffic which might be expected to pass by them, could most easily be superintended by him without drawing him off too much from those simultaneously in progress. Minute recorded in Consultation, 31 January 1851.

59. I still think that the best way of laying out the four lacs annually is, not by distributing it over a great many roads, but by concentrating it on a few, working on those in hand at many points at once. If a road is to cost, say four lacs, I think it would be better to provide for its construction in two years,* by allotting to it two lacs per annum, than in four years by an assignment to it of one lac per annum; the gain in time in bringing it into use is an obvious advantage, and another great advantage is the setting the superintendent free to commence other projects so much earlier.

60. I think it was a mistake not to give the superintendent the assistance of a subordinate department, constituted as he proposed in 1846. It is to be regretted that the superintendent so early lost the services of the engineer officer originally Para. 140 to 145.

* This I conceive to be the minimum time that must of necessity be allowed for making a road in this country to admit of its settling properly.

originally appointed his assistant, and that the department has since been without the advantage of a second professional officer to take a share of the superintendence, so as to admit of its being more widely extended, without intermission of the closer oversight of the works under construction by the agency of the department, which the Government required to be maintained. With such aid, I doubt not Captain Best would have been able to expend the four lacs annually on trunk roads with economy and efficiency by the agency of his own department, but not if he made "numerous, almost continual, journeys from one end of the Presidency to the other," and not without some such concentration of the operations of the department as the Government contemplated. It is to be observed that Captain Best had a good reason for his lengthened journeys at first, in order to become personally acquainted with the several lines in all their extent, which object having been accomplished, there would have been less occasion in future for his absenting himself from the localities where the principal roads were in process of execution.

See letter from
Captain Best to
Government, 25
March 1851, p. 15.

Para. 147.

61. The statement referred to of the works executed by the Road Department, and the sums they have cost, is made up to 1 May 1851; the amount expended is 13 lacs of rupees. I fully consent to the opinion of the Commission that all the money spent has been most economically used; that the cost of the magnificent bridges over the Cavery* and Coleroon,† including losses by destructive accidents, came to no more than 55 rupees for each running foot of bridge, is, I think, a most signal proof of the ability of the architect, Major Lawford, and the careful superintendence given by him to the execution of those great works.

Para. 148.

62. By an account brought up to 30 October 1852, it appears that the amount drawn on account of sanctioned estimates to that date was 16,04,405 rupees, for 9,22,454 rupees of which bills had been sanctioned, and bills to the amount of 75,870 rupees were ready to be submitted, making a total of 9,98,344 rupees, leaving 6,06,080 rupees for which bills were yet to be made out, instead of 8,34,427 rupees, the amount unadjusted, as noted by the Commission, on the 1st May 1851.

Paras. 149 to 155.

63. In these paras. the Commission give an account of the Great Western Road from Madras to Vaniambaddy, a distance of 125½ miles, upon which the expenditure from April 1845 to May 1851, exclusive of superintendence, amounted to 3,71,212 rupees, an expenditure which the Commission pronounce has been very economically managed. "The road," they observe, "has improved, the traffic increased, and the cost of carriage fallen to two-thirds of what it was, and this at a cost, when compared with the traffic, at one-eighth of the sum, which, making allowances for the difference in the value of money, &c., would have been considered necessary in Ceylon for the mere maintenance of a road already in the highest order." An interesting memorandum is exhibited in para. 151, showing the great reduction in the cost of carriage, in proportion as this road has been improved: the hire of a cart carrying 900 lbs., from Wallajahnugger to Madras, was, in 1823, seven rupees; in 1851 the hire of a cart carrying 1,600 lbs. was reduced to Rs. 3. 10.; the mode of travelling on this road, now almost universally used, is by post carriages drawn by horses, running at from six to seven miles an hour; the post is carried in the same manner.

Para. 154.

Para. 153.

About 70 miles.

Para. 156.

64. Of the 13 lacs of rupees expended from the funds appropriated to the Road Department, the Commission point out that nearly five lacs, being more than one-third, was really expended by other agency, chiefly by the aid of the civil engineers; they add, that the works on which this money was expended were not only executed, but projected by other departments.

Para. 157.

Para. 158.

65. They conclude that the Road Department has failed in relieving the civil engineers, as was anticipated, but rather has led to an increase of labour on the Civil Engineers' Department in this description of work, by reason of a fund being ready to supply the means for it, which they suppose has, in a measure, diverted

* Consists of 32 arches of 45 feet each, and spans a breadth of more than a quarter of a mile (1,714 feet). Cost, including losses, 28,640 rupees.

† 38 arches of 60 feet each. Cost, including losses, about 1,40,000 rupees.

diverted the attention of the officers of the Maramut Department from the works properly belonging to it.

66. The Commission doubt whether the money spent has been applied to the works most required. Speaking of the great bridges particularly, they intimate their opinion that although most useful works,* more especially those near Trichinopoly, over the Cauvery and Coleroon, above adverted to, they were not so urgently required as similar works are at other places mentioned. The Commission, however, overlook the consideration that led to the construction of the bridges over the Cauvery and Bhowany, viz., that there were local funds available for the purpose, and that the general fund was drawn upon merely in aid, and to make up the losses from the casualties that befel them in the course of construction. It is true that the importance of the Bhowany Bridge is not to be compared with the advantage that would arise from a bridge over the Palar on the Western Road; but it was not from a mistake on this point that the former was undertaken, but simply because it afforded a means of employing the local fund referred to in a way to improve an important trunk road, while a special benefit would accrue to the district. Para. 159.

No. 5. Madras to Coimbatore through Salem, and to Palghaut and Ponany, on the Malabar coast.

67. The Commission state that the accounts of the Road Department, though kept with the most minute accuracy, have not been brought to an adjustment, because there was no inspection. The orders of Government, of January 1851, were calculated to remedy this in some measure. I confess that I do not perfectly understand after all why bills to the amount of 8,34,427 rupees for work done and paid for several years previously should still be hanging over the executive officers, considering the not very extended limits within which the expenditure must for the most part have taken place. The Commission observe that the bills for work done on the roads under the superintendent's own personal management are sent up by him for sanction without any check but his own. On this point I quote the following explanation given by Captain Best in a letter dated 22 August 1850, in answer to a remark to the same effect, in a minute of Major Pears, then a member of the Military Board: "The accounts presented by me to Government for sanction are not my own accounts, but those of the above-mentioned officers (viz., the executive officers under him), or of the civil engineers who have built bridges or executed road work from funds supplied by me. It is their accounts which I audit. All advances are, in the first instance, debited against me by the collectors and the accountant-general, and I am held personally responsible for them until bills are passed by Government; but this is merely a variation of form. My office with regard to the accounts of money expended upon trunk roads is precisely the same as that of the Board of Revenue, D.P.W., as to what is spent upon branch roads and the works of maramut." Para. 161.

Reduced by the end of October 1852 to 6,06,080 rupees, as above noted.

Para. 162.

68. Concluding that the Road Department has failed to attain the objects aimed at, the Commission recommend that it be abolished, and give their opinion that the charge of the roads ought to be re-united to that of the works of irrigation, both in the local offices and in the controlling office at the Presidency; a recommendation which will fall under consideration in the sequel. I must observe, however, in this place, that, somewhat inconsistently with the opinion expressed by them, that the employment of the civil engineers in aid of the superintendent of roads was objectionable, because it took them off from their proper duties, which, with all their exertions applied to them, they could not overtake, and added to the burden of an already overworked establishment, the Commission, on the 21st November 1851, proposed that the office of superintendent of roads Para. 164.

* The following statistics, which I have extracted from a report of the civil engineer, dated 11 September 1852, show that they are indeed "most useful."

Average daily passage over the Coleroon Bridges, from 5 July to 20 August 1852.

Carts and carriages	-	-	-	-	-	432
Horses and bullocks	-	-	-	-	-	1,036
Foot passengers	-	-	-	-	-	19,157

Over the Cauvery Bridge, from 31 August to 1 September 1852.

Carts and carriages	-	-	-	-	-	606
Horses and bullocks	-	-	-	-	-	1,144
Foot passengers	-	-	-	-	-	24,730

roads should be established and the superintendence again vested in the Board of Revenue, represented to be already overworked and incompetent to the performance of such a duty, and the charge of the trunk roads, and the direction and supervision of the executive officers employed on them, committed to the civil engineers. It appearing to the Government that there were serious objections to this proposition, it was thought proper to let the present system continue until the whole subject should come under consideration on a review of the more complete account of it expected to be submitted in the General Report of the Commission.

6 April 1852.

Paras. 167 and 168. 69. Referring to the remarks of the Commission in these paras., I must confess that I am not satisfied that the trunk road from Madras to Trichinopoly is likely to be of such importance as to make it so well worth the money laid out upon it as a road in some other direction might have been; for instance, the projected trunk road to Bellary, No. 11. With regard to the Northern Road, I am inclined to think it advisable now that the whole line should be examined with a view to ascertain to what extent the making of a road might be dispensed with, by adapting the back waters for navigation. A beginning is being made by the improvement and extension of Cochrane's Canal navigation through the Pulicat Lake, and to some distance northward, which has been commenced. It may be well to note, with reference to para. 167, that the project of a direct road from Salem to the sea at Cuddalore has been approved by this Government, and will be recommended for the sanction of the Government of India as soon as certain information that has been called for is received.*

Section IV.

70. The 4th section gives an account of the Engineer Department under the Military Board, with suggestion of changes in the structure of the department.

Para. 170.

71. The Board consists of the commandant of artillery, the chief engineer, and two stipendiary members, with a secretary and assistant secretary. But at present there is only one stipendiary member attached to the Board, the place of the other, which became vacant last year, not having been filled up, pending a reference to the Court of Directors.

Para. 172.

72. The work of the Board is divided into two departments, the Ordnance Department and the Engineer Department. The latter alone is now brought under consideration.

Para. 173.

73. The Board has control in this department over all military works in the interior, and all Government buildings and works at the Presidency, whether military or civil; also, in the interior, over roads and bridges, and Government buildings of whatever kind in cantonments. In the Saugor and Mhow division, lately transferred to the charge of this Government, the Board has more extended control over public works, under the orders of this Government as regards military works, and with regard to other works partly under the Government of India and partly under the Lieutenant-Governor of Agra.

74. The expenditure controlled by the Board independently of the Saugor and Mhow division, is about 2½ lacs annually, of which 130,341 rupees is expended at the Presidency. In the other divisions the maximum is about a quarter of a lac, the minimum under 9,000 rupees. The Military Board has power, without reference to Government, to direct the execution of repairs on estimate not exceeding 500 rupees; for new works, and extensions, and improvements of old works, the previous sanction of Government is necessary.

Para. 175.

75. Under the Board there is a superintending engineer for the Presidency division with an assistant, and a superintending engineer in each of the Mysore, Hyderabad, Nagpore, Saugor and Mhow divisions. In the last there are also three executive officers. In the Hyderabad division the executive duties at Jaulnah are entrusted to the local cantonment staff officer, who corresponds direct with the Board. In the other divisions there is no engineer, or other officer,

* Since this was written the requisite information has been received, and application has been made to the Government of India.

officer, permanently under the orders of the Board for the execution of work; the work required is executed by commanding and staff, and other officers, as may be most convenient.

76. In the Saugor division the superintending engineer is in the position of direction and supervision, with an executive officer under him in three of the four circles of which it is composed; in the fourth he is himself executive also. In all the other divisions where there is a superintending engineer, he is exclusively an executive officer. In the other divisions, where there are no superintending engineers or other officers permanently at the Board's disposal, considerable inconvenience has been experienced. A partial remedy has been lately applied by assigning an allowance to officers occasionally charged with the execution of work.

Paras. 184 to 186.

77. The absence of inspection in the interior and beyond the frontier is represented to be a material defect, and suggestions for removing it are brought forward in the sequel. At the Presidency, the duty of inspecting work done by the superintending engineer is laid on the chief engineer, but he has not much time to give to this duty; and many details devolve on the Military Board not properly appertaining to an office of general control.

Para. 181.

78. The native subordinates of this branch of the department are described in terms similar to those applied to the maistries in the Civil Department.

Para. 189.

79. The execution of works on contract is extremely limited in the up-country stations, because very few men of respectability, capital, and skill, can be found to take contracts, and because it is found that work in course of execution by contract requires fully as much careful superintendence as that done by the direct agency of the department. It is very much the practice, however, to obtain supplies of building materials by contract. At the Presidency, contracts are more generally in use.

Para. 178.

Para. 180.

80. With respect to roads and bridges in cantonments, they are usually, at division head quarters, in charge of the division quartermaster-general, and at other stations in charge of the station staff officer. It is said to be the practice in most cantonments to devote to this object all the fines levied at the police office. At some stations beyond the frontier where there is cultivated land within the cantonment, the Government revenue is laid out on the roads without being brought to account. Government have lately allowed the grazing rent for the glacis and esplanade of Fort St. George to be applied to the repairs and maintenance of the railing, &c. and of the esplanade roads; and this order has been extended to up-country stations also.

Para. 190.

81. The Commission justly regard it as objectionable that the amount available for local improvements should depend on the sum that is levied in the way of police fines, and considering the practice open to abuse, they recommend that it be put a stop to. They propose that in every cantonment certain roads should be fixed to be maintained at the Government charge, with a certain mileage allowance for them; from which, when there are any local funds available, (excepting fines) these should be deducted, the receipts and disbursements of such funds being subjected to regular audit no less than the expenditure of the mileage allowance. This plan I think should be followed. With respect to fines, while it is improper that the expenditure upon roads should depend upon such a fund, I do not see why, when the fines have been duly brought to account, the amount should not be appropriated to the roads in reduction of the mileage allowance.

Para. 191.

82. The suggestion of the Commission in para. 192, as to the value of the labour of Lascars employed on cantonment roads, and the value of tools, &c., supplied from the Government stores being charged against the roads, appears to me to be proper.

Para. 192.

83. Changes are proposed by the Commission directed chiefly to the removal of anomalies and inconveniences arising from the mixture of duties now laid on the Military Board and the Chief Engineer.

Paras. 193 to 199.

84. The changes adverted to will be more conveniently considered in the sequel.

Section V.

85. The fifth section contains the views of the Commission as to the constitution of a new Board of Public Works to perform the duties now committed to the Board of Revenue in that department, and those of the Military Board in what is called the engineer department; and the ninth details the establishment which appears to them to be necessary to make the executive department adequate to the work which they think ought to be performed in order to the due maintenance and improvement of the present works of irrigation, roads, &c., and the construction of new works of the same description urgently called for in all parts of the country.

86. The views of the Commission as to the value of irrigation to the revenue and to the general wealth, and the importance of maintaining and extending it, and the urgent necessity for the real and effective improvement of the roads, are set forth at large in the sixth and seventh sections; and the eighth submits a scheme of expenditure proposed to be laid out annually on works of irrigation and communication.

87. It seems to me advisable to review these sections, before entering on the questions of the superintendence and control under which it may be expedient to place the whole Department of Public Works, and of the agency to be at the disposal of the superintending and controlling authority, both as to its organization and its strength. These questions I propose to consider in close connexion after having seen what is the nature and extent of the work to be provided for.

88. I therefore pass over the fifth section, and proceed to the sixth.

Section VI.

89. The subject treated of in this section I consider of the highest importance, and I am bound to say that it is handled in a manner to set its importance in a very strong light. I have always been an advocate for laying out money in improving and extending the means of irrigation, and in my place as a member of the Board of Revenue, I gave my strongest support to the projects that were brought forward for that end during the period that I sat there.* I may mention particularly the Coleroon Anicuts. The annual net gain by these two anicuts in South Arcot and Tanjore, as shown by the table in para. 273, is in the proportion of 133 $\frac{1}{4}$ per cent. to the cost for the lower one, and 144 $\frac{1}{3}$ per cent. for the upper one. Since I have had a seat at this Board I have done all in my power to further the completion of the Godavery Anicut and the subsidiary works for the spread of irrigation by means of the waters of that great river, and have strongly advocated the adaptation of the channels originally designed for irrigation, to the object of navigation, to facilitate the carriage of the increased produce of the country to markets where prices are more remunerative than are to be obtained from grain dealers coming to the villages to lay in their stocks. I earnestly supported the project of an anicut across the Kistna,† towards the execution of which the most active exertions have been made this season, and such an advance has been effected that in the course of another working season it may be expected to be to a certain degree operative, by throwing larger supplies into the channels leading from it, which will have been prepared for conducting a larger body of water, and for carrying it farther, and distributing it more widely.

* From 1832 to 1838.

Para. 289 to 292.

90. The Commission have vividly stated the terrible effects of drought in the district of Guntoor, which lies on the right bank of the Kistna. The Government in recommending this work strongly insisted on the importance of it as a means under Providence of preventing the recurrence of calamities so dreadful as this district had been afflicted with, but at the same time, upon careful

† I may here remark that the information contained in the note appended to para. 294 of this report, might have led the Commission to expunge that paragraph lamenting the supposed indefinite postponement of this work, which they were aware for months before the close of the report, was incorrect in fact. The civil engineer in charge of the work was appointed on the 9th March 1834, nearly nine months before the date of the report.

careful consideration, expressed their conviction that it would be highly remunerative. Upon calculations which I made at the time, and which are set out in my minute on the subject, I have not a doubt that this project will prove, as the Commission anticipate, an investment of capital most profitable to the Government, while it will create a vast amount of private wealth.

91. I have earnestly supported several other projects of the same description, promising like profitable results, for which Government have obtained sanction, not always without difficulty; and I have had the pleasure very lately of concurring cordially with the Right honourable the President in recommending for the sanction of the Court of Directors a great scheme for turning the waters of the Palar, which hitherto have run waste to the sea, to the fertilization of the country on both its banks, by means of an anicut, which will furnish a full supply to a series of great reservoirs, whence the lands depending on them will be fully and constantly irrigated in season. The waters of the river will thus be brought down to the vicinity of Madras, and will probably be made further available for the supply of this great place (said to contain a population of about 700,000) with water, both for domestic purposes and for the object of sewerage. The anicut and subsidiary works of irrigation are estimated to cost 8,66,114 rupees.

In the districts of North Arcot and Chingleput.

92. But while I have always been sensible that by a judicious expenditure in promoting irrigation the Government as well as the people would be largely benefited, my convictions on this subject have been strengthened by the forcible manner in which the Commission have adduced practical proof of the soundness of the theory they maintain in their synopsis of what has been actually effected by this means in Tinnevely and Tanjore, South Arcot and Rajahmundry. An instructive example is drawn from the two Southern Talooks of South Arcot of the deterioration caused by neglect of the sources and channels of irrigation, checked immediately by the operation of works designed specifically to cure the defects which that neglect had occasioned, whereby not only was the loss of revenue which had been the consequence of those defects recovered, but a large augmentation secured, the improvement of the revenue being an unquestionable indication of proportionate improvement in the resources of the Ryots. I would point also to the beneficial results springing directly and obviously from the improvement of irrigation in the tracts depending on the Samulcottah channel in Rajahmundry, and in the Woondy Talook of that district, both under the influence of the Godavery Anicut; not to speak of the effects of the anicut in other directions, so far as it has come into operation, which cannot yet be correctly estimated, but which we may assume with confidence have already much overpaid its cost, and the eventual results of which I am fully persuaded will be, if not equal to the anticipations of Colonel Cotton,—anticipations endorsed by the Commission, but which I conceive are too speculative to be entirely depended on,—at any rate productive of a very rich additional revenue to Government, and a vast accession of wealth to the people, who will be enabled to turn their land to such a profitable account as is indicated in para. 265.

Paras. 241 to 263.

Para. 266.
Para. 267.

Paras. 257 to 265.

93. The advantage of cultivating sugar is strikingly exhibited in this para. The introduction and spread of a variety of valuable products is the great desideratum in the agriculture of this country—of products more valuable than rice, to the raising of which the irrigated lands have been too exclusively confined. The principle of our assessment* takes the rate of tax upon land capable of producing rice and sufficiently supplied with water to render it fully productive when employed to raise that kind of crop, as the maximum demand upon the land, howsoever it may be employed. The ryot cannot be required to pay more for

* In the districts under survey field assessments "the lands have been assessed without reference to the species or value of the crops produced, and the same tax is collected from the same land, whether the produce be sugar or rice," and in 1837 the same rule was introduced in all the other districts, viz., "that land cultivated with sugar cane by irrigation should be taxed thereafter in the same manner as land employed in the cultivation of rice" v. C. O. Board of Revenue, 13 November 1837. This order was passed by authority of Government, under instructions from the Government of India and the Court of Directors. In no case can land cultivated with sugar cane be charged with a tax additional to what would be charged on it if cultivated with rice. But if the land was classed

for the land when cultivated with sugar-cane, betel, chillies, plantains, &c., than when it is cultivated with rice. The whole profit of the more valuable crop goes to enrich himself. Hence the high importance of providing such a supply of water, so ample and so constant as will enable the ryot to interchange crops of those more valuable articles with his rice crops, and bring into the market products which may be exchanged for rice, or which in the course of traffic will have the same effect, and so tend to prevent the glut of rice which some apprehend will be the result of extending irrigation. On this point I concur generally in the observations of the Commission.

Paras. 320 to 322.

Paras. 271 to 274.

94. I would direct attention particularly to the remarks of the Commission on the statement given in Appendix Z, showing the revenue results of the outlay incurred by Government from 1836 to 1849 in the extension and improvement of irrigation, pointing out that from thirteen of the works entered in the statement there is an annual gain of 134 per cent. on the first cost, and upon the whole an annual gain of 69½ per cent., excluding the charge of the engineering and other establishments, which it is thought will be more than covered by an allowance of 25 per cent. I cannot but concur in the conclusion of the Commission, that "the result is most satisfactory; a most convincing proof of the value of irrigation, and of the ease with which the resources of the Government, as well as of the people, may by that means be immensely increased."

Page 274.

Paras. 295 to 302
and 312.

95. Upon the very important question discussed in these paras., I am inclined upon mature reflection to think that the arguments of the Commission are just and sound. I allude to the effect of increased production in overstocking the market and causing a reduction in the prices of grain, and thus *pro tanto* disabling the cultivator from paying the present money assessment. I apprehend it will have some effect in this way. But considering, as observed by the Commission, that "all improvements such as we are contemplating must be gradual, and the enlargement of cultivation in any one year must be atomic compared with the total agriculture of the country," I do not anticipate that it will be very sensibly felt. Should experience prove that the ryot is really unable to carry on the cultivation of irrigated land profitably at the present money assessment, by reason of the reduction in the price of rice (partly, it may be, from increased production, but more probably and in a greater degree from the cause adverted to by the Commission in para. 312, which must be met at any rate), notwithstanding the gain on so much of the land as he can employ in the cultivation of more valuable products, there will be no alternative, certainly, but to apply the remedy of reducing the assessment proportionately; but it is to be remembered that the great difference between the assessment of dry and irrigated land, in the case of land converted from one class to the other by means of extended irrigation, and the still greater gain to the revenue by land hitherto utterly unproductive being made capable of yielding rice and more valuable products, will afford the fund which will enable the Government to make a sufficient allowance on this score, and still retain a large profit. In this view there would be an advantage, as far as the revenue is concerned, in the extension of irrigation, if it only gave such a return as, besides redeeming the cost of the works and paying for their maintenance, would leave a fund just sufficient to replace any remissions that might become necessary to meet the fall of prices. It would surely be an advantage to secure the present revenue, if nothing more was gained, by a self-redeeming expenditure of this kind. When the inestimable good of cheap food is enjoyed by the people, and the state still gets the same revenue, the common weal is promoted, and the direct benefit to the community is reflected upon the state, which gains by it in various ways. The cheapness of food of course will cause increased consumption by the existing population, and we know that population has a constant tendency to increase not only in proportion to the increase of food, but beyond it. I do not anticipate therefore any such

Para. 301.

at the survey as one crop land with reference to its supply of water at that period, and the supply has since admitted of its producing two crops of rice, it is charged with an additional tax for that additional supply, equally whether cultivated with rice or with sugar cane, it being reckoned that sugar cane, requiring permanent irrigation, takes as much water as two crops of rice. How much this rule favours the cultivation of sugar cane is shown by the statement in the report, that the value of an acre of rice is 20 rupees, and of an acre of sugar cane 230 rupees; which however, perhaps, requires some qualification.

such fall in the prices of grain from the combined influence of increased production within and increased importation from without, as will ever necessitate remissions to the extent or nearly to the extent of the gain which will accrue to the state by the improvement resulting from irrigation extended gradually with a wise discretion.

96. It behoves the Government, of course, while it provides the means for increased production, to provide also, and simultaneously, all possible facilities for the transport of produce by means of good roads, canals, &c., which will best conduce to the equalization of prices, and tend to prevent the anomaly occasionally known of famine prices prevailing in one district, while the ryots in another can hardly obtain a remunerative return for their crops. And so it will be the duty of the Government to adjust the assessment carefully.

97. And here I may observe, with reference to the remarks of the Commission in para. 249, that several months before the close of their report, measures had been taken for the revision of the assessment of South Arcot, an overt fact of which they could hardly have been unaware, though they appear to ignore it. Para. 249.

98. I may also remark, that a plan of the civil engineer for partially improving the harbour of Porto Novo, and connecting it with that of Cuddalore, in South Arcot, by a navigable canal, has been sanctioned. Para. 251.

99. I do not think it necessary in this place to enter into a discussion of the other suggestions offered by the Commission in the paras. noted in the margin. But with reference to para. 323 I have to note that this Government has recommended the abolition of the moturpha tax. Para. 316 to 322

100. I wish I could pass from this section, in which I have found so much to commend, without an expression of disapprobation; but there is one part of it upon which I cannot but animadvert; it is the passage contained in paras. 278 to 280, with the foot note to the latter para.

101. It is true that the Government, having already sanctioned a very large sum for the repairs of damages to tanks in the Bellary district, hesitated to authorise the expenditure of 37,998 rupees for the repair of a tank originally constructed upon an extravagant scale, whereon depended a revenue of only 7,524 rupees, and called for more particular information as to the circumstances which rendered the tank of importance; at the same time requiring the civil engineer and the Board of Revenue to consider whether the cost could not be diminished by some plan which would contract the tank to a size and capacity suitable to the object which it was to serve. They hesitated also at first to authorise the expenditure of 60,500 rupees* for the repair of another large tank, upon which depended a revenue of 12,239 rupees, calling for similar information respecting it. But upon mature consideration of the further information afterwards submitted, it was deliberately resolved, with special reference to the interests of the ryots,† that it was the duty of Government to undertake the repairs, costly as they were, and the Government of India, assenting to this principle, granted the sanction which this Government applied for. As the Commission must have known the grounds upon which the Government of Madras applied for sanction for the outlay of 98,500 rupees in the repair of these tanks, and the Government of India allowed the expenditure, if their object had been simply to advocate the principle that the interests of the ryots should be considered as well as those of Government, they would have done it with more force by correcting their statement that Government had "completely ignored the rights of the ryots," and

* The Commission erroneously, in para. 278, state this as the amount required for the repair of the two tanks.

† Extract from Minutes of Consultation, 17th November 1851, para. 8.

"The object is not only to recover revenue which may be considered as lost, but to restore the means of subsistence to the large body of ryots who have lived by the cultivation of the lands irrigated by these tanks. There is a marked distinction between the cases of outlays on new projects, and applications for expenditure of the nature of those now before Government. In the case of a new project no private capital is destroyed by the failure to execute the work, and no individual can be ruined or injured by its abandonment. But where, as in the present instances, a large amount of private capital and whole communities may be ruined by the failure to repair these great works, it becomes alike the duty and the interest of Government to make the necessary outlay."

and showing that the principle had been admitted and acted upon by Government. The first resolution of Government, calling for information to which the Commission refer, is dated 6 September 1851, the second, to the effect above stated, is dated 17th November 1851;* the authority of the Government of India for the outlay recommended by this Government, was given under date the 23d January 1852, and was communicated to the Board of Revenue D. P. W. on the 17th February 1852. The report is dated the 23d December 1852. The resolution of Government of the 17th November 1851 was equally open to the Commission as that of the 6th September preceding; and if the paragraphs in question were written intermediately, it is certain that they were not then printed. There was no excuse therefore for retaining in the text observations obviously intended to cast a reflection upon the Government, and suppressing what would have obviated it. For this the foot note to para. 280 makes no amends.

Minutes of Consultation, 13 February 1849, para. 5.

102. I am constrained reluctantly to notice another passage in this section, which contains a gratuitous reflection on this Government. I refer to the note to para. 263, where the Commission, in offensive terms, represent that the civil engineer who devised the project of the Godavery Anicut, and superintended its execution, was severely censured merely for "the grave offence of making too small an estimate;" for "an error of judgment" in under-estimating the cost, "which might have been supposed pardonable in an undertaking of such vastness and such novelty." I am sorry to be obliged to say that this is a misrepresentation. The Government, as the Commission must have known, simply expressed "regret that the estimates originally submitted were so deficient as they have now been shown, and that the work should have advanced so far without this fact having been brought to notice." What the engineer was really censured for, and that not severely, was "a profusion and want of economy in the expenditure of the public money," for which, it was observed, the Government "could find but little excuse in that officer's earnest desire and endeavours to expedite the work so as to bring it into early operation."

Section VII.

103. In the seventh section is presented a general view of the condition of the roads of this Presidency, with remarks on the necessity of improving them.

para. 377 and seq.

Salem, Tanjore and Madura.

104. In paras. 329 to 366 the Commission give a detailed abstract of the annual reports on the state of the district roads from Ganjam to Tinnevely in the period since 1846, which is followed by a more general view. I have already said that the want of roads is our great and crying need. Those that exist, except in some districts which have been particularly attended to, are generally bad. The assertion, however, may be questioned that there are "not above 1,000 miles over the whole extent of the country on which it is possible to travel in a wheel conveyance at the rate of six miles an hour with any degree of comfort." And bad as the roads generally must be admitted to be, we have seen that in 1848 there were more than 90,000 bandies, or carts drawn by bullocks, in use upon them.

Calcutta Review, June 1852.

105. The Commission undervalue what has been effected in Salem, which they notice as being generally regarded as the model district with respect to roads. They think little of its having "400 miles of road suitable to a light traffic, infinitely superior to the common roads of other districts," because they are "very inferior to first-class roads," that is, roads equal to English turnpike roads. Let us see how the roads of this district are spoken of by a writer who brings down the statistics of the district to 1852, at the end of which the report of the Commission is dated. "From one end of the district to the other, from north to south, and from east to west, there are excellent roads bordered by flourishing avenues." "The whole extent of roads within the district which has been completed, planted, guarded by ditches, and with few exceptions marked by milestones, amounts to 726 miles. They are traversed night and day by hundreds of country carts, without let or hinderance, and may be traversed by any English traveller in his own carriage." "The bridges built in the district amount

* More than 13 months before the date of the report.

amount to 84." The Commission remark, that in 1850 three new lines were opening in addition to the 400 miles they speak of. They make little account of the carts having increased between 1836 and 1847 from 1,189 to 3,296, to which 80 were added in 1848; of the bandy load having increased from 300 lbs. to 1,000 lbs., and the bandy hire decreased from 14 to eight annas for every 10 miles. In the district of Cawnpore, with all the attention that, according to the Commission, is given to roads in the N. W. P., the extent of the cross roads is 500 miles unmetalled. And it may well be doubted that they are nearly so efficient as those of Salem. Indeed it is evident they cannot be so, as the description of them represents that they are passable only for nine months in the year. Para. 378.

106. It is undeniable that the lines from the interior to the coast, which are of the most importance with a view to opening up the resources of the inland districts, have been unaccountably neglected. The condition of the military road from Masulipatam to Hyderabad is not to be excused. An estimate for the formation of a road to the Hyderabad frontier was called for under date the 19th June 1851, but has not been received, though the call for it was repeated on the 23d August 1852. It should be immediately attended to. The improvement of different portions of the northern road is in progress; the first part of it leading out of Madras is, I am informed, in excellent order. Para. 379.
See Minutes of Consultation, 11 January 1853.
Para. 5.
In Ganjam, Vizagapatam, Rajahmundry, Nellore and Chingleput.

107. The districts of Bellary and Cuddapah have not been cared for as they ought to have been in respect to roads. But by the last reports the works noted in the margin* were in progress in the former district. In the Cuddapah district "the opening of the Goolcherroo Ghaut has been successfully accomplished, and there is little doubt that during the next season the improvements of the roads from it to Cuddapah on the one side, and towards the Damulcherroo Ghaut on the other, will open Cuddapah to the Western Trunk Road, and so make it easily accessible from the Presidency. An allowance of 15,000 rupees has been made for improving the road from Madras to Cuddapah *via* Naggery, which it is not intended to maintain as a principal road. Para. 381.
Minutes of Consultation, 11 January 1853, para. 8
Ibid. p. 9.

108. With respect to the road from Berhampore to Russellcondah, in Ganjam, which is the subject of remarks in the paras. noted in the margin, I may notice that on the 19th March last, this Government applied to the Government of India for authority to lay out the whole sum required for metalling and bridging it completely, so as to make it available at all seasons, if it shall be found that the traffic increases to an extent that will warrant the additional expense, and that conditional sanction has been accorded for that expense. Para. 379.
Paras. 332 and 383.
1,42,246 rupees.
28 April 1853.

109. I agree with the Commission in the opinion they express, that Government, generally speaking, ought to make and maintain not only the main roads of the country at large, but those connecting principal towns or points in the same or contiguous districts, with exception, perhaps, of district roads which run through large zemindaries, such as that of Vizianagram in the Vizagapatam district, the advantage of which is confined to the zemindary, or to it and to other zemindaries contiguous to it. Also, speaking generally, I agree with them, that the duty of the ryots is confined to the formation and preservation of the village roads connecting the outlying parts of the country with such main lines. If the ryots can be made to perform this duty, they will do, I think, as much as can fairly be required of them. Where the villages are widely separated and not populous, it will hardly be possible to get so much by this means. Para. 386.

110. The Commission say, that in other parts of India this duty, or interest, on the part of Government has been recognised, and in the North-western Provinces in particular, enormous sums, such as have never been dreamed of in this Ibid.

	Estimate.
* Road from Bellary to Dharwar - - - -	Rs. 11,489
Extending the work to parts not made - - - -	28,744
Road from Bellary to Bangalore - - - -	21,000
Ghaut Hill road to Ramandroog - - - -	647

Para. 324.

this Presidency, are expended on the great lines of communication.* It seems to be assumed by the Commission that in Bengal, as well as in the North-western Provinces, and also, as I understand them, in Bombay, that is to say, generally throughout India, the roads, other than the trunk roads, are in a much better condition than in this Presidency; that the other Presidencies are all "more on a footing with the rest of the civilised world" in this respect than this Presidency. I should like to have full information on this point. For my own part, from what little I know of the Bengal Presidency, and from what I was accustomed, when I was at Calcutta, to hear of the cross roads, and indeed of some main roads, and from such knowledge as I have of the roads of this Presidency, I was not prepared for the statement that Bengal is better off than Madras in its secondary communications, or to speak definitely, that its cross roads, or its roads generally, exclusive of the one great trunk road, are in a condition, on the whole, which will admit of traffic by wheeled vehicles for a greater number of days in the year, those vehicles being able to travel a greater distance daily and to carry a heavier load than the roads of Madras, other than the western trunk road. I must say, I doubt it.†

Para. 325.

111. In Bengal and the North-western Provinces the Ferry Funds, which are of considerable amount, are given up for local improvements, under the direction of local committees. In this Presidency the receipts from ferries are inconsiderable, except in Malabar. It is true that the Court of Directors authorised the tolls collected at ferries being set apart as a fund for providing ferry-boats, and building bridges over rivers and nullahs, and the appropriation of any surplus there might be, after defraying the expense of these accommodations, to the repair of the public highways in the respective districts. I presume that this order was not carried into effect in the districts generally, simply because of the inadequacy of the fund to the purpose contemplated. In Malabar, however, it would have amply provided the accommodations of ferry-boats and bridges to the extent required, and would moreover have paid for the formation of a good system of internal communication, and it is to be regretted that the authorised appropriation was not made. With respect to the other districts, it is absurd to say, as the Commission do, that they have been injured by these particular funds not having been expended specifically for local purposes, when larger sums have been expended out of the general revenue for the objects to which they were meant to be appropriated—it may be affirmed that they have been virtually expended as intended, as part of the assignments from the Treasury for those objects. The Commission recommend that now, at least, the funds may be appropriated as authorised by the Court of Directors. This might be allowed in Malabar; but *en bono* elsewhere? If the collections from ferries amount in any district to 3,000 rupees, for example, what would be the advantage of assigning that sum specifically to the maintenance of the ferries of the district,

Para. 326.

* Whatever has been expended, it would seem less has been done than might have been expected, if we may rely upon the statements in a recent work—*viz.* Kaye's Administration of the East India Company, pages 306 to 310. Under the Presidency of Fort William, including the North Western Provinces, there is the great trunk road from Calcutta, which has been completed as far as Kurnool, a distance of 970 miles, having cost, it is stated, about 10,000 rupees per mile. "Two other trunk roads of lesser proportions, but still of very considerable extent, have also been commenced, and carried some way towards completion." One between Bombay and Agra, the extent of which will be 734 miles; this, it is stated, is not metalled except in parts. The other, from Bombay to Calcutta, will be upwards of 1,100 miles. How much of these two trunk roads has been completed is not stated in the work to which I refer, nor have I any means of ascertaining otherwise. Whether the second of these roads is to have more metalling than the first does not appear. Probably not.

† I find in the Friend of India of 14 April 1853, some remarks which indicate the contrary. Referring to a Table of the rates of speed at which the mail is carried in Bengal, it is observed, that "the grand trunk is the only road upon which a good speed has been attained, remarks being attached to all the remainder, strongly indicative of the want of improved means of communication. From Shergotty to Gaya and Gaya to Patna, for instance, the pace is 4½ miles an hour, but there the road is cut ba, and the slightest shower of rain renders it puddy, and impracticable for speedy transit." Again, "the southern roads are, however, in the worst condition, the mail's travelling to Jubbulpore at three miles an hour, or less than a groom can walk, and even between Calcutta and Baraset (that is in the immediate vicinity of the capital) the rate rises to only four miles and a half an hour, while everywhere we have such notices as 'Road intersected by numerous unbridged rivers and nullahs.' 'Road has not been repaired for these many years.' 'Road not repaired for years.' 'The road in so bad a state and so much intersected by rivers and nullahs, that no great improvement in the speed of the mails can be effected.'"

district, the expense of which has hitherto been borne by Government. It is a mere begging of the question to assume that Government would have laid out that money equally if the ferry collections had been originally given up, and it is clear the Court of Directors meant exactly the reverse. The Commission would hardly argue that, if Government should consent to assign to the improvement of the communications in Malabar, the whole of the ferry collections, amounting, as they state, to 35,000 rupees a year, Government must still contribute to the same extent as before to that object—and why should they in any other district? It would be far more for the advantage of the district that the tolls on ferries should be carried to the account of revenue, as before, and that an allowance should be granted for keeping up its roads, bridges, and ferries.

112. I do not agree with the Commission that the receipts from Cochrane's Canal ought to be appropriated of course to the improvement of the canal. This income might be kept in account together with ferry collections and such like receipts, under a separate head, as constituents of a fund appropriated to the improvement of the communications, but there is no reason why it should be laid out on this work particularly, or that the expense necessary for the improvement of this work should be confined to what the net income from it would admit of. At present a large sum, equal to a third of what the Commission say has been realised as net profit from the canal, is about to be expended in its extension and improvement. Para. 394.

113. I fully concur with the Commission in their view of the direct and powerful tendency of improvements in the roads to re-act on the revenue. I have already adverted to the importance of such improvements as tending to equalise prices. The remarks of the Commission as to the effect of good roads in promoting the production of crops other than grain fit for foreign markets are very just. I have before said that the great agricultural desideratum is the growth of such crops, and the most effectual encouragement towards the accomplishment of it, I conceive, will be afforded by facilitating the transport of such produce to the places where a demand for it will be found. Those who have a strong apprehension that the improvement of irrigation gives too great a stimulus to the production of grain, ought most strenuously to support a very liberal expenditure on roads, with a view to give the greatest possible vent and diffusion to produce, as the only means of preventing the glut they anticipate. Para. 395.

114. The Commission point out the effect of improved roads in facilitating the carriage of salt into the interior, and thus creating a greatly increased demand to the advantage of the revenue, as developed by the experience of Canara since the opening of the passes, and of Madras since the sale of salt for inland consumption has been permitted there, and the Western Trunk Road has admitted of its easy transport at a comparatively cheap cost. Paras. 401 to 403.
Paras. 404 to 406.

115. In a minute which I recorded as a member of the Board of Revenue, on the 9th November 1836, I took up a suggestion of Captain Cotton, in a recent report* on the project of forming railways on the principal lines of communication, in which he mentioned salt as one of the principal articles of traffic which would be greatly facilitated by this means. I proposed by way of experiment that a railway should be constructed on his plan from Madras to Wallajah-nugger 70 miles inland, and that a salt depot should be there established, a main object being to reduce the expense of the conveyance of salt, and thereby to lower the retail price in the interior, and thus increase the consumption. My scheme was adopted by the Board of Revenue and recommended to Government, and approved by the Governor in Council, who "entirely concurred with the Board as to the expediency and practicability of the proposed undertaking." This scheme is the germ from which has eventuated, at a long distance of time, the railway which has just been begun, the first terminus of which will be within a few miles of Wallajahnugger. * Dated 6 May 1835.
Proceedings of Board of Revenue, 5 December 1835.
Min. of Cons., 29 December 1836.

116. In support of the general argument of the Commission for the improvement of roads, I may observe that the position taken by the Board of Revenue in the proceedings just referred to, was that "the construction of roads and canals has been found to create trade and property with extraordinary rapidity." Having adverted to the report made by Captain, now Colonel, Cotton in 1836, on the improvement of the communications in this Presidency, by means of Para. 8.

canals and railroads, I cannot pass it by without drawing attention to its great merit, and especially to its far-reaching suggestiveness.

Disp. Rev. Dept.,
No. 13 of 1852,
para. 9.

117. The Court of Directors have lately signified their approval of a suggestion of the Honourable Mr. Thomas for the establishment of salt depôts at important inland stations, and if this suggestion be carried into act, as I hope, it will be necessary to make roads to such stations from the principal places of manufacture on the coast, where such do not already exist, which will promote general traffic and contribute to the object, stated in p. 407, of facilitating the transport of the raw produce of the interior to the nearest shipping port. The views in this and subsequent paras. as to the principles on which the communications should be planned, I mainly agree in.

Paras. 407 to 411.

Para. 410 & Paras.
433 to 439.
From Govt. of
India, 1 April 1853.
From Board of
Revenue, 6 June
1853, enclosing
letter from the Civil
Engineer, dated 18
May, reporting that
the expedition
would set out in
four days.

118. I concur with the Commission in regarding the opening of the Godavery for navigation as an object of the greatest importance. The Government of India having sanctioned the sum proposed for the survey of the river, &c., this work is in progress, and I trust that it will be successful in proving the feasibility of making the river easily navigable, so as to afford a ready outlet to the cotton of Berar, and to admit of a return of rice and salt from the coast.

Para. 415.

119. The Commission have not fairly stated Captain Best's sentiments in para. 413. The question was, what could be best done to promote commerce generally in a large extent of country with a limited sum to expend on roads? Speaking generally, as stated in the extract from the remarks of Government, given in the next para., he laid down the position that the benefit to commerce from 150 miles of road made practicable for carts for two-thirds or three-fourths of the year by an expenditure of 100 rupees the mile, would be many times greater than would ever be derived from 10 miles of good road made at an expense of 1,500 rupees the mile. There is not the least reason to suppose that Captain Best, or the Government which concurred with him on this point, had any idea of applying his suggestion to roads traversing the Ghauts; it was distinctly meant to apply to cross roads, or roads other than those classed as trunk roads, in the plain country only; to improve them generally up to a certain point, and to provide for their being kept in that state, rather than to give one and another district the advantage of good cross roads practicable at all seasons for short distances, leaving the roads of the other districts in the meantime wholly unimproved. Captain Best thought that having, say 1,50,000 rupees to lay out on cross roads, he would do more for commerce by using it so as to make 1,500 miles practicable for carts during nine months of the year, the other three months being, from the state of the weather, unsuitable for the transport of many sorts of goods, and otherwise unfavourable for traffic, than to make 100 miles by which carts could travel during those three months, and which would always be easier for draught, so as to admit of larger loads and longer stages. Supposing the good road to admit of a cart carrying two-thirds of a ton at 15 miles a day, and the inferior cross road to admit of only one-third, and for a distance of only 10 miles, still the amount of tonnage carried in the year by the 1,500 miles of the latter description would greatly exceed the amount carried by the 100 miles of the former, even supposing that the latter were traversed equally as at other times during the three months that the former are assumed to be impracticable, a supposition which is improbable.

Para. 422.

120. The Commission say dogmatically, that it is a mistake to suppose that trade ends when the rainy season commences, from any other cause than the roads being impassable; whereas there are, as above remarked, certain kinds of goods which cannot be carried in the wet season without great risk of loss; sugar and salt, for instance, and the weather of itself is sufficient to check, though not absolutely to put a stop to, general traffic.

121. I cannot but think that the Commission go quite beyond the mark when they propose, as they seem to do in para. 419, that our roads generally should be made equal to English turnpike-roads, so as to admit of bullock carts carrying from 1,800 lbs. to a ton, and travelling with ease 20 miles a day, indeed, so as "to render fast travelling practicable and moderately cheap." It would seem that they are speaking of cross roads as well as the trunk roads, for it is Captain Best's suggestions regarding cross roads that they are cavassing; I am ever, inclined to think that where the actual traffic on a partic

siderable, and that which may be reasonably expected, with reference to the products of the country which it opens, is promising, the road should always be made so good as to give such a decided facility to the carriage of commodities by it as will be likely to encourage a greater use of it; I mean that the quality of the road, where there is a good promise of increased traffic, should be in advance of what the actual traffic requires, and that "when a road inferior to the best is deemed sufficient at first, its quality should be raised to that standard as the traffic is found to exhibit or to promise commensurate increase." It was upon this principle that the Government lately sought and obtained the sanction of the Government of India to converting the road from Berhampore to Russellcondah, in Ganjam, into a first-class one, by bridging and metalling it throughout. Still I apprehend that Government must be content, with respect to the great mass of the cross roads, to do little more in the way of improvement than Captain Best suggested, that is, to put them, and to take care to keep them, in a state practicable for carts during three-fourths of the year, until all the trunk roads and the more important cross roads, especially those leading from the interior to the coast, have been finished in a way to entitle them to be called really good roads, though not so perfect as the turupike-roads of England.*

Para. 424.

Para. 310.

122. I agree generally with the Commission, that greater attention ought to be paid to the state of the harbours. Measures have already been taken, as I have noted above, for the improvement of the ports of Porto Novo and Cuddalore. I think the improvement of the roadstead of Cocanada and the harbour of Coringa, which are closely connected, a very important object, and I hope it will soon † be taken up by Government. The memorandum of Colonel Cotton, in the Appendix to the Report of the Commission, demonstrates the great value of these ports, particularly of the protected harbour of Coringa, and the defects for which a remedy is required, and proposes a plan for removing them which seems to be well deserving of consideration.

Para. 426 & seq.

Porto Novo and Cuddalore, p. 444 and 445. Paras. 429 to 432. Cocanada and Coringa.

123. I was of opinion, and expressed it at the time, that the small additional expenditure proposed for the improvement of the harbour of Negapatam, for which the ship and boat-owners were willing to pay a tax at a rate which would replace the outlay in little more than two years, ought to be allowed. I am not aware that any project for the improvement of the port of Cochin has been laid before Government; the project for connecting the back waters here adverted to has been lately sanctioned by Government.

Paras. 441 to 443. Negapatam. Note on letter from Board of Revenue, D.P.W., 30 Sept. 1850. Paras. 446 and 447, also 370. Cochin.

124. I agree with the Commission, that the fund accruing from the operation of Act XIII of 1839, may very properly be applied, in part, to the improvement of the harbours; but the expenditure should not be limited to what such a fund can immediately afford. The suggestion of Colonel Cotton, recommended by the Commission, of raising the capital required occasionally by opening a loan on the security of the port dues, seems to be worthy of attention.

Para. 450.

125. The Commission give an account of the Paumben Channel, between Ceylon and the main land, and of the improvements effected in it, the cost of the improvements, and the beneficial results, the value of which to the community they estimate at above five lacs a year. There can be no doubt that the facility of intercourse between the opposite coasts of the Peninsula, which has been effected by the improvement of this channel, evidenced by an increase in the tonnage from 30,000 to 168,000 tons, has been cheaply purchased at the cost of 1½ lac laid out on the work between 1834 and 1851. It may be taken as certain, that the direct benefit to trade has indirectly had a favourable influence on the revenue.

Paras. 457 to 460.

Section VIII.

126. I come now to the 8th section, in which the Commission submit a scheme of expenditure on works of irrigation and communication.

127. They

* It appears from the work I have referred to above, that the cross roads even in the North Western Provinces are not metalled at all. In the quotation given to illustrate the system for the management of the cross roads, it is noted with respect to Cawnpore, that "the district is intersected in every direction by unmetalled roads passable for nine months in the year," just the kind of roads suggested by Captain Best.—*Vide* Statistics of Cawnpore, para. 90, page 19.

† Since this was written a resolution has been passed for effecting this object.

Irrigation.
Para. 463.

127. They first consider the amount proper to be annually devoted to the maintenance and improvement of irrigation works. The sum now expended annually on repair and maintenance they assume to be about seven lacs, which, though it might be sufficient if the works were in good order, they take to be much under what is required for the purpose of bringing them into that condition; they reckon that an expenditure of 15 lacs yearly will be necessary for some time, to be progressively decreased as the works are brought into the efficient state contemplated, after which the charge for them respectively will be no more than will repair the annual deterioration. The charge will be diminished and the revenue augmented as the works are successively made perfect.

Para. 466.

128. Besides this annual expenditure, commencing at 15 lacs, which they propose to be devoted to the restoration and maintenance of the existing works, they recommend that at least $7\frac{1}{2}$ lacs annually should be devoted to the object of extending the benefits of irrigation; the whole amount to be laid out annually on works of irrigation would thus be $22\frac{1}{2}$ lacs.

129. In treating of the expenditure necessary to keep the works of irrigation in repair, the Commission notice a set-off which is not usually taken into account, viz., the cess under the denomination of tank meras, or some corresponding term, which, originally intended to provide for this object, has been, in most districts, consolidated with the ordinary land revenue. The aggregate amount of this cess cannot be ascertained, but it is proper to bear in mind that there is such a fund in considering the burden of maintaining these works.

130. The aggregate of the expenditure proposed for the restoration and maintenance of existing works, and the formation of new works, is a good deal more than double what has been laid out annually on works of irrigation during the five years from 1846-47 to 1850-51, the average of which is 10,37,393 rupees; the proportion of this average applied to the maintenance of existing works, and the construction of new works respectively, is not distinguishable.

Para. 463.

131. The Commission, as I have remarked in a note above, have under-estimated the revenue actually received by Government from lands irrigated from Government works, in stating it at 135 lacs, by omitting the Northern Circars and Kurnool, including which it will not be short of 150 lacs, without reckoning the land irrigated from Government works which are held on enam tenure, the value of which I conceive is still more under-stated. There has been hitherto but a trifling expenditure in several of the Northern Circars, particularly Ganjam, Vizagapatam, and Masulipatam, in which in future, from the reversion to Government of lands hitherto held by zemindars, a considerable expenditure will be necessary to restore works which have been suffered to go to decay. The expenditure proposed by the Commission for the restoration of such works, the complete repair of others which are out of order, and the ordinary annual repair of the rest, will be about 10 per cent. of the Government revenue depending on artificial irrigation as estimated by me. It is impossible, from any data before us, to estimate with any degree of exactness the expenditure required for these objects; but supposing five per cent. of the revenue to be not an extravagant allowance for the maintenance of the works, after they have been put in good order, and I am inclined to think that it is not extravagant, the annual charge for that alone would be $7\frac{1}{2}$ lacs, and I believe that if it were doubled for five years we should hardly accomplish the object of complete restoration and repair, so as to leave nothing to be done annually in future but to provide for the ordinary accidents of season and the usual wear and tear. I conclude, therefore, that the Commission have made a reasonable proposition on this head. I think that they have at least reasonably estimated what is required, though I rather doubt that, with the means of superintendence likely to be available, it would be possible at once to provide for the profitable expenditure of 15 lacs annually in the manner proposed, with a further simultaneous expenditure to a large amount in the execution of projects of improvement. The latter expenditure, if judiciously employed, would certainly reproduce itself with a large profit; the former would also be, in a measure, reproductive, by the irrigation being made sufficient to a large extent of the land being fully cropped, and so yielding constantly a revenue approaching to the maximum formerly obtained only in the best years, and of course above the average.

132. The question of how much should be laid out annually for the extension of irrigation must depend, irrespectively of other considerations, on the means at the command of Government for the investigation of the projects of improvement that may be suggested, and for obtaining trustworthy plans and estimates, and eventually for their efficient execution. It is the primary duty of Government to provide for the object considered in the last para., and however remunerative a scheme of improvement may promise to be, beyond what will be gained by mere restoration and repair, the obligation to attend to the works required to keep up the present irrigation and make it more perfect, must not yield to such a consideration. Improvement, if the means for it are available, should go on *pari passu* with restoration and repair, but if there are not means for both, improvement must be postponed. The Commission observe, that there is no want of profitable projects to be undertaken; that in every district there are favourable openings for such undertakings, which will be brought forward rapidly as soon as officers shall be available for the important duty of investigation. Of this I have no doubt; but the officers required cannot be created at once.

133. With respect to roads, which the Commission divide into three classes, viz. 1st, the main arteries, consisting of roads running inland from the coast, those parallel with the coast, and those connecting important posts and places in the interior, the extent of which they estimate at about 8,000 miles; 2d, roads connecting towns of inferior importance with each other, and with the main lines, and connecting the chief stations of the talooks, and the chief talook towns of different districts with each other, where contiguous; the extent of these they estimate at 20,000 miles; 3d, the village roads connecting villages with the towns, or with roads of the first and second class. They think that not less than 1,50,000 miles of these roads are required.

Roads.

Para. 467.

134. The first class of roads, they think, should all be made equal to an English turnpike-road, to admit of carts with a pair of bullocks, carrying from 1,800 lbs. to a ton, and travelling with ease and certainty 20 miles a day, the cost of which, from the experience of the Trichinopoly Trunk Road, they estimate at 3,500 rupees per mile. The second class they propose should be made as good as the Western Trunk Road, that is to say, fit to admit of carts carrying 1,600 lbs., and travelling 15, or, in dry weather, 20 miles a day, which they think may be done for 2,500 rupees a mile; viz., 1,500 for construction and bridging, and 1,000 for metalling.

Para. 419.

Para. 417.

135. The cost of these two classes of roads they estimate at 7,74,00,000 rupees, viz.: 1st class, including canals, 2,74,00,000; 2d class, 5,00,00,000 rupees.

Para. 470.

136. They are not so sanguine as to expect that the construction of these roads can be accomplished within a short period, but are only anxious to point out what there is to be done, and to urge that now at length the task should be entered upon with vigour. With this view, they propose that, as a beginning, 20 lacs annually should be steadily expended on the communications, in improving the roads already existing, and in opening new lines, exclusive of ordinary repairs.

Para. 471.

137. The Commission present no data for their assumption that the extent of the second class of roads is not overstated at 20,000 miles. It is purely a conjectural estimate, which I will not attempt to test, for I hold it to be quite out of the question that Government should undertake to form such a network of subordinate roads on such a plan as is proposed by the Commission, before the construction of those of primary importance has been accomplished, and that will be a work of many years. The former are the roads to which the remark I have made above applies, that Government must be content with respect to them to do little more in the way of improvement than Captain Best suggested.

138. The Commission have given the elements of their calculation, that the extent required for the first-class roads is about 8,000 miles. But they are not the result of investigation. They assume, for example, that 28 new roads from the coast into the interior are needed between the northern frontier of Caniam and Cape Comorin, and from Comorin to the northern limit of Malabar, merely because in Canara there is on an average one road into the interior for every 35 miles of coast. They have not gone over the districts inquiring what are the ports which it is desirable to open to the inland districts, and what natural lines offer for communication between them, and how far one common line will serve

Para. 410.

for several districts, or parts of several districts. They have not adverted to the effect of railways in drawing to them at different points the traffic of many districts at greater and less distances, and causing the abandonment of lines leading more directly to the port whence their produce is shipped, but which, though more direct, will not, however improved, admit of the carriage of produce with anything like the rapidity, safety and cheapness with which it could be carried by the cross roads of the country to the railway, and by the railway to the place of exportation. Such a railway, for example, as that now commenced, to run out from the capital for some 60 miles in a line due west, as a trunk to two main branches, one to be carried by Vaniembady through Salem and Coimbatore to the Malabar coast, with a branch from Vaniembady to Bangalore, and the other through North Arcot, Cuddapah and Bellary towards Bombay. Considering these things, I feel pretty sure that probably one-half of the number of roads of this description suggested by the Commission would suffice; and still more sure I am that the average length of 150 miles assumed by the Commission is exaggerated. This indeed I think is self-evident on the least consideration of the data presented by the Commission. I should say the average would not exceed 120 miles, or one-fifth less. The length of 14 roads at 120 miles each, would be 1,680 miles, instead of 4,200. I think the lines parallel to the coast are also over-estimated at 1,500 miles.* There is to be deducted, at any rate, the southern trunk road, already far advanced; and making allowance for the improvements to the northern trunk road already sanctioned, and in course of execution, and for the water communication in Malabar, which, with the canal lately sanctioned, will be complete along the coast, and allowing also for the existing coast roads in Canara, I am inclined to think the estimate may be reduced to less than 1,000 miles. The Commission, I conceive, would be very much puzzled if they were required to lay down inland main lines answering to their description to the extent of 2,000 miles. With such abatements as I have suggested, it seems to me that 4,000 miles will be more nearly the extent of road required † to be made substantially, and bridged and metalled throughout. But I do not think that all these roads would need to be made at the expense proposed by the Commission. I should be disposed to say, taking the total at 4,000, that 1,500 miles might be made at the cost proposed for the first class, 3,500 rupees, and 2,500 miles at the cost proposed for the second class, 2,500 rupees. On this view, the estimate for roads to be made substantially, bridged and metalled, is reduced to 110 lacs. For this sum we should obtain 4,000 miles of road fit to be travelled at all seasons, with such a facility of draught as to admit of the cart load being trebled or quadrupled, and the distance travelled daily nearly doubled, and by which the mails might be carried at the rate of seven miles an hour, and travellers post in carriages drawn by horses to all the principal places in the Peninsula. I have said roads, but I conceive that it will probably be found most advantageous to provide for a considerable part of the aggregate length by canal; and I am myself disposed to think that on some of the lines the tram-roads proposed by Colonel Cotton, in his report of 6 May 1836, above referred to, might be introduced with excellent effect. I concur with the Commission as to the considerations which ought to determine the kinds of communication to be resorted to in different localities. I apprehend that with all the means that could be brought into operation, it would be difficult to execute in the year more than 300 miles of new road, say 100 at an expense of 3,500 rupees, and 200 at an expense of 2,500 rupees, besides giving some improvement to the cross roads in the manner proposed by Captain Best, and providing for the repairs of existing roads, as well as for the execution of the works proposed in the Maranmut Department on the great scale already considered. The execution of 300 miles of new road would require an expenditure

Para. 468.

Miles.
 1,500 at 3,500 = 52,50,000
 2,500 at 2,500 = 57,50,000
 110,00,000

See also para. 47, App. B.

100 x 3,500 = 3,50,000
 200 x 2,500 = 5,00,000
 8,50,000

* The length of the coast from the frontier of Cuttack to Cape Comorin, the Commission say is about 1,000 miles, the length of Malabar 120, of Canara 220 = 1,360. Deducting 200 miles for the southern road to Trichinopoly, there remain 1,160 miles.

† It does not appear to me that the example of England and Wales which the Commission refer to, is relevant in considering the accommodation that this country requires in the matter of roads. They look only to the area and population, without regard to the amount of traffic in the countries brought into comparison. But when this is considered, and the immense disproportion between the wealth and commerce of England and Wales and of the Madras Presidency is adverted to, it is evident that there is no practical analogy between them.

expenditure of 84 lacs, at which rate it would take about 13 years to complete the project. The present allowance for trunk roads is four lacs, which includes their repair. It is in my opinion expedient that at least double this sum should be allowed in future for making new roads, and improving existing roads, to bring them into the condition proposed, and that a separate provision should be made for repairs, as may be found necessary according to the extent to be kept in repair.

139. I am inclined to think that tolls to provide for the repair of roads might be established under Act VIII of 1851, at least at ghauts, and at bridges over great rivers, where the advantage to be paid for is palpable, and perhaps at the entrances to towns; at such places tolls could not be evaded, and being few, I should imagine that means might be used to maintain such a control as would tend to prevent the exaction which would be likely at places removed from supervision.

140. In these paras. the Commission discuss an important question, namely, whether the expenditure for works of irrigation and for roads, &c. should be dependent on the amount of surplus revenue available, or whether if the year's revenue be insufficient to admit of the full expenditure required for the execution of works which may be expected directly or indirectly to reproduce their cost with a considerable profit, whereby the public revenue will be permanently augmented, and private wealth increased, the deficit may not be raised by borrowing on the credit of Government. The Commission strongly advocate the raising of the capital required for such works by loans, when the revenue from the drain for war or other objects is insufficient to afford it, pointing out the essential difference between raising a loan for the purpose of war, which is a mere sinking of capital, and for works which, besides returning a large profit to Government, will be the means of enriching and adding to the comfort of the community. Such a debt, they contend, cannot be regarded at all as a burden on the finances, because it is morally certain that the investment of the sum borrowed will create a fund for its repayment within a short period. They urge, therefore, that the sum fixed as proper to be annually expended on public works should be so expended, without consideration of the current surplus revenue; that the amount should be considered no less necessary to be provided, and no less an essential part of the year's expenditure than the pay of the army or the interest of the debt; and that any deficiency in the year's revenue to meet the charge, should be made good by loans. In these views I entirely concur. I observe that similar views have lately been propounded in Parliament, and cogently advocated. Paras. 482 to 488.

141. I have further to express my concurrence with the Commission in the opinion they submit, that whatever sum is fixed as proper for the usual annual expenditure in this Presidency on public works, should be at the unfettered disposal of the local Government. A precedent for the assignment of a certain sum annually for a certain purpose, to be at the disposal of the local Government, without reference to other authority, is afforded, as I have already remarked, by the grant of four lacs per annum as a fund for the construction and maintenance of the trunk roads. Para. 497.

142. I concur also in the recommendation that a standard for the usual expenditure having been fixed, an estimate of the probable actual expenditure of the two years next to ensue should be laid annually before the local Government, and if approved, communicated to the Government of India, provided that, if the estimate exceed the fixed standard, it should be first sent for the approval of the Court of Directors, and communicated to the Government of India after the approval of the Court has been obtained for the excess. Para. 498.

143. Having now seen the nature and extent of the public works of this Presidency, under the present system, and having formed some conception of what more is required for the material improvement of the country, I come next to the constitution and organization of the department for directing, controlling, and conducting the execution of those works. And first, I return to the fifth section of the report, in which a new Board of Public Works is proposed, to undertake the duties now divided between the Board of Revenue, the Military Board, and the chief engineer. Here I am prepared to say at once that I agree with the Commission, that it is not possible for the members of the Board of Section V.
Revenue,

Revenue, with such assistance as the chief engineer can render them, to sustain the burden which the greatly increased business in this department imposes on them. The present constitution was a great improvement on that which preceded it, but it is no longer adequate to the requirements of the department. I agree with the Commission also in thinking it expedient that the superintendence of the roads should be conjoined with that of the Maramut, as the agency for the latter must at any rate be largely used in the formation and repair of the roads. For the same reason, I think that the buildings, &c. in the provinces, now under the control of the Military Board, may be better placed under the control of the authority to which the officers, whose agency must be resorted to for their improvement, alteration or repair, are ordinarily subject; and for consistency, the authority which has the control of such buildings, &c. in the provinces, should have it equally at the Presidency.

Para. 208.
Paras. 210 and 211.

144. Agreeing with the Commission that the whole of the public works should be under one control, I agree with them too, for the reasons they assign, in preferring a Board to an individual officer for the exercise of that control.

Para. 213.
Para. 216.

145. I agree also with the Commission in thinking that an experienced revenue officer should be one of the members of the Board, and that his salary should be fixed at such a rate as to make the appointment eligible to any collector, so that Government may be able to select the fittest of the officers of that class. I think the chief engineer should be a member of the Board *ex officio*. I do not think that two other engineer officers are necessary to complete the Board. It appears to me that, with the chief engineer to give the Board the benefit of his advice on all professional questions of importance, and he being relieved from his present most burdensome duties, one other engineer officer will be able to conduct all the business that is purely professional, and to superintend the correspondence with the officers of the department who communicate directly to the Board, while the civil member, it may be presumed, will take charge of the correspondence with the collectors and the communications with the Board of Revenue, and also, of the accounts which do not require a professional revision, such as do require that revision falling to the professional member. The Board, I think, should have an engineer officer as their secretary, of the standing proposed by the Commission.

Para. 216.

146. The salaries proposed for the members and secretary of the new Board appear to me suitable.

147. The civil member, I think, should be also a member of the Board of Revenue, in order that he may take a part, in the discussion of all subjects referred to that Board by the Board of Works, according to the 5th of the rules proposed in para. 232, and, if he thinks proper, record his sentiments; also in cases where the Board of Revenue, according to the 7th rule, may desire to initiate a project of improvement, or to bring before Government a scheme which the Board of Works may not approve. I may here observe that the other rules proposed in the same para. appear to me to be unobjectionable.

Para. 220.

148. I am of opinion with the Commission, that it should be the duty of the Board rather to control and direct operations, and to check and examine results, than to interfere with details which may be better left to the local officers; and that the proper method for a controlling Board to exercise its functions is by general rules, leaving cases and details within those rules to the discretion of the subordinate authorities, whose proceedings should be brought annually under review by detailed reports; and I approve of the practical application of those principles by the propositions submitted in para. 224, which appear to be essentially in accordance with the long established practice in Bengal.* With respect to the ordinary repairs of buildings and roads, the proposed rules will introduce the practice which already obtains with respect to works of irrigation, the necessary repairs of which the collector orders on his own responsibility.

Vide Appendix O.

149. I have

* Since writing this I have had an opportunity of seeing the Report of the Commission on Public Works in Bengal, para. 26 of which appears to contradict the statement furnished by the Military Board at Calcutta with respect to estimates for repairs, all which, when the amount exceeds 25 rupees, it is said, must be ultimately submitted for the sanction of Government.

149. I have felt that the Government has not the means of really dealing with the details of bills; that no real check is applied by their being submitted to it. Government must trust, and does practically trust, to the Board which has the means of check. I never could see any compensation for the trouble and waste of time caused by all bills being required to pass before Government. If it has any effect, it can only be to detract something from the sense of responsibility on the part of the Board, which ought by all means to be quickened. It is equally in vain, according to my experience, for Government to have estimates for ordinary repairs submitted to it. Government cannot of itself judge whether the repairs are necessary; the opinion of the local officer must really be its guide, and it is better to fix the responsibility upon him, whose report after all must of necessity be depended upon. I am persuaded that an annual report from the Board, showing the expenditure in repairs to buildings, and the time when each was last repaired, and explaining any particular circumstances, would be, as the Commission think, far more useful to Government, and a more real and effective check on wasteful outlay, than the present plan of submitting all the bills for such works in detail for sanction. Para. 222.

150. I am further disposed to agree with the Commission, that it may be expedient to give a discretion to collectors to undertake, within certain limits, improvements in irrigation works and roads, as well as to provide for keeping them in repair. Para. 225.

151. I quite approve of the arrangement which the Commission propose, in order that the Government may be put in possession of the information necessary to give it a complete view of the proceedings of the Public Works Department, and to enable it to exercise a due control. The reports and returns described by the Commission I conceive will very well answer the purpose. The information indicated under the 6th head in para. 226 is very much required. I think an account current of the costs and profits of irrigation works, such as the Commission contemplate, is very desirable. I think it would not be worth while, however, to have it made up for the numerous petty works of irrigation, which would be an immense task, but only for first-class works, defining these as being above a certain value. Para. 227 to 229.

152. I do not think such an account could be made up for the roads. Para. 230.

153. The Commission suggest that one* of the stipendiary members of the Military Board and the assistant secretary may be dispensed with, and that the salary of the secretary may be reduced in consequence of the duties of that Board being so much diminished. On these points I am disposed to agree with the Commission. I do not think it advisable to give seats ex-officio to the Adjutant-general and Quartermaster-general. If it is not necessary that the commandant of artillery shall have a voice in Ordnance matters, I incline to vest the whole duty in a single officer. The Commission contemplate also the abolition of the offices of superintendent of roads and secretary to the Board of Revenue, D. P. W. This will follow of course the establishment of the new Board. Para. 218.

Section IX.

154. I proceed to the 9th section, in which the Commission discuss the necessity of enlarging the public works establishment in all its grades, and submit a statement of the new establishment proposed.

155. Without following the Commission through the remarks which they offer to show the necessity of a much more liberal provision for superintendence than has hitherto been allowed, and the need there is for more engineers to watch, repair, and improve the tanks and channels for irrigation, upon the efficiency of which the revenue of this Presidency so largely depends, a need that I am perfectly convinced of from my own experience and knowledge, coinciding with the statements in this report which I have already considered, I go at once to their scheme of an establishment for the Public Works Department in all its branches. Paras. 424 to 524.

156. First

* The appointment of the second stipendiary member has not been filled up since a vacancy occurred last year.

Para. 525.

156. First, they present a statement of the number of commissioned officers they consider to be required for the department, including the Board and its secretary, and the chief engineer and his adjutant.* The number is 113, which comprehends the officers to be employed executive in the Road Department, and in the performance of the duties relating to buildings now superintended by the Military Board, as well as those required for the Maramut Department. For this are proposed an engineer officer and assistant to each district to perform the duties with which the civil engineer is now charged, and an inspecting engineer to each † of the divisions now under the civil engineers, that is 20 district engineers, 20 assistant district engineers, and 9 inspecting engineers for the provinces immediately under this Government, with an inspecting engineer for the Presidency. Besides this establishment for our own territories, provision is made for an inspecting engineer and four district engineers for Mysore, and an inspecting engineer for the Saugor division and contiguous districts, also an inspecting engineer for railroads. Total 13 inspecting engineers, 24 district engineers, and 20 assistants. Further allowance is made for nine "special assistant district engineers," to be employed in investigating special projects of works.

157. Among the districts proposed to be provided each with a district engineer and an assistant, is Kurnool, with a revenue of only seven lacs, of which only a small part is dependent on irrigation, and a population of a lac and three-quarters; I conceive it to be unnecessary to give the same establishment to this small district as to the largest. It should be placed under the charge of the district engineer of Cuddapah or Nellore, with an extra assistant to aid him in this part of his range.

Para. 526.

158. I have always thought it to be desirable that there should be an engineer to each of the large collectorates (excepting perhaps Malabar and Canara †), with an assistant in some of them. Considering, that on the plan before us, the roads generally, as well as the Maramut works, will be under the district engineer, and that there will probably be hereafter much more work in both branches, I now think it advisable to allow an assistant for every district including Kurnool, partly, as the Commission suggest, to give assistance to the district engineer, and partly to train up a body of young officers in the practical knowledge of Indian civil engineering, especially in regard to hydraulic works.

159. With regard to the inspecting engineers, whose intended duties are described in para. 528, the need of such officers to stand between the district engineers and the superintending Board has not hitherto occurred to me. There can be no question that the department would be made more efficient by the introduction of inspecting engineers, but without this provision, I should expect it to be generally sufficiently effective with the establishment of an engineer and assistant to each collectorate. I should look upon these officers as the professional staff of the collector, and I have no doubt that the material improvement of every district would be greatly advanced by concert and co-operation between the administrative head of the district, and the engineer appointed to conduct the business of the Maramut and Road departments under him, who from his duty being confined to the district, would be equally interested with himself in its progress. I think the district engineer should be under the collector, just as the sub-collector is under him, subject to his authority in a general way, but without direct interference on the part of the collector in regard to the details of his duty.

Para. 527.

160. A great assistance would be afforded to the district engineers by the appointment of a certain number of unattached officers for the investigation of special projects either of irrigation, or of communication, or of other kinds. Under this arrangement, when a district engineer, and the collector of the district, and the inspecting engineer, if there was such an officer, agreed in recommending a project

* I do not see why the adjutant of engineers should be included in this list, for no duty is assigned to him in the Department of Public Works.

† There are at present eight divisions, but the first division is temporarily subdivided into two, an arrangement proposed to be continued.

‡ These districts not depending on artificial irrigation, there would hardly be sufficient work for an engineer of the superior class in each; one might be appointed to superintend the two districts, with an assistant in each.

a project of improvement, the district engineer would be relieved from the duty of investigating the scheme in detail and the labour of preparing a plan and estimate for its execution. One of the "special assistant district engineers"* would be sent to undertake this work, in the prosecution of which he would of course consult with the district officer, and if there was an inspecting engineer, would execute the duty under his control. I do not know that so many as nine officers are required for this kind of duty, but I think it is very expedient that in laying out the department, provision should be made to place a certain number of officers at the disposal of the Board and Government, for the purpose indicated.

* I do not think this a very apt designation.

161. According to my view, if inspecting engineers cannot be afforded, as proposed, the regular establishment within our own provinces, exclusive of the Presidency, to carry on the duties of the Department of Public Works under the Board, would consist of 19 district engineers.†

20 assistant engineers.

—
39

Say 5 special assistant district engineers.

—
44

† Or 18, if one be assigned to the two districts of Malabar and Canara;

or 43.

162. The Commission reckon that besides the regular establishment for the districts, there will be employment for about 30 occasional executive officers, and considering that 20 such officers are employed at present, I apprehend that this estimate will prove not much, if at all, beyond the actual requirement, should works of irrigation and communication be undertaken in future to the extent to which my views go.

163. Supposing inspecting engineers to be allowed, as proposed by the Commission, I think it is proper that they should have the same allowances as the civil engineers have at present. If inspecting engineers be not allowed, I think that all the present civil engineers should be retained as district engineers with their present allowances, and that the first class of district engineers should consist of nine, whose allowances should be fixed at that rate; to the second class, which would consist of 10, I would give the staff allowance proposed by the Commission for the first class of district engineers, with the tent allowance of the first class. I conceive that two classes will be sufficient. I think there should be two classes of assistant engineers, with 8 or 10 in the first, and 10 or 12 in the second. The first class to receive a staff salary of 200 rupees, the same as the head assistant engineers at present; the second, 100 rupees, the same as second assistant engineers at present. The two classes to have the tent allowance at present received by the head assistant and second assistant engineers respectively. I would arrange the occasional executive officers likewise in two classes, assigning to them respectively the same allowances.‡ The "special assistant district engineers," that is, the engineers employed in special projects, I think should be in a position intermediate between the second class of district engineers and the head assistants, with a staff salary of 350 rupees.

Para. 540.

500 rupees.
4 rupees per diem.

164. I have hitherto considered only the establishment required for the Maranul Department in the provinces within our own territory, exclusive of the Presidency.

165. For the Presidency there may be an inspecting engineer and an executive engineer, on the footing and with the allowances proposed by the Commission.

Inspecting Engineer, staff salary, 1,000 rupees;
Executive Engineer, 600 rupees.
Both without tentage.

166. For Mysore the Commission propose an inspecting engineer and four district engineers, with an executive officer for the works under the Board at Bangalore.

‡ I have proposed the same allowances as at present to the head assistant and second assistant engineers, and to the executive officers of the first and second classes, but I doubt whether 100 rupees is a sufficient allowance for the second assistants and second-class executive officers. I think that it should not be less than 150 rupees, and that to preserve a due gradation, the allowance of the head assistant engineers, and the first-class executive officers, should be 250 rupees.

Bangalore. At present there is only one engineer officer, styled superintending engineer, for the whole territory of Mysore. It appears to me to be necessary on this occasion to consider only what agency is required for the performance of the work under the superintendence of the Board; and I should say that an inspecting engineer for the whole division, and one permanent executive officer for Bangalore, would be a sufficient provision.

† With tent allowance.

167. For the duties to be performed under the control of the Board of Works in the Hyderabad, Nagpore, and Saugor territories, it seems to me that it will be sufficient to allow one inspecting engineer with a permanent executive officer at Hyderabad and Nagpore respectively, and four for the stations in the Saugor territory. Further, following the Commission, I suppose a permanent executive officer must be allowed for the Straits of Malacca, the Tenasserim Coast,* Cannanore and the Neilgherry Hills (when the barracks are finished). In all, three inspecting engineers and 12 permanent executive officers. Of these 12 permanent executive officers, one is intended for the Presidency, with a salary of 600 rupees, as above noted. Of the rest, four might be allowed a salary of 300 rupees;† and the remaining seven, a salary of 200 rupees,† or the same as the head assistant district engineers. I do not see reason for giving the former 400 rupees, as proposed by the Commission.

168. Without inspecting engineers in the districts within our own territory, the permanent establishment would thus be—

	Inspecting Engineers.	District Engineers.	Assistant Engineers.	Special Assistant Engineers.	Executive Officers.
Presidency - - - - -	1	-	-	-	1
Maramut and roads within the Madras territory - - - - -	-	19	20	5	-
Beyond the territory and at certain military stations within the territory -	2	-	-	-	12
	3	19	20	5	13

Total, 60.

With 9 inspecting engineers for the Maramut and Road Departments in the districts within our own territory, the number would be 69, besides about 30 officers required for occasional works. Total, 90 or 99.

Para. 539.

169. The Commission are not of opinion that all these officers need to be engineers. Where engineering skill and science are required, they would employ professional officers only; and in this view they would confine all the permanent appointments in the Maramut Department, all the inspecting engineer-ships, and as a general rule all the special appointments for the examination of projects, to "the professional corps;" and they think that generally the executive officers at the Presidency, at Tenasserim, Singapore, Hyderabad and Kamptee, should be engineers.

Para. 569.

170. Their reasons for confining the appointments specified to "the professional corps" are given in the 10th section, in which they discuss the question whether it will be best to provide the additional engineers absolutely necessary to render the Maramut Department efficient, by enlarging the corps of engineers which forms a part of the army, or by constituting a separate body of engineers for civil duties without military commissions or organization. They conclude that the best plan to effect the object in view, the cheapest and the most effectual, will be to extend the present system. They deprecate the employment of officers of the line in duties which require engineering science and skill.

Para. 571.

* This however will be regulated by the Government of India in connexion probably with the arrangements for the Province of Pegu.

skill. Their opinion on these points differs from that expressed by Colonel Cotton in 1837, who advised that the department should be opened to officers of the line and the artillery, and to others not in the Company's service, proposing that even "the highest appointments should be open to any one who could fit himself for them." "I cannot see anything in the nature of the department (he said) which can make it advisable to keep it exclusively for one body of men; a turn for these duties may be found in any class, and in England civil engineering is open to all, and the effects of it are very evident and beneficial." I confess myself inclined to adopt the above opinion of Colonel Cotton. I think it desirable to increase the strength of the military corps of engineers considerably, and to employ the officers who can be spared from military duties in civil engineering as heretofore. But I think it is quite inexpedient to depend wholly on a body of officers who must be held primarily subject to the calls of military service, and liable at any time to be withdrawn to answer those calls. We are experiencing the inconveniences of being so dependent at the present moment. I would therefore have not only the occasional executive appointments open to all persons who may be qualified for them, but also a proportion of the permanent appointments supposed to require engineering skill and science. The Commission recommend that the young military engineer officers may in future pass through a prolonged course of civil engineering in England, in order that they may come out like the young officers in the medical service, with practical as well as scientific knowledge. This is no doubt highly advisable, and should be strongly recommended to the Court of Directors. But I apprehend that effective service would be earlier obtained from civil engineers who had already actually practised their profession in England, and that not only would the present exigency therefore be more quickly supplied by such recruits to the department, but generally there would be less time lost in preparatory training in India, in the case of persons already practically proficient in civil engineering, who would only have to get an acquaintance with the modes of operation adapted to the circumstances of the country and native agency, and a knowledge of the language of the people with whom they have to work, to make their services useful; whereas officers of the military corps must in the first instance undergo a practical training for all the duties of military engineers, and must actually serve for that purpose with the corps of Sappers.

Appendix B., page XVIII.

Para. 597.

Paras. 598 & 599.

171. Supposing the number of permanent appointments under the Board of Works of a nature to require engineering skill to be 60, a fifth, or perhaps a fourth part, might be left to be filled up partly by professional men sent from England, and partly from among the officers of artillery and the line, and other qualified candidates who may be found in the country. I have noted that the Commission propose that there shall be an assistant under each district engineer, not as absolutely necessary to assist him in his work, but that a body of young men may be in training in the practical knowledge of hydraulic engineering especially, and I doubt not that young men will be forthcoming from the army* with a tolerable scientific foundation to begin upon, and some natural aptitude for this kind of employment, who may soon be taught to make themselves useful to the engineer, and gradually under his instruction, with constant opportunities of observing his operations, will gain sufficient practical skill to undertake the charge of works in execution, and presently to relieve the district engineer from many duties of detail.

172. This question must be decided before it can be determined what ought to be the strength of the engineer corps of the army; a subject upon which I do not feel myself called upon to enter further at present.

173. I turn now to the subordinate agency proposed for the Department of Public Works. Para. 547.

174. A large

* In the 41st para. of the printed account of Roorkee College, it is remarked that "the Indian army is one of the sources whence scientific agency is most easily supplied. Besides the officers of the scientific corps, properly so called, there are in the Indian army many well-informed and highly educated men, who have much taste and capacity for civil engineering. It is only necessary that the persons possessed of this talent should be known, and that they should be provided with the means of improving themselves, and of perfecting their knowledge."

174. A large staff of warrant and non-commissioned officers is proposed,* viz., 80 of the former to be styled sub-engineers, with allowances running from Rs. 431. 12. to Rs. 176. 8. per month; 60 overseers and 64 sub-overseers, with allowances running from Rs. 145. 14. to Rs. 52. 12. 8. per month; total, 204.

Para. 548.

43 to the 21 districts, including Kurnool and Madras. † 2,25,588. Appendix II. H.

175. The allowances proposed for the sub-engineers of the first class exceed the military pay and staff salary and tent allowance of a first lieutenant of engineers, with the appointment of second assistant engineer. This appears to me inconsistent. The sub-engineers are a new class of officers intended to assist the engineer officers in all branches of their duty by relieving them from the more detailed and mechanical parts of it. Their work will be strictly of an engineering character. With two engineer officers to each district it may be questioned whether these sub-engineers are necessary. It is proposed that there shall be two to each district, 16 for main roads, 20 for special projects, and one for the Presidency division. The total charge for this new class of officers is Rs. 2,44,912. 8., which considerably exceeds the present charge for the whole of the Civil Engineer's Department. I cannot say I am satisfied that there is a necessity for this additional charge, at least to the amount proposed, supposing the number of superior professional officers to be increased as suggested. The case would be different if that increase could not be given. In some districts, where there are very extensive and important works, the district engineer might with advantage have an officer of this class to aid him, besides the assistant district engineer; and such officers would no doubt be very serviceable in the execution of special projects, such as the Godavery and Kistna anicuts, and in directing and superintending occasionally the construction of main roads, ghauts, &c. I think it expedient on the whole to have such a class as this on the establishment as an opening for promotion, among other considerations, for the most able and deserving of the subordinates. But I conceive that the allowance proposed for the second rank of this class in the plan of the Commission, viz., Rs. 301. 5., may be sufficient. I do not observe, however, that such a class has hitherto been proposed. To the highest subordinate officer, called by the superintendent of roads "supervisor," the maximum salary was to be 140 rupees, including the pay of a conductor, to which warrant rank it was supposed the overseers of this class would be promoted. This rate was proposed by the superintendent of roads, as corresponding with the maximum rate allowed to the same class in Bengal and Bombay, including horse allowance. The same system was to be followed in the Maramut Department. In the North-Western Provinces a class of officers has been introduced denominated "sub-assistant executive engineers,"‡ but their salary is limited to 100 rupees a month, with travelling allowance when in the field to the extent of $\frac{1}{2}$ of their salary.

From Board of Revenue, 30 July 1849, para. 57, Appendix II.

From Capt. Best, 16 May 1846.

See printed account of Borker Col. lege, 1851, p. 12 and 13, and p. 614 of this Report.

60 Overseers.
64 Sub-Overseers.

176. Of the 124 overseers it is proposed that 48 shall be distributed among the 20 collectorates in the interior, including Kurnool, 18 employed on main roads, 20 on special projects, and the rest at military-stations, &c. The charge will

* The establishment for the whole of Bengal and N. W. P. proposed by the Bengal Commission on P. W., I observe, is—

Conductors	-	-	-	-	-	-	-	-	-	15
(corresponding apparently with the overseers of first class in the plan of the Madras Commission).										
Sub-conductors	-	-	-	-	-	-	-	-	-	20
Overseers	-	-	-	-	-	-	-	-	-	65
Assistant Overseers	-	-	-	-	-	-	-	-	-	200
Total										300
Ordinary Regimental Pay	-	-	-	-	-	-	-	-	-	234 14
Staff Salary	-	-	-	-	-	-	-	-	-	100
Tent Allowance	-	-	-	-	-	-	-	-	-	90
Total										424 14

(According to military pay and audit regulations, p. 177, first and second assistant, same tent allowance)

† The number of this class was at first limited to four, but was afterwards increased to 20. Up to 1851 only four had been appointed.

will be Rs. 1,40,259. 4. If sub-engineers are not employed, I should think that two overseers might properly be allowed under every district engineer, and three in some; it would be necessary to allow some for main roads and special projects; what the numbers should be for these and other services I am not able to judge. It must depend upon experience. The Commission propose 40 more officers of the non-commissioned grades for the duties of the Presidency division, and of the various military divisions and stations. The maximum rate of allowance to overseers of the first class in the plan of the Commission somewhat exceeds what was intended as above remarked for the supervisors with the rank of conductors, the highest officers in the subordinate department in the scheme hitherto contemplated.

Vide letter from Board of Revenue, D. P. W., 24 October 1850, and statement appended.

177. The Commission speak of the proposed establishment of warrant and non-commissioned officers as an establishment of Europeans, and they say expressly that, in their opinion, "it is absolutely necessary that for many years to come the superior grades of the subordinate department should be almost exclusively European." Again they say, "appointments to this corps of subordinates should be confined almost wholly to men of European birth and education; at first this should be so strictly." I differ with them on this point, thinking that the sure way to bring up natives and East Indians to the required standard, is at once to make them eligible to any and every appointment in the list of subordinate offices on the ground of proved qualification and tried character. I would therefore do at once what the Commission propose to do eventually, that is, lay the appointments open to competition, and give them to the best men without distinction of race or colour, or place of birth or education. I think that the grade of sub-engineers, if there be such a grade, should from the first be declared "attainable by a superintendent of maramut, having displayed in a pre-eminent degree those qualities of zeal, energy, and honesty, which (the Commission observe) it is only fair to say that some few of the class have already evinced, and on passing the required examination," and that East Indians should be immediately "admissible to the grade of assistant overseers, and then compete for promotion on equal terms with their European comrades," of course subject to their furnishing sufficient testimony to their character and qualification. Otherwise the *élite* of the young men who have distinguished themselves by the manner in which they have gone through the training of the institution under Major Maitland, for example, who have had their minds disciplined and stored with useful theoretical and practical knowledge, and their physical energies developed by the laborious practice of a mechanical art in which they have acquired a high degree of skill, and through a long course of close observation have been found unexceptionable in their moral conduct, would be excluded, in order to make way for Europeans, who would probably have no pretensions to a like degree of knowledge and skill, and whose moral character and conduct could not be so well attested. The injustice and inexpediency of such exclusion seems to me to be so self-evident, that I need not dwell upon it. But I would just point to the high character which many of the East Indians in the class of medical subordinates have attained both for professional ability and for integrity. I would advert also to what is more in point, the fact that East Indians are now commonly employed in this country as engineers in steam vessels. The engineers in the Bengal marine I am informed are all of this class. The principal subordinate officer (with the rank of conductor) in the gun-carriage manufactory is an East Indian, a most able man. The services of persons of this class have been used with great advantage in responsible offices in the Mint and other working establishments, and I believe that they have been found worthy of trust.

Para. 547.

Para. 556.

Page 556.

177. The Commission submit their views as to the establishment of native subordinates required. The scheme of establishment they propose provides for a superintendent of maramut to each of the 20 districts, and a deputy superintendent to 15 of them. At present there are 15 superintendents and 3 deputies. There are now 97 maistries; the Commission propose 251 maistries and 302 under maistries, total 553, to be called respectively foremen and sub-foremen. Including the superintendents, the number is 588, at a charge of 2,11,620 rupees per annum in place of 33,375 rupees. The pay of the superintendents is proposed to range from 90 to 120 rupees. That of the deputies to be 60 rupees.

Para. 558.

The pay of the foremen to range from 30 to 60 rupees, and of the sub-foremen from 15 to 25 rupees.

- I. 178. In the paper by Major H. C. Cotton, referred to by the Commission, and printed in the Appendix, the number of servants of this class proposed, including a superintendent and deputy superintendent to every district, was 349, which the Board of Revenue D. P. Works reduced to 150 maistries of all classes. The rates of pay proposed by Major Cotton were 100 rupees to the superintendent and 60 to the deputy, and from 35 to 14 rupees for the talook maistries. The Board proposed to give 100 rupees to maistries of the first class, 10 in number, and 70 rupees to those of the second class, comprehending 15. Under these were four classes with rates of pay from 50 to 15 rupees. The total charge proposed was 65,100 rupees. The Commission "have no hesitation in declaring that this establishment was far too small for efficiency," and as far as appears without any warrant, they proceed to say they are "fully convinced that in thus limiting their demands the Board were actuated too much by a regard to the known indisposition of the Government to admit any enlargement of existing establishments. They deemed it hopeless to ask for a sufficient establishment, but they hoped by asking for little, to get that little." I know not how the Commission presumed to make such observations, and seeing no foundation for them, I must take the Board to have meant what they said.

Para. 560.

179. I cannot pretend to determine what addition to the present establishment is really required. I have already expressed my opinion generally that it is highly expedient to take measures for improving this valuable class of servants; that they should be better paid, and that their number should be increased. I have said that it seems reasonable that the superintendent should be put on the footing of a tahsildar in regard to pay, and that the rates proposed for the maistries do not appear to me to be excessive. I would add, that I think it very proper that there should be a superintendent of maramut in every district where there are artificial works of irrigation, upon which the revenue considerably depends, and which are of such extent as to fully occupy such an officer.*

Para. 563.

To Government,
22 August 1850.

180. It does not appear to me to be a change likely to have much effect on the respectability of this class to call the maistries foremen and sub-foremen, as proposed by the Commission. Upon a suggestion of this kind Captain Best remarked that he "deprecated high-sounding titles." This very experienced officer frequently pointed out the expediency of providing for the systematic instruction of the maistries. The plan he himself adopted with this view has been already noticed. In the letter from which I have made the above quotation, he observed, in continuation, "If a maistry's rank and salary be made dependent upon the certificate he receives upon examination by an engineer officer, he will not want motive to exertion. I would have every maistry in public employ examined, and I would reward some of those who show diligence and skill, by the gratuitous instruction, for shorter or longer periods, of their sons or other relatives or nominees." He proceeded to say, "The sum that pays a surveyor or overseer for one year would suffice to educate a maistry who would do surveyor or overseer's work for half the salary. The surveyor or overseer must then improve himself or sink below the maistry. With better superintendence for the small and less important works, the engineer would have more time to spare for the more important. The teaching of one maistry would often save the salary of an engineer for many days, and the work the instructed maistry superintends will be better and more economical than those made now by the ignorant and unskillful. The education of maistries would spread downwards as well as upwards, and would be a boon to the whole population, valuable and cheap, for it would make workmen more skillful, and dwellings more comfortable." He added, "I believe that more may be done by the systematic instruction of maistries to remedy the deficiencies that are felt and complained of, and at less cost to Government than by any other measure, excepting the substitution of engineer officers for those of other corps who now hold engineer appointments." These are

* The Commission provide equally for Malabar and Canara, in which there is no artificial irrigation, as for the districts in which the revenue is mainly dependent on such works, and for the small districts of Kurnool, as for the large districts of Belary and Cuddapah adjoining.

are important observations, coming from an officer of Captain Best's ability and experience, gained by long and varied service in the Maramut Department, as well as in the charge of the roads, especially with reference to the question of resorting largely to the aid of Europeans instead of natives in the subordinate department.

181. Besides the maistries, or foremen and sub-foremen, the Commission propose to have a class of surveyors, on pay varying from 20 to 10 rupees, at an aggregate charge of 23,900 rupees, the number being 139. I have no doubt that it will be useful to afford to the engineer officers the assistance expected to be rendered by this class of servants, but the number appears to me excessive. Para. 567.

182. The Commission propose that the duty of nominating district engineers and assistant engineers to particular districts, as well as of nominating all the executive officers to particular works, shall be reposed in the chief engineer and the Board of Works, and that the recommendation of officers for promotion shall emanate from the chief engineer, and shall be sent up to Government, accompanied by the concurrence or dissent of the Board of Works; and that the same rule shall apply to the designation of the inspecting engineers, and of the permanent executive officers to particular divisions and stations. They also propose that it shall be recognised as the duty or privilege of the chief engineer and the Board to recommend officers for employment on executive duties. I do not see adequate reason for individualising the chief engineer, and assigning to him a special privilege or function in the manner proposed. I do not think it advisable that he should have power to act apart from the Board in this or in any respect. Para. 546.

183. I think that Government should reserve the power of determining the districts and divisions to which district and inspecting engineers respectively should be appointed, but I would give liberty to the Board to recommend the arrangement which they consider advisable, and also to recommend officers for promotion. I would leave to the Board the disposal of the officers of the department under the district engineers. I would permit the Board to recommend officers from the Line for executive duties, and would authorise them to make arrangements for the examination of officers desirous to enter the department in the manner proposed. Para. 546.

184. With regard to the subordinate department, I see no objection to the suggestions of the Commission regarding the appointment and employment of men in the different grades, and their promotion, except as to the separate action of the chief engineer. Paras. 556 to 566.

185. The suggestions of the Commission in regard to the training of the young officers of the corps of engineers, both in England and in this country, appear to me judicious. Paras. 597 to 601.

186. I agree with the Commission that it is advisable to abolish the present survey school, and to make a larger and better provision for the instruction and training of the subordinates of the Public Works Department. Paras. 609 to 611.

187. The Commission propose to form a great establishment for this purpose, on the model of the Roorkee College, with some modifications. Paras. 614 to 637.

188. This Government, under date the 9th August 1850, recommended to the Government of India to take advantage of the foundation for a school of theoretical and practical instruction, calculated to form men for the duties of the Public Works Department, afforded by the school already existing, established by Major Maitland for the instruction of the Ordnance artificers under his command, by which he designed to raise them from mere manual labourers into skilful, scientific mechanics, and to give them a good sound practical education, such as workmen of all trades require to fit them to serve as foremen and overseers. I went pretty fully into the subject in my minute of the 25th July 1850, in which I endeavoured to show how well the plan of this school is calculated to furnish men thoroughly qualified for the duties of overseers in the Department of Public Works, by the combination of science with the actual practice of mechanical arts. I need not repeat what I there expressed, but I will repeat my conviction that by extending and improving this school as a Government institution, under the direction of the superintendent of the gun-carriage manufactory, with an officer of engineers, or any other officer duly qualified, to assist

in the scientific instruction of the pupils in the manner proposed, a very effectual and at the same time a very economical provision would be made for the immediate object of preparing men for this department of the service with qualifications eminently fitting them to give the engineer officers the aid they so urgently require.

189. I contemplate, primarily, the training of Europeans and East Indians in this institution, but I mean that it should be adapted also to afford to the class of native maistries the instruction which it is so necessary to impart to them; and I anticipate great advantage from their competing in the school with the Europeans and East Indians who are under instruction along with them. I have already said that I think all should be equally eligible for employment in the class of overseers, and in every rank of the subordinate department.

190. In the Minute referred to, I presumed that sanction would be given eventually for the appointment of a professor of civil engineering as a part of the system of public instruction, and I suggested that a provision might then be made for the election, from the highest class of the artificer's school, of a certain number of the students found to be most proficient, at an examination to be held for the purpose annually, to engineer scholarships, to be held by them during a course of study under the professor, by which they might acquire a higher degree of science than would fall within the scope of the school.

5 April 1853.

191. A letter has been lately addressed to the Government of India, again soliciting the attention of that authority to the scheme here noticed, and until we are favoured with the views of the Governor-general in Council on the subject, the discussion of the great project of the Commission may be deferred.

192. I have thus followed the Commission through their Report, and have given my views upon the topics on which they have treated. In doing so, I have been led on to a greater length than I anticipated when I began my review, and I fear it will be a weary task to follow me through it.

193. I think the Commission have done good service in bringing prominently and strikingly to view the importance of irrigation in this Presidency, with regard equally to the interests of Government and the people. They have done this very ably; and I think have proved incontestably the necessity of increased expenditure in maintaining, improving, and extending the works of irrigation, and carrying out the system of making the waters of the rivers available for this object, which has proved so successful on the Cauvery and Coleroon, and now on the Godavery, the works on which are notable examples of the profit to be derived from well-contrived projects of that nature. The peculiarity in the revenue system of this Presidency which gives Government a special interest in the improvement of irrigation, and the peculiarity of climate which makes irrigation extraordinarily valuable here, are well stated and forcibly applied. I am free to own that I have been led by the representations and arguments of the Commission to take a larger view of the duty and responsibility of Government in this behalf, than I had previously entertained.

194. I must say the same with regard to roads and communications. I have become more sensible of the importance of opening the country by this means, as the most effectual method of drawing out its resources, and more conscious of the obligation upon Government to lay out money liberally in the formation of roads and canals with a view to the promotion of commerce—more confident, at the same time, of a return for the expense in the improvement of the revenue, an improvement distinctly appreciable in the case of the revenue from salt—and not less certain, though not so obvious, as produced indirectly, in the revenue from the land, the grand resource of Indian finance.

195. I am persuaded that it is only by simultaneous efforts on a great scale, in the improvement and extension of irrigation, and in facilitating the transport of produce by making good roads and other communications leading to the principal marts, and especially from the heart of the country coastward, that we have reason to expect any augmentation of the public revenue, if indeed, without such means, it can be maintained at the present standard. By such efforts I am convinced that we may not only maintain it, but largely augment it, with infinite relief to those from whom it is raised; that not only will the cost be recovered

and

and the revenue permanently secured, while the people will be eased and put in the way of acquiring wealth, but that with the same benefit to the people, the finances of the State will be growing and a large profit accruing.

196. With such convictions, I concur with the Commission in advocating a greatly increased expenditure annually on these reproductive works. It has appeared to me, however, on grounds which I have stated, that the Commission have formed extravagant estimates of the expenditure required, both for irrigation and for roads, &c., especially for the latter, with regard to which they propose a scheme which I conceive to be utterly beyond what is called for under present circumstances, and in truth impracticable.

197. The expenditure which I propose is large when compared with what has hitherto been laid out; but I am satisfied that it will be for the advantage of Government to incur it, as soon as it has at its disposal a sufficient agency for the construction of works on which it will be profitably employed. I think it of such importance to follow out the scheme of improvement proposed steadily, without intermission, that I agree with the Commission that it is expedient to raise the necessary funds by loan when the surplus revenue may from any temporary drain be insufficient to afford them.

198. I have been led to agree with the Commission that the management of the roads and communications, and the works of irrigation should be combined, and that as the charge of both could not possibly be attended to by the Board of Revenue without prejudice to the proper business of that Board, it is necessary to provide otherwise for the superintendence of these departments; and I concur in their opinion that it is advisable to constitute a new Board of Works, to take charge of those departments, and of the buildings, &c., now under the management of the Military Board, confining the duties of the latter to the Ordnance Department. I further agree with the Commission as to the composition of the new Board, except that I think that it will be sufficient to appoint one engineer officer to be a member of the Board, besides the chief engineer, who is to have a seat at it *ex officio*.

199. With regard to the agency under the Board, while I agree with the Commission that it is greatly inadequate at present, and must be largely increased, I have not been able to concur entirely in their views as to the extent of the increase, either in the commissioned or subordinate ranks, or the manner in which it should be provided for. It has appeared to me inexpedient that Government should continue wholly dependent on the military corps of engineers for the supply of the officers required for civil engineering. In recommending therefore that the military corps should be increased, I have suggested that the increase need not be carried to the extent required to provide for all the appointments which should be filled by scientific officers, but that a proportion might be left to be supplied by civil engineers sent from England, and by officers of the artillery and the line, and any qualified persons that may be found out of the service.

200. With regard to the subordinate agency, I have been unable to subscribe without reserve to the scheme submitted by the Commission, which it appears to me has been drawn on an extravagant scale.

201. I concur with the Commission in thinking it not only expedient, but necessary, that some provision should be made for the instruction and training of men to fill the subordinate offices in the Department of Public Works, but I am not at present prepared to adopt the scheme they propose for this object, deeming it proper to wait for a communication of the views of the Government of India on a project some time ago submitted for raising a Government institution for the same purpose, on the foundation of the existing school for the instruction of artificers, established by Major Maitland, Superintendent of the Gun Carriage Manufactory.

202. Having thus briefly noted in a general way the principal points on which I agree and disagree with the Commission, I wish I could at once conclude my Minute. But while amply acknowledging the merit of this Report, and giving the Commissioners the praise they well deserve for the ability with which it has been drawn up, and the lucid manner in which they have explained the existing system, and expounded their views of the reforms they deem requisite, I think it

my duty as a member of this Government to animadvert upon the extraordinary tone which the Commissioners have thought proper to use in reference to proceedings and orders of the Government, and the principles and views ascribed to it, a tone of presumption and disrespect which seems to me to call for rebuke.

203. In the course of my review of the Report I have noticed, as they passed before me, some individual instances of studied reflection on the Government, which an exact statement of the case would have shown to be unfounded; and they are not the only instances of exaggeration and misstatement that might be pointed out. It is with great regret that I advert to these blemishes, which disfigure and discredit a work that would otherwise deserve unqualified praise.

Fort St. George, 19 July 1853.

D. Elliott.

POSTSCRIPT.

Para. 158 above.

In the 144th para. of the above Minute, I have said that, for the reasons assigned by the Commission, I concur with them in preferring a Board to an individual officer for the control of the Department of Public Works. I would now add a few words to explain more particularly my views on this very important point. In considering under what control it would be best to place this department, I have had especially in mind the two elements of which it is constituted in the Maramut branch, which is incomparably of most importance, viz., the officers of revenue, and the civil engineers, and the agency subordinate to them respectively. We have seen how intimately the Maramut works are connected with the Revenue Department; that in fact the general management of the sources and channels of irrigation rests, and must rest, with the collectors; we have noted how large a part is performed by the revenue establishments in the execution of such works as are planned by the civil engineers, while the great bulk of the ordinary work which is necessary annually for the repairs which are indispensable for keeping the reservoirs and channels in efficient condition is done by them exclusively. Seeing how deeply the collector is interested in the conduct of the Maramut, upon which the prosperity of his district so essentially depends, and how extensively his revenue establishment is engaged, and must of necessity be engaged, in carrying on the ever recurring operations which it requires, he must be looked to as the head of the department. I hope that in future there will be allowed to every district a civil engineer and an assistant; but according to my view they will be the professional staff of the collector, subject to his authority in a general way, and bound to give him their professional assistance at his requisition, but not liable to be interfered with by him in the actual performance of what is of a strictly professional nature. Now the practical question is, how can a department so constituted be superintended and controlled, so as to secure to the controlling authority due respect and deference, to give it a due command over the executive, that it may be able to keep each of the branches in its proper place, and preserve that harmony of co-operation between them, which is essential to the orderly and efficient conduct of the department as a whole. It appears to me that the solution to the question is to be found in a Board constituted as proposed, consisting of an able and experienced revenue officer, to whom the collectors will be prepared to yield deference, and of a select officer of engineers eminent for his professional skill and experience, and thoroughly conversant with the practice of the department, in whose judgment the local engineers, and probably not less the collectors, will be ready to acquiesce; aided in professional questions by the head of the engineer corps, whose position will give him authority with the officers belonging to that body. And I do not see how it is to be found otherwise. If it be proposed to place the department under the superintendence and control of an individual, he must of necessity be an officer of engineers, for professional knowledge would be an indispensable qualification; and I think it is not to be expected that the collectors would submit with due respect to his sole authority. There would, I fear, be endless contentions between them, which would never be settled without the intervention of Government. It would be worse if there were no general superintendent, and the Presidency were distributed in four grand divisions, with a superintendent to each; for the superintendents of divisions would mostly (all but one, probably) be of lower rank, and would, it may be presumed, carry less weight personally than an individual selected from the whole body of scientific officers. Under either of these arrangements for indi-

vidual superintendence, there would, I apprehend, be a failure in the government of the department. I doubt very much whether anything would be gained in the dispatch of business. I have supposed that, with a Board constituted as proposed, the business would be divided between the two ordinary members; the engineer officer taking the conduct of the business that is purely professional, and superintending the correspondence with the professional officers, who communicate directly with the Board, and the civil member taking charge of the correspondence with the collectors, and the communications with the Board of Revenue, and also of the accounts which do not require a professional revision. I think that promptitude in the disposal of business would thus be better obtained in a Board by a regular division of labour in all the details of a nature not calling for consultation, than through an individual superintendent, who must give his personal attention to every part of the business. I feel confident that the correspondence with Government would not be diminished, but increased, by the substitution of one general superintendent, or four superintendents of divisions for a Board, for the reason I have already given, that references to Government would be more frequently called for to settle questions between the superintendent and the collectors, and the local agency. If there were four superintendents there would be a tendency to diversity of system, and Government would find occasion to maintain a closer oversight, in order to restrain that propensity and preserve uniformity. The Government would to some extent be obliged to take the place of the Board for this end. These considerations and others relating to matters of detail, which I need not here enter upon, confirm me in the opinion before expressed, that it is advisable to commit the superintendence of the Department of Public Works at this Presidency to a Board, with reference especially to the union of the management of the Maramut with the administration of the Land Revenue.

19 September 1853.

D. Elliott.

MINUTE by the Honourable *J. F. Thomas, Esq.*

Para. 1. Before entering upon an examination of this Report in detail, I will offer a few preliminary remarks upon its general character and tone, in support of the opinion expressed in my Minute of 12th April 1853.*

* See also Appendix A.

2. A further examination has confirmed me in the opinion, that the Report is chargeable, so far as it relates to, and purposes to set forth, the views and proceedings of this Government in past years, with misrepresentation, however unintentional, whilst there prevails throughout, a tone of exaggeration, and an undue appreciation of the merits and services of the existing civil engineers department, neither justified, in my opinion, by the records, nor by experience.

3. As an example of the mis-statement referred to, I quote the following passage in para. 225, in which it is asserted, that though professing to approve of outlays for the improvement of the country, yet the view practically acted upon by the Government has been, that "all expenditure is an evil." And again, in para. 18, it is alleged without qualification, that this Government "has never duly recognised the importance of improving the communications of the country;" and that "an expenditure on the roads has almost always been an unwelcome subject." Against such representations of the views and proceedings of the Government of this Presidency, for many years past, I can only enter my protest, and declare them to be unfounded.

4. It is difficult indeed to understand if the records of Government had been fairly examined by them, how the Commission could permit themselves to record these statements. They had before them the fact, that in 1844, the then Head of this Government, Lord Tweeddale, had placed the question of roads in this Presidency in so strong a light before the Home Authorities, as to obtain a grant of 4 lacs per annum, to be laid out upon trunk lines alone, and not to be subject to the control of the Government of India. And in consequence, although the department took unavoidably some time to organise, and has been comparatively but a short time effective, sums to the extent of 23 lacs of rupees have been already sanctioned by Government for trunk roads, independently of

considerable sums for other roads. So little foundation is there for the statement, that "all expenditure on roads has been unwelcome;" and so far is it from the fact, that this Government has never duly recognised the value and importance of the communications of the country. They assuredly did most fully appreciate their importance—not less fully than the Commission.

5. In like manner the Commission wholly mis-state the facts, in declaring, that all expenditure was deemed by this Government "an evil." The following were the views of this Government recorded in 1848, and urged upon the Government of India, in reply to a despatch pointing out the necessity of rigid economy. I give them here at some length, as they will clearly show that there is no foundation for the statement of the Commission, that this Government has been always opposed to a liberal expenditure upon public works, especially when it is considered that the Government had previously proposed (1845) to the Court of Directors, the construction of the large and costly work, the Godavery Anicut, to which was added subsequently, in 1848, that of the Kistnah.

Letter to the Government of India, 3d January 1848, para. 21: "The Government of India in closing their letter, state their concurrence in the views expressed by the Honourable Court, and urge upon this Government, 'the duty of sparing no exertion to bring the public expenses down to the level with the public income, and the absolute necessity which exists for the adoption of the utmost economy in all branches of the administration.'" In paras. 19, 20, and 24, this Government expressed their views as follows: "The point to which this Government would desire to attract the attention of the Supreme Government, is, that the returns submitted show an almost stationary or very slowly advancing land revenue during the last 30 years. This may be deemed unsatisfactory, considering the general security, and the peace which has prevailed in Southern India for years past. It is no doubt in a great measure to be ascribed to the peculiar circumstances of this Presidency, which labours under the disadvantage of the want of navigable rivers, and of roads and means of interior communication. These deficiencies cramp and even preclude a development of its sources of prosperity, and forbid the increase of the revenue. They limit the products of the soil to the common grains and other articles for home consumption alone; and whatever natural capability there may be for raising cotton, sugar, &c., or other raw produce for the British market, this Presidency is in a great degree disabled by these disadvantages from competing with other countries in the markets of Europe."

"The remedy is plain: and is in the hands of the controlling authorities themselves. They have only to sanction, and provide efficiently for the early construction of good and permanent communications from the inland districts to the coasts, and throughout the country; and to encourage the influx of European skill and capital, applied to the improvement of the indigenous cotton or sugar cane, &c., or to the raising a foreign and better species, by judicious and well-considered leases to *bond fide* capitalists on favourable terms, similar to that granted to Messrs. Arbuthnot & Co. in Vizagapatam, and to Mr. Hutson in Malabar, and by perfecting the works of irrigation on the Godavery, and constructing similar ones on the Kistnah; inducing at the same time the influx of British capital and its outlay in such projects as the Arcot Railway, (which would indicate a desire on the part of the Government for improvements,) and the Presidency will prosper. By these means, which would not require a very large annual outlay, for the progress of the works must be gradual, the country will at an early date advance steadily, if not rapidly; and it is not easy to understand why measures of this nature, involving comparatively so small an annual expenditure, should be postponed."

"Adverting to the facts that the land revenue is still increasing, rather than diminishing, and that a large saving has been lately made in the civil charges by the abolition of the provincial courts and of principal collectors, the Government of Fort Saint George sees no sufficient foundation for the further statement, that Madras must be dependent on external means for support. And whilst this Government would counsel a wise economy in all branches, it is of opinion that a considerable outlay of its revenues at this time on internal improvement, even if there were no surplus, would prove in the end a more sound policy, and more beneficial to the finances, than any other course; and they

they would deprecate the view of its financial state taken by the Honourable Court and by the Government of India, chiefly from the apprehension that it might lead to restrictions greatly calculated to retard its general and its financial prosperity."

6. The foregoing views are those which have guided me in my duties as a Member of the Government for nearly four years; and I am not prepared, by silence, to give countenance to the mis-statement of the Commission, nor to leave it to be supposed that the Government has been at all times adverse to a large and wise expenditure of the revenues in developing the resources of the country.

7. I will now proceed to examine each section of the Report separately, avoiding, as far as practicable, the notice of minor points; for I fear these papers are already too voluminous.

Section II.

8. I concur with the Commission, in their representation of the present unsatisfactory condition of the Department of Public Works under the Board of Revenue; but I think their statements in this Section are too often loose, and deficient in accuracy.

9. Take for example their assertion, in almost their opening paragraph,* * Para. 6. that "the whole of the territories of the Madras Presidency carry on their cultivation in great part by means of artificial irrigation; the waters for this purpose being obtained either by channels taken off from the rivers, or by the tanks or reservoirs." The truth being, that it is only a few districts which thus depend so greatly on artificial channels and tanks; whilst some of our largest and most important provinces (as will be seen by the following data) scarcely depend at all, for their cultivation on such artificial irrigation as channels and tanks. It is also well known to those acquainted with this Presidency, that the food of the great mass of the people in our inland provinces, is chiefly raised by dry land cultivation. A fact of itself, showing that the statement of the Commission cannot be correct.

10. The facts are as follows, in 1851-52.†

† See Appendix B.

1. "Guntoor" had lands under tanks and nullahs, but 21,408 acres. Under other cultivation, 7,19,004. This manifests how little the province was dependent on artificial irrigation.
2. "Bellary" had 18,95,717 acres under cultivation, of which, under tanks and nullahs, but 90,690.
3. "Cuddapah," another large province, had 12,89,073 acres; of which 87,006 only were under artificial channels.
4. "Salem," 7,11,886 acres; under tanks, &c., 51,384.
5. "Coimbatore," 14,23,429 acres; under tanks and channels, 67,761.
6. "Kurnool," 4,53,156 acres; under tanks, &c., 6,973.

11. The above districts form a large portion of the Madras territories, and the data given, though not to be taken as accurate to an acre, are sufficient to demonstrate with what a want of precision statements are made by the Commissioners. It is this exaggeration, which runs through their report, to which I have adverted in the preliminary remarks.

12. But though I cannot follow the Commission in these and other statements, I entirely agree with them in the conclusion at which they have arrived, as expressed in para. 23, that the Board of Revenue in the Department of Public Works is essentially defective, and unequal to the duties of the department.

13. They state the case as follows: "And the cause of these deficiencies is not difficult to discover; it lies undoubtedly in the fact that the Board is physically utterly unequal to the various duties required of it. It is primarily a Board of Revenue, and its duties in connexion with the Public Works of the country, highly important as they are, have always, and unavoidably, been regarded as supplementary and subordinate. The revenue duties are fully sufficient to occupy the whole time of the members, and they are unable to give more than a very limited amount of attention to the Public Works Department. It is true that the chief engineer has a seat in the Board in that branch of its

business, and, nominally, he is the professional head of the department; but he has, besides that, two other offices to attend to, his own, and the Military Board, in which also he has a seat; hence he also, though he gives his written opinion on new projects agreeably to the orders of the Honourable Court, has but little time to give to the general business of the Board, or to devote to the improvement of the department."

14. It is obvious here to remark, that if such has been the real state of the Board for years, as I am satisfied that it has, the alleged efficient working of the department, as averred in para. 21, in which all errors and "misfeasances" charged at different times upon the Board are declared to have no foundation, can scarcely be correct. It seems to me indeed incredible, and contrary to the nature of things, that a Board "utterly unequal to its duties," and giving "little attention to them," with an inadequate ministerial establishment, should be free from all the omissions and oversights charged against it; yet this I understand to be the assertion in para. 21, and that the Commission maintain that the Government and the Honourable Court have been throughout in error in all their animadversions. I am unable to reconcile the statement in paras. 21 and 23, whilst those in para. 21 are, in my opinion, refuted by the records of Government.

15. As an instance in point, it will suffice to refer to the circumstances attendant upon the destruction of the first Bowany Bridge, as I view the records. It was then explained to Government by the Board, that one officer of engineers had designed the structure, but had not fixed the exact site, nor ascertained the true width of the river; that another, pursuing the same course, had estimated for the bridge; and a third commenced building, laid the foundations insecurely, and in order to make the bridge span the river, added, of his own authority, two additional arches, but to include them in the cost sanctioned, he reduced and weakened the buttresses. Upon the first trial of its strength, not merely the arch injured, but the whole structure fell like a pack of cards, owing, I believe, to these defective proceedings of the several civil engineers.

16. I am also equally satisfied that the loss at the Yenamaikal dam, another costly work, might and would have been avoided if the Board had been efficient and exercised a careful supervision or control, for this work would not then have been allowed to go forward in incompetent hands. The Government, at the time, condemned the Board in the latter case. I give these instances as two out of several which occur to me, and I must be allowed to express the opinion that the statement of the Commissioners merits little confidence.*

* See Appendix C.
"Memo."

17. Further, in addition to their remarks upon the total inefficiency of the Board of Public Works, I agree also to a great extent with the Commission in their view (para. 34), that one of the chief defects of the department is the limited number of engineer officers; I should however especially add, of the class proposed in the minute of the Most noble the President upon this department in August 1846.† I shall quote that minute at some length, as it exhibits, I think, a just view of the prominent defects and wants of the Department of Public Works. The only point in which I could not concur is in the salaries to be assigned to executive civil engineers, which I think too low to secure the class of men needed.

† See also Appendix C., as above.

18. After pointing out that the first and chief defect was the absence of real individual responsibility, it was added, "I will now touch upon the second part of my objections to the present constitution of the Department of Public Works.

"Under the present system there is no adequate supervision in the execution of works for irrigation, or in the great bulk of the repairs. Works are suggested, and estimated frequently without any reference whatever to any scientific officer, by parties wholly incompetent to form any opinion as to their necessity or advisableness, and by whose want of skill and judgment I have reason to believe much of what is laid out is now expended in vain; and even in the works projected by scientific men under the present system, the same result is seen. Minor works are executed by parties ignorant of any but the rudest methods of construction, and wholly without any scientific aid. In larger works the collector of the district and the engineer stand in such anomalous relations to one another, and there is such a confusion of duties and responsibilities, that it were vain to make either really accountable for the result. The engineer has the sole ability, and

the collector has the sole power, and between the two the natural consequences of the divided responsibility are delay and inefficiency. Finally, there is no check in such a case; the same officers who have thus guided the operations of a large work are the sole authorities by whom its successful completion can be attested, and who can make a report of it to the Board. I would propose to alter this. I would desire to see a system established, and such a constitution of the department made, that all the expenditure of the public funds should be made under judicious and scientific direction, and that there should be a proper series of checks. My proposal would be, therefore, that the duties which the collector now performs in the large expenditure of public funds, with no assistance except that of his native servants, he should hereafter invariably discharge by the assistance of an engineer officer; I would propose that each collector should have an engineer officer attached to his district as an executive Maramut engineer, who should undertake on his behalf, and under his orders, all the outlays now made by the collector in the Department of Public Works. It would not be necessary to have officers of very high standing or salaries, on account of the other parts of the arrangement which I shall presently allude to, but I would recommend that a salary of 150 rupees per month, in addition to tent allowances, be given to the nine most important collectorates, and 100 rupees, with the same addition, to the rest. I would keep about the same number of civil engineers as at present, giving them the supervision of the executive works performed by ordinary engineers. By this means, and with the addition of a supply of the non-commissioned subordinate assistants lately promised to be sent out annually by the Honourable Court, we should be able to transfuse into the native agency a mass of European science, energy, and intelligence, and practical skill, which could not fail to tell powerfully upon the effects of their industry.

“These subordinate executive engineers should not be liable to be removed for military duty, but when once attached to the Public Works Department they should be considered altogether as in civil employ. Without this provision it is obvious that the efficiency of the system might be at any moment destroyed, and the experience gained in the duties of a civil engineer lost to the one branch of the service, whilst they could be of no use in the Military Department.

“The additional expense of such a constitution of the department would be saved, not in the diminution of the outlay upon the public works, but in the threefold usefulness derived from them, and in the means of insuring that the large outlays annually made should not, as at present, be too often thrown away.

“Let the cultivation of the sources of the revenue be once taken up in earnest, not as a secondary thing, but, as it really is, one of the chief and most important objects of the solicitude of the Government, and I have not the slightest doubt but that all objections on the score of expense will speedily vanish before the obvious results of the system.

“I will not enter here into the details of the system which I propose should be established further than to say, that the executive engineer attached to each collectorate would be essentially the executive officer for all works executed in that district; he would, in more important works, originate plans and estimates, and send them through the civil engineer of the division to the Board, the projects being thus, on their passage, subjected to the local check and scrutiny of the experienced scientific local officer, and finally submitted to the two officers at the head of the department. This I cannot but think would be found more advantageous than the present arrangement.

“Out of the body of such executive engineers thus constantly employed there would be gradually raised a school of really experienced men upon whom Government could depend, and from amongst whom, as vacancies occurred, a selection would be made from time to time of the most experienced to rise to the office of civil (divisional) engineers. We might thus hope, by keeping a larger body in constant training, to be ever ready to fill up those most important posts with men of undoubted qualifications; a thing which at present it is of the utmost difficulty to effect at any sacrifice, and which it is quite impossible to combine with the necessary regard to the fair and equitable claims of the commissioned officers themselves to higher employment in other branches; and through their instrumentality an amount of superior practical knowledge would be diffused through the native subordinate agency, of vast importance to the community generally.

"The number of collectorates in this Presidency being 19, the number of effective engineer officers necessary to be employed in the civil establishment on the system I propose, would be 19 executive engineers, and allowing a civil engineer to every two or three collectorates, probably a total of 28 always on duty. If an allowance of one-fifth be made for absentees, we should require a body of 34 officers for the revenue branch of employment, exclusively of the exigencies of the military branch.

"I have thought it my duty to enter into the above brief calculation, because from the remark made by the Honourable Court upon this subject, it would seem to be understood by them that all the necessary wants of the Revenue Department in engineer officers would be fully satisfied were 16 set apart for appointment to the eight divisions; whereas I am of opinion that the experiment is not fairly tried until a proper and efficient system is established and fully brought into action, and that to attain this a larger number of officers will be necessary than the Honourable Court originally contemplated."

19. Should the proposition here made, for giving each collectorate an intelligent civil executive engineer, permanently attached to the district, and competent to instruct and raise up a body of good native workmen be carried out, more would, in my opinion, be done for the department than by any of the recommendations of the Commission.

20. I may here point out, by an example which has lately come before the Government, my view. The Neilgherry Barracks, now under construction, were necessarily planned for a lower story alone, though not recommended as the best for that climate by the military authorities. It has been resolved that they shall now be an upper-storied building. This has only become practicable since skilled builders, brickmakers, &c., have been obtained from the European regiments. Till their practical skill was obtained, the officers of engineers have never, during the last thirty years, made, nor could they ever procure, either a really good solid brick or tile on the Neilgherries. They were indeed of opinion that clay of the requisite quality could not be found, and they have been compelled in consequence, for years, to build with very inferior materials, for they did not themselves possess the practical knowledge to remedy the evil.

21. This want in the Civil Engineers Department, viz., superior practical knowledge, cannot be supplied by adding to the corps itself. The scientific young officers who join it will be no more qualified to direct or superintend the native maistry or workman in his business than the present intelligent officers now serving, and the department will not benefit by the addition of any number of such officers, as it would by the introduction of a superior and practical executive civil engineer, such as proposed in the foregoing minute. It is this class which I think to be so greatly required, and without which the department will always be most defective.

Para. 34.

22. I observe in the paragraphs (34-6) under consideration, which refer to the civil engineers and their duties, the same inconsistency before commented upon. The civil engineer of a division, it is pointed out, has an extent of charge and duties averaging "16,000 square miles," and "10,000 works," with other routine calls upon his time, which it is justly observed he is "unequal to." At the same time the Commission would have us infer that the shortcomings and defects in particular cases, when noticed by Government, have no existence. The two statements cannot stand together, and there can be no doubt that this branch of the department has been very inefficient, from the paucity of officers and their practical inexperience. And it should have been added also, in some cases, from neglect or indolence on the part of engineer officers,* so that the public works have been neglected or ill executed.

23. Such an addition to the corps of engineers is, I think, required, as may always leave an engineer officer with two assistants in each division. This addition, with an executive civil engineer permanently attached to each collectorate,

* The recent communications from the Board of Revenue, as respects the officers lately in charge of the second and fifth divisions, show their neglect and inefficiency, as well as the inefficiency of the Board as a controlling authority.

torate, would supply the ordinary wants of the department, and I would limit any increase to this extent.

24. An additional number will still be required for other duties of the corps, such as to provide for the corps of Sappers and Miners, the military divisions at Hyderabad and Kamptee, &c., but to what extent I am not prepared, nor is it necessary to offer an opinion.

25. On the further points discussed in this section (II.). The subordinate agency of the department, the revenue surveyors, the European overseers, and the native maistries, I have only to record my agreement in every point with the Commission, and especially as to the importance at the present time of the European subordinates. The testimony borne to the value of the trained European workman, and the saving arising therefrom, fully confirms the remarks offered by the late President in 1846, quoted above.

26. We see that in one instance (Report, p. 48) the work of a properly qualified foreman, even when compared with other European overseers, produced a saving of 15 per cent., and was better work at the same time. The Commission thus state the fact:—"In all the foregoing cases the estimates appear to have been made at the usual rates, and it is unlikely that there would have been much to spare from them under the common superintendence. It may be asked, then, to what cause is the saving to be ascribed; is there really this amount of cheating under ordinary circumstances? We believe not; cheating and peculation to a certain extent are no doubt practised in maramut works, but a large part of the saving effected by means of European superintendence is ascribable to other causes, besides the mere prevention of direct fraud. The skill of all classes of workpeople in this country is at a low point, and their tools are bad; again, all of them are much disposed to loiter over their work, and especially when they are working in large bodies. Now an active intelligent overseer will correct all this, and to this cause we believe a great part of the result of their employment is due. Thus Captain Best, speaking of bridges built by one of his overseers (Brown), states that by good workmanship and good management every cubic yard of masonry built by him consumed much less chunam and employed considerably less labour than the work even of other overseers, so that there was a saving of 15 per cent. in the cost of the work (even compared with that of other overseers), while the work was much better, because the joints were closer." Nothing could more forcibly point out the advantage of the practical knowledge of a civil engineer well trained.

27. I also most fully participate with the Commission in the regret they express, that the European overseer has been deprived for a long period in this Presidency of advantages possessed by others of his class in the other Presidencies, but I do not doubt but that this will be remedied when the whole subject comes before the Government of India. I would urge this point the more, as it is scarcely possible to overrate the importance of giving due encouragement to this class of men. I am convinced, with the Commission, that the remedy for nearly all the evils in the details of the department is to be found at this time solely in the larger employment of this class, when superintended by well educated civil engineers.

28. It is also, I think, chiefly through them, by their influence and example, and by his associating with them, that the native workman or maistry will rise in efficiency and in character. I most cordially concur therefore in their recommendation and remarks on this head, paras. 43-64.

29. There cannot also, I think, be any doubt as to the value of the further recommendations, in paras. 73 to 89, for the improvement of the class of native Maramut superintendents or maistries. I would hold out, as the Commission propose, every inducement to this class to improve, and I would advance them both in pay and position to the utmost whenever found qualified.

30. I shall not enter at length upon the questions discussed in paras. 93 to 108. The real point at issue is, whether it is the best and wisest policy at the present juncture, when the department is under-supplied with officers, that they should be employed each year in going hastily over the whole extent of their too extensive charge, and doing nothing thoroughly for want of time; or

whether, as the Government suggested, they should give their time in alternate years more exclusively to one district of their charge, and thus be enabled to overlook, with a care and efficiency now impossible, large and costly works executed under very imperfect supervision. I should not agree in the view the Commission take of the proposed rules in the existing state of the department. And I should have been glad if the Government had before them not only the opinions of the Commission, but those of the civil officers, as well as of the engineers in the provinces. I much doubt if they would concur with the Commission.

Section III.—*Trunk Roads.*

* Para. 132, Section III.

31. I am quite unable to agree in either the statements, or in the views in this section. The representation here given of the intentions and orders of Government in constituting the department of the superintendent of trunk roads, and of the instructions issued for the conduct of the department, appear to me rather a laboured perversion than a correct exposition of the facts of the case. Equally incorrect do I consider the statement,* more than once repeated in this section, that the department has been a "complete failure." The reverse can, I think, be proved. I am also of opinion that it can be shown that the orders and proceedings of Government, from 1845 to 1848, commented upon by the Commission, were practical and judicious.

32. For what were those orders, suggested in part, as the Commission observe, (para. 132), by Captain Best himself. The orders of Government, as I understand them, were to this effect: That one uniform system should be enforced in the Road Department; that to this end all trunk lines should be placed under one officer, not removable for other duty, thus securing individual responsibility and practical experience for the department, and constant attention to the state of the roads, providing thereby for their timely and perfect repair. That the lines should be constructed and the department enlarged gradually. That the lines and works were to be undertaken as the superintendent and his subordinates could properly supervise them, and consequently that he should confine himself and the department, in the first instance, to three great lines.

33. There does not seem to have been any difficulty on the part of the Honourable Court, in apprehending the views of the President, which are thus given in their despatch approving the scheme, and I am at a loss to understand why the Commission should have so mis-stated them.

Despatch dated 23 September, No. 38 of 1845.

"We approve of the suggestions for that purpose offered in your President's minute of the 21st of January last. Lord Tweeddale proposes that an experienced officer of engineers, with an assistant attached to him, should be entrusted with the control and management of the great trunk roads, and that the collectors and district engineers should have charge of the branch roads. His Lordship also proposes that a sufficient number of overseers for the constant superintendence of road repairs should be placed under the several engineer officers.

"The lines of road of chief importance are stated by the chief engineer to be the following:

- "1st. The western road to Mysore to be completed, and provision made for keeping it in thorough and permanent repair.
- "2d. The southern road to Trichinopoly, ditto.
- "3d. The northern road, with the connecting line to Cuddapah and Bellary, thus opening up a more direct communication with those large fields of cotton and indigo."

* Captain Best named 15 years for the construction of the nine trunk lines. † See para. 649, 132 & 257.

34. Yet these orders for the gradual progress* of the trunk lines, and for placing the whole of the lines under one head and system, and for carrying them on under efficient and *bond fide* superintendence, are represented by the Commission,† first, as impracticable, inasmuch as they gave a charge of some hundreds of miles of road to one head, and so overwhelmed him with duty, overlooking the fact that if there was to be one uniform system, that there must be one head, and forgetting at the same time that it was proposed that time should be given for the work, and that the whole department was to be gradually extended and enlarged. Again, it is on the other hand alleged, that the instructions so limited and crippled the superintendent, that the department was rendered almost useless, its agency being confined to so few roads; forget-

ting equally, that if the work in the department was to be thoroughly done, and experience acquired to warrant its enlargement, it must be by a gradual progress; and that this was the precise object of the orders of Government in limiting the superintendent's field of labours in the early stages of the department.

35. The course prescribed is, in my view, the proper course to be followed; and anything but unwise and impracticable. The Commissioners themselves, if they were called upon to lay down a system for the improvement of the harbours of this coast, as adverted to by them in para. 426 of their Report, would no doubt propose this identical course. Of commencing upon some one or two in the first instance, training assistants, and gaining experience, and so carrying on the work gradually; whilst they would probably, at the same time, propose that some one officer, best qualified for the task, should have the general charge of the whole.

36. I confess I am unable, therefore, to perceive either the justice or the force of their remarks throughout this section. They would, I think, apply to, and condemn, every large scheme intended to be carried to completion systematically and gradually.

37. But to advert now to the facts. The Commission themselves have fully admitted that, prior to the date of the appointment of the superintendent of roads, and of the formation of this separate department,—that is, so long as the roads were under the charge of the Board of Revenue, Department of Public Works, and of the Civil Engineers,—nothing had been done through a long series of years, and that at that time the whole country was without a good road in any direction. What are now the facts? Though the Road Department has been constituted but a few years, and it early lost the assistant engineer appointed to it, through illness, and some time back the superintendent, Captain Best; and although, necessarily, much time was at first given to the mere organisation of the department, yet these are, at this hour, the results, taken from the latest Report laid before the Government, dated 28 June 1853.*

* Appendix D.

38. In the seven years from 1 May 1846 to 30 April 1853, the estimates sanctioned by Government for this one class of roads amounted to Rupees 23 lacs, and upwards; † and the superintendent reports, that satisfactory progress has been made in all the works in hand under the department. He thus speaks (para. 6) of the condition of Trunk Road No. 1, the most important line, and the extracts show the great advantage of systematic attention, and of the experience gained by placing these most important works under a separate and independent charge.

See Superintendent's Report, para. 48.
† 23,33,809 rupees.

“Probably the best criterion of its improvement may be formed from the trifling extent of damage it sustained during the late very severe monsoon, compared with former years, as mentioned by Captain Best, in his general report of the department, to the 1st October 1848. The gradual improvement may be dated from the monsoon of 1846, during which no fewer than 11 bridges were destroyed; these having been substantially rebuilt, all the smaller tunnels and culverts carefully strengthened, others added to admit of the passage of water where necessary, and proper attention, as before stated, having been paid to the side slopes and drainage, I feel sanguine that, with the additional metal now being laid on, the present annual allowance of 39,178 rupees will be found sufficient to keep the surface of the road in good order for some years to come.”

39. It will be further seen that the Government, notwithstanding the great difficulty experienced in finding qualified assistants, has lately strengthened the department. ‡

40. These statements, and the report throughout, § entirely disprove, in my opinion, the reiterated assertion of the Commission, that the department has been a total “failure,” as well as the prior assertion, that the Government have never recognised the value of roads. I cannot view these allegations but as a misapprehension

§ Appendix D.

‡ The superintendent thus gives the facts: “The establishment for European superintendence, which, on my first joining the department, consisted of one superintendent, three assistants, one assistant supervisor, and 14 assistant overseers, in all 19, has now been increased to one superintendent, five assistants, one second assistant, one assistant supervisor, 21 overseers; in all 29.”—*Superintendent's Report, para. 51, Appendix D.*

prehension of the facts; and I should consider the abolition of the department, or any alteration, except to strengthen its executive, as calculated to retard, if not put a stop to, the effective progress now making in this branch of the Public Works. I will refer for a further statement of my views to the minute recorded in March 1852,* on the proposition then made by the Commission, to transfer this department to the existing Board of Revenue, even though they declare that Board "utterly unequal" to its actual duties; and although they were fully aware that, under it, nothing had ever been permanently done for the roads of this Presidency.

* See Appendix E.

Section IV.—*Military Board.*

41. I have very few remarks to offer upon this section. I have known, and I may add, have carefully observed the proceedings of the Military Board for several years past, and it has always appeared to me as peculiarly inefficient. The most ordinary and trifling matters take weeks for their disposal; and delay, with ineffective supervision, are, so far as I can form a judgment, the marked characteristics of this Board.

42. Its composition seems to me essentially defective. The official members, who have a voice on all questions equally with the stipendiary members, have other important duties. Those in the Board may be secondary in their estimation; they feel, therefore, that they are not responsible for the acts of the Board, nor does their public character depend in the least on the efficiency of the Board. On the other hand, the stipendiary members, not having the sole direction, they are not responsible; and in point of fact, the Government has not the power to fix responsibility upon any one; consequently it can neither stimulate the exertion nor secure an effective performance of duty.

43. This division of the Board into official and stipendiary members, leading also to continual changes, is, I believe, in itself a source of delay; independently of the fact, that the commandant of artillery, the senior member, resides of necessity at St. Thomas' Mount, and there is nothing in his former service which qualifies him to take the lead, nor any part in the despatch of nine-tenths of the business devolving upon the Board; and even the stipendiary members, unless they are officers who have been its secretaries, have ordinarily no special knowledge or qualification to fit them for the duties. I see no prospect of improvement in this department of the Public Works, but by the abolition of the Board, and by placing its several departments under officers conversant with the duties entrusted to them; upon whom actual and individual responsibility will rest, with whom the Government therefore can deal if the department is inefficient.

44. I should not consider it at all probable that any modified arrangements in detail, such as those suggested by the Commission, would effect anything of moment so long as the Board exists, or is constituted as at present.

45. I do not now, therefore, enter upon the consideration of these details, nor upon the statement made (para. 196) of the chief engineer's position and duties. It is manifest that the chief engineer can have no time for his special duties so long as he has more important duties in the Revenue Board, Department Public Works, and in the Military Board, confided to him. The sooner he is relieved from some of these multifarious duties, and they are entrusted to officers who can be made responsible for them, the better, I believe, for the public interests. But arrangements to this effect can only be made when the Military Board is abolished, which I should strongly advise at the earliest date. It is the more practicable at this moment, as only one stipendiary member is now in the Board.

Section V.—*Proposal for constituting a new Board of Public Works.*

46. We now come to perhaps the most important part of the Commissioners' Report: their view of the best means of remedying the defects which exist in the administration of the Department of Public Works. They propose a new and distinct Board, to consist of three members: two officers of engineers and one revenue officer, aided by the chief engineer, to have the charge and control of all Public Works throughout the Presidency.

47. I cannot concur in this proposal, and I am decidedly opposed to the formation of any new Board for Public Works. A Board at once puts an end to individual responsibility, which I look upon as essential to efficiency in this department. I am unable also to see any necessity for a Board. It is only

when large, or new untried projects are brought forward, that the sifting and the matured elaborate opinions, which are the results of the deliberations of a Board, can be needed. In the case of Public Works this is, I think, best obtained by a committee of engineer officers examining such projects on the spot. In all other cases, where there is nothing new or difficult—that is, in the great mass of the business of the department—an early decision and prompt disposal of the matter, without the delay which a Board is sure to interpose, is of more value than any little improvement of a plan, such as a Board sitting at the Presidency might suggest.

48. I am not also prepared to admit that an engineer officer or officers at the Presidency, who may not know the localities of works, are better judges of them, and of the expediency of their construction, than the local divisional officer, who has not only a perfect knowledge of all the circumstances of the district, but who must have the concurrence of the collector in his view of any project he may propose.

49. A Board will be found as heretofore, I should fear, a cumbrous and expensive machinery. It will not only create delays, but overload the Government—if there are to be three members, or even two, and a duly qualified secretary—with elaborate communications; whilst the subordinate officers will be burthened with additional correspondence and calls for information, as they will have to satisfy the various views of the several minds sitting at a Board. I should deprecate therefore the establishment of any such Board.

50. But in lieu of it, and of the present system, I would strongly advocate local superintendence and control, under a single responsible head. I would propose therefore to divide the Presidency into four divisions, or into any other more advisable number, and give to each a separate general superintendent, who should communicate immediately with the Government. He should not be a fixture at any one place, but move, when necessary, into any part of the division, and he should confer in person with the district officers under him, who should remain, as at present, in charge of two districts. The general superintendent should recommend important projects to Government, only after conference with the local officers and personal examination, certifying therefore from personal inquiry that they were sound in principle, and well and economically planned, and could be carried out without difficulty at the cost estimated.

51. It is the personal control and responsibility, under the immediate eye of Government, extended over not too large a charge, which will, I think, chiefly infuse vigour, and give efficiency to the department, and thus secure the due and early execution of works. Such superintendent would have an advantage which a Board never would possess. He would thoroughly know the wants and peculiarities of his division; and considering how diverse are the provinces of this Presidency, e.g., Malabar, Tanjore, Ganjam, Bellary, this full local knowledge I look upon to be of the highest importance. Again, each division of the Presidency would, under this system, be equally well looked after and cared for, and the Government would know where to fix responsibility, and be able to apply a remedy if the Public Works in any district or division were neglected or ill executed. This system of divisional superintending engineers would also, I think, be found less expensive, and yet in my opinion be far more effective and conducive to the public interests than a Board.

52. I may further add, that I do not see why a collector in his own district is not as capable of judging of projects proposed for its improvement as the single revenue member of the proposed Board, who may really know little or nothing personally of the district. I should certainly prefer the opinion of the local officer, if he was one who had been any length of time in his district, to the judgment of the member of the Board. In whatever light therefore it is viewed, the Board proposed does not seem to be an advisable agency for the Public Works Department, but the contrary.

53. I think it also Utopian to expect and to propose a Board, on the ground that the two best men in the service will be always, and under all circumstances, selected for the Board. A Board opens the door for the employment of a second-rate man, with one superior man; and it is in the nature of things, therefore, that such second-rate man with interest, or a popular man, will find

entrance into the Board, and remain there, whatever might be the advantage to the public interests by his supersession.

Section VI.—*On Works of Irrigation.*

54. I agree to so great an extent with the Commission, as to the value and importance of such works in this Presidency, that it is not necessary for me to follow them into the details by which they seek to establish this point. It is almost sufficient to advert to the known facts, that the Carnatic with the Northern Circars, embracing a large portion of this Presidency, depend upon the annual fall of rain from the north-east monsoon; and that this monsoon is always variable and uncertain, often scanty, and not infrequently fails.

55. The advantage, therefore, it may even be said the duty, of providing supplies of water to meet the deficiency of this monsoon, from the never-failing south-west monsoon, can need no arguments; and I shall but add here the opinion I have already expressed in a minute on the projected Palar Anicut, in further support of the Commissioners' views: "I should have wished that, in lieu of this general statement, the Government had been furnished with well-ascertained data, that in years such as 1823-24, 1832-33, the seasons of our severest droughts, the Palar would have then supplied the tanks.

"It is in such seasons chiefly that these works are so invaluable, and repay the heaviest outlay; as they then preserve the lives of the agricultural labourers, and save the stock of a district."

56. Still, all-important as are works for irrigation, they have, I believe, if the interests of the producers or ryots are to be considered, their limit, unless they are executed gradually to admit of population increasing, and the demand for additional produce being thus augmented simultaneously with their execution. I think it would be an error to continue annually a very large expenditure upon new works of this description, when once the great object had been attained, of bringing such a breadth of land under certain irrigable culture, as shall secure the people against the famines consequent upon the failure of the north-east monsoon.

57. After this object has been secured the chief want of this Presidency is not so much, it appears to me, the execution of new extensive works of irrigation, such as the Commission urge, for the production of large additional quantities of grain, but roads and other facilities for the distribution of the produce of the land.

58. The low range of prices in all ordinary seasons shows that, at present, the supply is fully equal, and more than equal to the local demand; and in abundant years, the prices of grain fall so largely, that it is very doubtful if they are remunerative to the ryot, at the present rate of assessment upon his land.

59. I may adduce, as illustrating this point, the following statement, not selected, but taken from papers at this time in circulation. In the Government review of the North Arcot annual settlement, they observe, "In consequence of the increased extent of cultivation in so propitious a season, the price of grain underwent a great decline, as compared with the rates obtaining in the preceding year. The prices in the principal and subdivision were, respectively, 15 and 21 per cent. below those of Fusly 1260, 1850-51, and 31 and 39 per cent. below the commutation rates."

60. So again, the price of paddy the produce of irrigated land. That produce, which the Commission propose so largely to augment, is stated by the Board of Revenue, in their proceedings on the Bellary settlement, 1261 (at this time also under review), to have been gradually diminishing for years: "taking," they say (para. 3, Board's Proceedings, 10th July 1853, on the Bellary settlement), "the last 40 years in even periods of 10 years, the price of paddy has fallen gradually from 115 to 84 rupees the gurce."

61. We here observe the steady reduction of price, and its great extent, largely enhancing, as the Board notice, the assessment upon the ryot, for his tax is a permanent money rent per acre, payable within the year, let prices be what they may. The Board thus state the case: "It is of great importance to be able to compare the prices at the time the settlement was made, with these now prevailing.

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vailing, in order to judge how the assessment bears upon the ryot. It was supposed to be about 45 per cent. of the gross produce, when the settlement was made; but having been converted into a money payment, the prosperity of the ryots must always greatly depend on the price they can obtain for their produce, and the share virtually taken by Government will increase in proportion to the decrease in the price of grain. The average price of paddy during the first four years of the Company's Government was, it will be seen, as high as 152 rupees a garce; but the last two appear to have been years of great scarcity. During the next period of four years, the price of only one year (Fusly 1251) is given, when it was 104 rupees per garce. Taking the last 40 years in even periods of 10 years, the average price has been

				Rupees.	
From Fusly 1222 to Fusly 1231	- -			115	per garce.
" 1232 "	1241	- -		101	"
" 1242 "	1251	- -		103	"
" 1252 "	1261	- -		84	"

or 1851

Had the assessment remained unaltered, therefore, the average share of the produce taken by Government during the past 10 years would have been 61 per cent., assuming it to have been 45 per cent. when paddy was at 115 rupees per garce. But the general remissions of 25 per cent. and 33 per cent. made in 1820, were considered to have reduced the share of Government to 33 per cent., in accordance with what Colonel Munro, in his plan for a permanent ryotwar settlement, considered it ought to be, and the share of Government would now appear to have risen again, through the operation of low prices, to 46 per cent. of the gross produce, or about what it was previous to the general remissions." See also note as regards the district of Nellore.*

62. My

* Extract from the Proceedings of the Board of Revenue, dated 22 August 1853; reviewing the Annual Settlement of Nellore, 1851-52.

Para. 4. The prices of grain continue in a very depressed state. From the marginal statement given in para. 9 of the Collector's Report, it is seen that they are considerably below the average of the last 10 years, and less even than in the year immediately preceding, while, as compared with the commutation price, there is a falling off of 22½ per cent. in the price of paddy, and no less than 40 per cent. in that of dry grains.

Extract from a Report from D. White, Esq., Collector of Nellore, dated 18 February 1853, No. 17.

Para. 9. The grain market continued during the year under review, depressed as before. Compared with Fusly 1260, there was no improvement in the prices. On the contrary, the average rate for wet grains was less; that for dry produce being nearly on a par, but they were respectively 22½ and 40 per cent. below the commutation standard.

Fuslies.	Fine Paddy.	Coarse Paddy.	Jonnaloo.	Natcheny.	Varegnaloo.	Prices.
	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	<i>Rs. a. p.</i>	
1251	17 1 10	14 15 3	17 2 4	15 13 2	13 1 2	
1252	16 4 9	14 4 2	15 6 1	14 8 11	11 14 4	
1253	15 15 8	13 5 8	14 3 7	13 8 5	11 12 9	
1254	18 4 8	15 13 4	19 3 5	16 15 6	15 11 3	
1255	27 6 7	24 6 10	31 12 6	29 7 3	23 11 2	
1256	23 3 11	20 5 4	29 13 6	25 11 3	21 15 5	
1257	21 9 1	18 26 3	28 3 1	24 2 -	20 8 6	
1258	19 11 5	16 15 -	21 11 11	19 7 6	16 15 1	
1259	18 - 4	15 9 5	19 8 -	16 14 5	16 9 9	
1260	17 6 -	15 9 5	20 5 2	17 10 8	16 10 8	
Total	195 2 3	169 10 8	218 5 7	194 3 1	168 14 1	
Average	19 8 2½	16 15 5½	21 13 4½	19 6 8½	16 14 2½	
Fusly 1261	16 5 -	14 11 4	19 11 3	17 9 2	16 10 1	
Wet average	- - -	15 8 2	Dry average	- - -	17 15 6	
Commutation	- - -	20 - -	Commutation	- - -	30 - -	
Decrease	- - -	4 7 10	Decrease	- - -	12 - 6	
		22½ per cent.			40 per cent.	

213.

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62. My view, therefore, is, and I am not aware that it differs widely from that of the Commission, though in some passages in this section they would appear to controvert it, that to give new or additional works of irrigation, if at all extensive, their due value, they must be combined, with opening up, by roads, canals, &c., new and additional markets; and that, simultaneously with the execution of the works. That if this is not done, and there is no new market, but only the old local market, then such works must be carried on gradually, to allow of a population growing up to consume the large additional produce annually raised. Without this, prices must continue to fall, to the ruin of the ryots, or the Government must lower its rate of assessment. Or, to use the language of an authority quoted by the Commission, para. 281, "The decrease of price must be followed by a corresponding decrease in the commutation at which the assessment is rated, whereby both grower and consumer will be directly benefited, and the Government repaid by the extension of cultivation and the improved means of the people." This is no doubt true in the end; but it is not the view the Commission would seem to take; * as they calculate on an increase of revenue at the present rates on the land, and do not apparently allow that there can be an excess of production beyond the remunerative demand. They appear to me to overlook the necessary consequence of raising within a limited period, large additional quantities of ordinary grain by means of an expenditure of Government capital; that if there is no co-incident extension of the market, the result of these works must be to diminish the money value of the produce of every acre previously under cultivation, and so to raise the assessment on the ryots generally.

63. The Commission would seem indeed to recognise this partially, in paras. 303, 304-307, as they there state, that "the intimate relation between the extent under cultivation and the (lower) range of price is very observable;" but they afterwards argue against the plain and obvious deduction from their own statement; and their views generally in this respect, and in this section, seem to me somewhat confused and contradictory, and I cannot fully subscribe to them.

64. I may adduce in support of the foregoing remarks, the following observations, already offered in the minute referred to in para. 55: "A glance at the map will, I think, show that the local demand for home consumption can never take off the enormous additional produce which the anicuts of the 'Godavery and the Kistna,' and I should add, that of the Palar, will bring almost immediately into existence. And without, therefore, some permanent extension of the market,* co-incident and corresponding with this instant or early extension of production, a great fall of price must in a short time ensue, if rice is chiefly raised. This fall may indeed enable Rajahmundry (especially as the ryot is there aided by grants of 'Uccavey') and Masulipatam to export largely, and probably to under-sell the rice of Ganjam and Vizagapatam, where there is no such Government outlay on works of irrigation. But this may not so much benefit the state as raise, in time, one class of ryots at the expense of another." On this point the following statement will be found in a letter from the collector of Rajahmundry, enclosed in the Board's letter of 9th August 1853, just circulated.

"I conceive that the export will go on increasing, because hitherto the trade has been vigorously carried on in competition with the ports of Vizagapatam and Ganjam,

* Not depending, as at present, on the large mass of well-paid labourers congregated on the works.

This commutation rate was fixed, it will be seen from the following extract,† on an average of 55 per centage of the gross produce, after deducting village fees. The present low range of price therefore raises the assessment very largely, i. e., 75 per cent. on the dry grain lands, and 67 per cent. on the wet, and must be most oppressive, if not ruinous to the ryots. It is not easy to see what advantage would result, under these circumstances, from new works of irrigation, the additional supplies of produce still further lowering prices and ruinously enhancing the assessment if new markets are not created simultaneously, or the assessment lowered.

† Para. 243, Minutes of Board of Revenue, 5 January 1818.

643. Having ascertained the average gross produce of each gnooth of land, "from information obtained by the survey, as well as what is admitted by the inhabitants," Mr. Travers proceeded to assess it as follows: He first deducted from the gross produce six and a half per cent. for bandooloo, the admitted fees of the curnuma, village artificers, servants, &c.; the remainder was then, in supposition, divided between Government and the ryot, in the proportion of 11 in 20, or 55 per cent., to the former, and nine in 20, or 45 per cent., to the latter, and the Government share of 11 in 20, or 55 per cent., was finally converted into money at the rate of seven Madras pagodas for dry grain, and five Madras pagodas for paddy per pooty.

Gaujam, where rice is produced at a very cheap rate, as the wages of labour are very low."—Para. 2, Collector's letter, 14th May 1853.

65. In further examining the section, I cannot also agree in the views contained in paras. 295, and I might add 296-7 and 301; they seem to me to a great extent unsound. And I am not aware of any facts to sanction the statement in para. 316.

66. I will only advert, in conclusion, to the opinion expressed in para. 320: the great importance of the introduction of some agricultural product, not a common article of food in the country. Upon this point I entertain a strong opinion. This Presidency cannot, I believe, make any great advance in wealth till its produce finds its way largely into, and commands the great European or foreign market. So long as it is limited to a home demand and local markets, the returns from the land will be small, and the people continue poor. But I much doubt if exportable produce of articles of a quality, and of a kind to compete with those of other tropical countries, can be, or will be largely raised, except by a modification of the assessment, by holding out, by that means, inducement to the ryot to produce for the foreign market, and enabling him also to do so by lessening the tax on his land. For if a crop of sugar-cane, for example, is not only liable, as at present, to the highest tax of a single crop, but to an additional tax, that of double crop lands, because it requires more water than a crop of rice, I doubt if this country can, under such a system of taxation, compete with the rich untaxed soils of the Mississippi or Brazil.

67. I will not pursue this subject, as it would lead to a long digression; but I will state my opinion briefly, that I consider the present rules for assessing the land, as laid down by the Honourable Court, to be often injurious; and that I believe it to be a fallacy, to view the land tax of this country as identical with rent in England. I will only observe, that in England the whole produce of the land is readily consumed in the home market; that there is no land there pure waste, to be had for asking; whilst in this Presidency there are tens of thousands of acres of as good soil waste, to be had by any applicant, as there is under the plough, and as near the market too; that it requires no more labour nor capital to raise additional crops when food is wanted, than on land previously under the plough; that when land is irrigated by Government works, large areas are at once made as fertile as the land previously irrigated; and neither has the Government nor the occupant expended more capital or labour on this additional area, to make it equally productive with the old land.

68. I do not see, therefore, the applicability of the theory of rent at the present hour to this Presidency; and I look upon the assessment upon the land at this time as essentially, with but limited exceptions, a tax, and not rent; that a high assessment does, therefore, now operate precisely as a heavy tax. It may shut out the produce of the land from all but the home market, as it so raises the cost of production, that it cannot compete with the products from other countries, or in distant markets; and I am strongly of opinion that some modification of the existing system of assessment is necessary, whenever the land tax forms a large element in the cost of production, to attain the object the Commission so strongly press, and in the importance of which I so fully agree with them.*

Section

* The following Minute, recorded on the 12th January last, will further explain my views upon this point:

MINUTE.

Letter from the Board of Revenue, 9 December 1852, on the Survey and Revision of Assessment in South Arcot.

As this experimental survey and assessment will form the basis of a more general measure, it is of the first importance that sound principles should be laid down; I am induced therefore to call attention to what appears to me an error in these orders.

In para. 4 the Board direct "that such articles as require water for more than six months, as betel, sugar-cane, &c., should be declared liable to the assessment for two crops."

2. The principle here laid down is, to subject articles of produce, however essentially different in their character, and in the circumstances which confer value upon them,—that is, in their ability to bear a tax,—to one and the same rate of tax or assessment, and two products entirely dissimilar are put on the same level, though the one, betel, can bear the highest possible tax,—and even if over-taxed, it would be but little detriment to the country,—whilst the other, sugar-cane, if too heavily taxed, must cease to be grown, and the district will then be deprived of a most important source of wealth, at present a valuable article of export extensively produced.

Section VII.—*The Roads of the Presidency.*

69. The observations already made upon this head in Section II. render it unnecessary for me to do more than to state my entire concurrence with the Commission on the importance which they attach to good roads in every district of the Presidency. As I have before stated, roads, or facilities of communication, are the chief want of the present hour in this Presidency, whether the rail, or tramroad, or ordinary road, as the means of distributing the produce of the land, and of giving it, and the fruits of all productive industry, more extensive markets and an increased value.

70. The outlay of Government capital upon roads has one special advantage over other outlays; for, however large it may be, it interferes with no capital previously laid out; and it does not, like an expenditure upon works of irrigation, specially aid one particular class, and increase production without reference to demand; but the expenditure on roads benefits alike all interests and all classes; its only result is to give additional value to the products of all industry equally, and the largest outlay, if judiciously made, will certainly repay the State in the increased wealth of the people.

71. Upon the further question discussed in this section, whether the more or (as advocated by Captain Best) the less perfect road should be now constructed, it appears to me that each case must stand on its own merits; that it must depend upon the extent of traffic, the density of population, and whether the road will open up rich or poor tracts, and limited or extensive markets; and also upon the relative cost of the more perfect road. No one rule can, it seems to me, be laid down universally, and I should think it therefore an error to adopt one course, as the Commission appear to recommend,* and in all cases make the most perfect, that is, the most costly road.

* Para. 420.

72. I am not aware that I can add anything to the remarks of the Commission upon the harbours of this Presidency, para. 426. I only wish that it was in my power to bring home the conviction to the mind of others, as it rests on my own mind—as an eye-witness of so many wrecks, and of such deplorable loss
of

3. If we take the two articles named by the Board, and apply to them the great first principle of all sound taxation, that the tax be imposed so as to check or interfere as little as possible with future production, we shall, I think, at once see how entirely the Board's orders in the case of South Arcot are opposed to this principle; betel is there an article of pure luxury; it is consumed individually in very small quantities, so that a high price but little affects its sale; it is so perishable and incapable of transport, that it is not open to the competition even of a neighbouring district, and is wholly an article for home consumption, and for the home market.

4. Sugar-cane, on the other hand, in South Arcot, is largely grown for the foreign market. It is exposed, therefore, in the market of Europe, to the competition of the whole world; and so far from being in daily demand, at almost any price, like betel, if the price is not kept low, so that the manufacturer can continue to manufacture with a profit, all demand for it must cease, and it will cease to be grown; or, if the tax or assessment is not so heavy as to produce this result, the extension of the cultivation may be most seriously impeded.

5. I should not agree, therefore, with the Board in placing these articles in the same category; though I am aware of the grounds upon which this is done, that land of like capability shall bear the same tax, whatever its produce. This will be correct and sound in the case of all ordinary grains for the home market,—that is, as regards seven-eighths of the land under the plough in this country,—but is a questionable rule, and I cannot but think likely to prove highly detrimental, when applied, as the Board here propose, to products like sugar-cane, grown for the supply of manufactories already established in the district.

6. I should, therefore, request the Board to modify their instructions, and in lieu of now fixing one and the same high rate for the betel-vine and sugar-cane, &c., to direct the collector carefully to ascertain whether sugar cane can easily bear this two crop rate of tax, and to authorise him, if he found that the two crop assessment would interfere with, or in any material degree check the growth and extension of the cane, to lower the rate to one crop. This measure of encouragement I should think just, both to the ryots and to the manufacturers who have sunk their capital in sugar-works; and I cannot doubt its subserving the interest of the district. It is of secondary importance, but I should see no objection also, at this date, now that the town and inland duty on betel have been abolished, greatly to increase the rates of assessment on betel-vine land, in accordance with the old native usages in this district, which seems to me sound in policy. I annex a memorandum, drawn up some years back by the head sheristadar of South Arcot, bearing on this point. The Board might be asked (if there is no objection), with a view to a reference hereafter to the Honourable Court, whether the rates on betel-vine land might not be increased, and a higher revenue drawn from an article so legitimately a source of revenue.

12 January 1853.

(signed) J. F. Thomas.

of life in the storms at Madras—of the absolute necessity of a pier at the port, as noticed by the Commissioners, para. 448. If a return were made from the master attendant's office of the loss of life during the last five years, I do not think that there would be any hesitation in ordering the construction of a pile pier, such as that projected and proposed by Messrs. Mitchell & Son, patentees of the screw pile, at the cost of six lacs of rupees. I believe it possible that a boat might live in the sea, and carry aid, which could not by any effort cross the surf, and a pier running out beyond the surf line would then afford means of preservation for life and property which nothing else could.

73. There can be no question that a pier would at the same time confer a vast benefit on the trade of the place, and amply repay the cost of construction by tolls; whilst it must be remembered that Madras is the great mart and port of the Presidency, and will be still more exclusively so when the rail is completed. It seems to me that it may prove a short-sighted policy to promote the construction of a railroad to bring the commerce of the country to the beach, and then to have no better means of transport to the shipping than the rude Masulla boat. I should therefore urge the construction of a pier at Madras, whether by a guaranteed loan or out of the revenues, at the earliest possible date; and I regret that the Commission have not brought this work more prominently under consideration as one of the first—next to a railroad, the very first want of the Presidency.

Section VIII.—*Proposed Scheme of Expenditure on Works of Irrigation and Communication.*

74. Having stated my full concurrence in the views of this Government, as recorded in 1848, which the Commission here, in effect, merely reiterate or expand, I need not swell this paper by many remarks upon this section. The actual fact of the unimproved condition of far the greater part of this Presidency, the comparatively small amount of capital yet laid out on improvements of any kind, except in two or three districts, leave in my mind no room to doubt that the largest outlays on roads, canals, and similar works for communication, and for the general improvement of the country, will amply repay their cost; and I am satisfied that a large expenditure, as compared with past outlays, is absolutely necessary to develop the resources of the Presidency and to augment its finances, even though there should not be "a surplus revenue," as observed by the Government in 1848.

75. I hold the same opinion, to a great extent, as to expenditure upon works of irrigation; but the course to be pursued as respects them, when once the magnificent works of the Godavery and Kistnah, and the Palar are carried out, should, I think, be by a gradual improvement of existing works, as seen in Tinnevely.

76. The Commission thus state the facts as regards that district under Captain Horsley's charge, and it will be seen, though they are probably exaggerated by the Commission, that the results obtained by his judicious plans are more important; and I believe more certain and at less annual cost for repairs, than the returns obtained from new works and projects: "We think we are fully justified in ascribing this large and progressive increase in the revenue to the improvement of the works of irrigation, since it is spread over far too long a term to be attributable to a series of good seasons, and we have already remarked that the last 15 years contain two decidedly bad seasons; we have then an increase of outlay to the amount of 3,23,419 rupees, producing a direct return in revenue of 19,74,820 rupees, or about six for one, besides an addition of 30 lacs to the income of the people.

"We have already observed, that by far the greater part of the gain in Tinnevely was obtained by the efficient repair of existing works, and a very large part of it by rendering supplies of water comparatively certain, which before were precarious. This is a most important species of improvement." Paras. 241, 243.

77. Under these views, I would not push outlays on new irrigation works to an unlimited extent, nor require such outlays to be annually large specified sums;

neither would I limit the expenditure, unless it was to secure for the local Government the power to disburse a given per-centage of the revenue upon public works.

78. What is required, in my opinion, is, authority for the local Government, not to expend large specified sums, but authority to lay out any amount upon well-considered and well-sifted plans and projects, without reference to immediate returns; that they should be permitted, therefore, to sanction upon their own responsibility, all projects which they can carry out with the means at their command. The means this Government possesses of executing even the necessary public works must for some time be limited, and if, therefore, only ordinary care and consideration are exercised in sanctioning the projects submitted to them, there can be no doubt that the annual outlay will not be very large, and that it will be long before even the necessary works are all completed.

79. I am not aware, therefore, that anything can be gained by specifying the sums to be expended, as the Commission have done, unless it is also clearly shown that these sums can be now laid out judiciously and economically, and that there will be no fruitless schemes nor waste, like the large expenditure some years back on the abortive breakwater at Madras, and upon the Red-hill railroad, or like that upon the roads under the civil engineers, which were never completed nor duly repaired. Of these works nothing remains at the present hour except enough to warn the Government not to pursue a similar course, nor to entertain similar crude projects.

Sections IX. and X.—*On providing Officers for the Public Works Department.*

80. The subject in Section IX. having been considered in paras. 15-21 of this minute, I confine myself to a brief remark on the statement in para. 529, which I think erroneous.

81. The civil engineer for each collectorate proposed by the Marquis of Tweeddale, was a well-qualified executive engineer, trained as a civil engineer in England or in America, in the practical part of the profession; and it is an error to assume, as the Commission would seem to do (para. 541, &c.), that his place could be supplied by a junior officer of the Engineer corps. This proposal of the Commission will not secure the permanent employment of an officer in one district. The civil district engineers, such as they propose, may be called away at any time to other duties, and the works of the district put into new hands, whilst the native subordinate agency will continually have new masters; nor can they be instructed or properly trained by an officer of engineers, himself without real practical skill and knowledge. This is not the view of the Marquis of Tweeddale, and the objects he deemed necessary will never be attained by the proposed arrangement. The same view is expressed by an experienced officer of engineers, quoted by the Commission, Appendix I., page XLIII. Major H. C. Cotton thus states the results of his experience.*

82. This leads immediately to the consideration of the views of the Commission in paras. 569, &c., Section X, in which they pronounce against the introduction

* Extract from Report, page XLIII. Appendix.

Then an efficient corps of European Civil Engineers, as a permanent arm of Government, should be established,† and the native portion, of which also I intend to treat in this letter, would be formed into one of the most suitable and useful branches of the public service.

† Not a corps whose services are dependent upon the external relations of the country, as those of a military corps must be, but one exclusively set apart for works of civil engineering; a corps of covenanted servants educated before leaving England as civil engineers, and quite distinct from military corps. This corps might be formed at first by volunteers from the English corps, and a few practical and experienced civil engineers from England. There could not be a better time than the present for drafting officers from the engineer corps for the purpose, because nearly all the first lieutenants being brevet captains, it is evident that the younger branches who would be promoted to supply vacancies are fully qualified for it by time of service and experience, and the military corps would rather be improved than injured by it. It would not be necessary to set aside the service of the military engineer officers in the time of peace; employment would be found for them in the extended improvements for which peace would afford opportunity, and to which, during peace, the attention of Government would more especially be called.

duction of purely civil engineers, and advocate the strengthening of the existing corps, a military arm, as the most expedient course for improving the Public Works Department.

83. Unless there is a political object in keeping up a large corps of military engineers, I should not agree with the Commission; such a corps is necessarily formed of men who as youths may be good draughtsmen or mathematicians, and of superior scientific attainments, but they may all on entering the corps be entirely without practical knowledge of any art, and may never have the opportunity of acquiring it under competent instructors. This is of little consequence in a military engineer, but all-important in the purely civil engineer's duties in this country, where contractors and foremen well skilled in all details of execution are not to be found. The proposal of the Commission, if carried out, will exclude from the Government service the superior practical intelligent civil engineer, for he would be restricted to the lower grades, and placed under a junior military engineer; consequently there would never be seen in the Department of Public Works in this country that class of engineers which has done more for Europe than any other class, the men who have raised themselves through all the grades of workman, foreman, mechanic, to the highest post of civil engineers. I should regret to see a system adopted in this country which would effectually shut out all such men, and all superior intelligence combined with practical skill and scientific acquirement, and keep the Department of Public Works as inefficient as at present in the requisite practical knowledge, as well as solely a seniority corps, as other military corps in this country.

84. How far this want of knowledge as civil engineers might be obviated in part by a college, like Roorkee, as the Commission propose, experience can only determine. I must be permitted to question if first-rate civil engineering skill will be attained, and retained in the Government service, unless the advantages of promotion and of rank are provided, so that the civil engineer shall not always be subordinate to military juniors. I should therefore, notwithstanding the institution of a college, advocate the introduction into the Public Works Department of men from all departments, or wherever they might be found with the requisite qualifications of civil engineers, and advance such men, as Lord Tweeddale proposes, to the higher posts and duties in the civil department.

Section XI.

85. The Commission in this section give an analysis of their Report, and sum up their recommendations. I propose to follow the same course, and to state in a few words upon each separate head, my agreement or disagreement with them.

Section II.—Present Condition and Defects of the Department of Public Works.

86. I agree with them entirely in considering the present system most defective, that the Revenue Board Department of Public Works, the controlling authority, is wholly unequal to the duties of the department, and that it should be abolished.

87. I agree also in the opinion that the civil engineers in the provinces are too few, and consequently unequal to the duties, and that their number should be increased, and the department generally strengthened also in all its subordinate branches; but with this proviso, that the additional strength and efficiency will best be found in attaching well-trained civil engineers permanently to each collectorate, and not by appointing the junior officers of the engineer corps to the charge of a district.

Section III.—Trunk Road Department.

88. I dissent altogether from the views the Commission here set forth on the Road Department, whilst the records and facts disprove, in my opinion, their statement. I look upon their recommendation that the separate Trunk Road Department should be abolished, as calculated to be highly detrimental to the public interests, until all the trunk roads of the Presidency have been completed.

RETURNS RELATING TO PUBLIC WORKS, INDIA

Section IV.—The Military Board.

89. I consider the views of the Commission on this branch of their inquiry to be superficial, and that the root of the existing evils is left untouched, that their suggestions are in consequence of little practical value; the true and only remedy being the abolition of the Board and the transfer of their duties, in regard to public works, into the hands of officers with individual responsibility.

Section V.—The New Board.

90. I differ wholly with the Commission in this recommendation, as it will perpetuate the existing evils—delay and imperfect supervision. A Board will, I think, be a cumbrous and expensive machinery, but is above all objectionable, as it excludes individual responsibility. In lieu of a new Board I would advocate the division of the Presidency into four divisions, each with a general superintendent, as far more effective, as he would have full personal knowledge, and exercise actual personal supervision over the officers and the department in his division, and be himself individually responsible.

Sections VI. and VII.—Works of Irrigation and Communication.

91. I agree in the value and importance the Commission attach to the execution of such works, especially of roads, canals, and facilities for internal communication, so to create new markets, and to give increased value to the products of all industry. I should modify in part the views expressed by the Commission as to the vast additional revenue to be obtained from new works of irrigation, and consider it advisable, with the exception of the works on the Godavery and the Kistnah, that irrigation works should be carried out gradually; whilst I would push forward immediately to the utmost extent railroads, roads, canals, piers, improvement of the harbours, and all means for facilitating the external and internal commerce of the Presidency.

Section VIII.—The Expenditure on Public Works and the Extent of the Agency.

92. I do not see the use of specifying any particular sums to be annually laid out on public works, and so far I differ from the Commission. But I most fully concur with them that a large expenditure, even if there is no surplus revenue and the funds must be borrowed, on roads and other works for internal communication, and on works of irrigation to a large extent, is most necessary and advisable. This expenditure to be incurred on the responsibility and at the discretion of the local Government.

Sections IX. and X.—On the proper Means of enlarging the Establishment for Public Works and providing duly qualified Officers.

93. I should fully agree with the opinion given, that the Civil Engineer Department should be greatly enlarged in all its grades; but I should not agree in the opinion, that an addition exclusively to the corps of engineers, a military corps, is the best means of strengthening the department. I would introduce for civil engineer's duties, well-trained civil engineers, and raise them to high positions as the best, if not the only means of perfecting the department. I agree in considering a college similar to Roorkee as most desirable, but not in itself sufficient to place the department upon the most effective footing.

94. I may close these notes with the observation, that I think much credit to be due to the Commissioners for the ample and detailed review of all branches of the Department of Public Works, presented in their Report, and for the ability with which they have discussed the numerous important questions examined by them. I regret that the Report should have been drawn out to so great a length, and that it should be disfigured by an exaggeration not creditable to the members of the Commission, and by mis-statement and by a misrepresentation of the views and proceedings of Government. For they could scarcely be ignorant of the main causes which have compelled the local Government in past years to withhold expenditure from valuable improvements, the prohibition

prohibition by superior authority against all disbursements not absolutely necessary, and by the impossibility of finding agency to superintend important works. These facts were patent before them on the records, as will be seen in the Appendix (A.) annexed.

95. I trust, however, that large and extensive improvements will ere long be sanctioned, and that the Public Works Department of this Presidency will receive that attention from the controlling authorities which its great importance demands; and that there will be no prohibition, and no limit even prescribed by them to the largest expenditure upon well-considered projects, in all branches of the department. Unless experience shall show that the expenditure sanctioned by the local Government has afforded no adequate return, and has not been followed by a corresponding improvement of the finances, and of the general condition of the country.

23 August 1853.

J. F. Thomas.

APPENDIX

Appendix (A.)

1. HAVING referred in my minute of the 12th April last, to the letter to the Government of India from this Government, dated 3d January 1848, as in itself a complete refutation of the misrepresentations of the Commission, I deem it right to annex that letter in full, with a few of the passages from the Report to which I object. I consider it unnecessary to enter into particular cases; this has been sufficiently done in the Honourable Mr. Elliott's minute.

2. I also annex the following letters from the Government of India, of 1846, 1850, 1851, which will further demonstrate the error into which the Commission have fallen, in ascribing to this Government a systematic neglect of the Public Works. The course pursued by the Government of late years, it will be seen, has been forced upon them by the supreme authority, under the pressure of financial difficulties.

LETTERS from the GOVERNMENT OF INDIA.

EXTRACT from a Letter from the Secretary to the Government of India, dated 30 October 1846.

5. THE special attention of the Most Noble the Governor in Council is requested to the observations contained in paras. 111 to 114 and para. 329 of the Honourable Court's despatch, in which the Court desire that no important measure, tending either to diminish the public resources or to augment the public expenditure, shall be carried out without their previous concurrence, except under circumstances of clear and urgent necessity, and that the Governments in India shall co-operate in strenuous efforts to effect every practicable improvement of the resources, and the reduction of every expense that can be effected without detriment to the public service.

18. Concurring in the views of the Honourable Court, that it is most incumbent on the Government of India to spare no exertion to bring the public expenses down to the level with the public income, the Honourable the President in Council would urge upon the Most Noble the Governor in Council the absolute necessity which exists for the adoption of the utmost economy in all branches of the administration. It may be that no effectual relief can be afforded but by a large diminution of military expenditure and the exercise of rigid economy in those branches of civil expenditure on which the well-being of the people and the general improvement of the country mainly depend, cannot be contemplated without pain and regret; yet still, it will be a duty to control expenditure of every kind till the time shall arrive when a more favourable posture of the Indian finances will enable the Government to indulge more liberally in those great measures of public utility which are so much required for the moral and physical advancement of India.

No. 1740, dated 6th December 1850.

To the Secretary to the Government of Fort St. George.

Sir,

I AM directed by the Honourable the President in Council to transmit to you, for the information and guidance of the Right Honourable the Governor in Council, the annexed copies of paras. 3 and 4 of a despatch from the Honourable the Court of Directors, No. 39

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of

of 1850, dated the 9th October; and, with reference to the instructions therein conveyed, to impress on you the absolute necessity of enforcing every possible economy in the management of the public resources.

I have, &c.

(signed) *J. Dorin,*

Secretary to the Government of India.

Fort William, 6 December 1850.

Letter from, dated
7 November 1850,
No. 7.

EXTRACT from a Despatch from the Honourable the Court of Directors, addressed to the Government of India in the Financial Department, No. 39 of 1850, dated the 9th October.

Forward Reports on
the Tabular State-
ments of increase
and decrease of
charge on account
of salaries and estab-
lishments submitted
in the months of
November and De-
cember 1848, and
January and Febru-
ary 1849.

3. WHILE we are not unmindful of the fact that a portion of this augmentation represents additional establishments which have been required for the purpose of developing the receipts from opium, salt, and other branches of revenue, and that against that portion may therefore fairly be placed the increase gained by means thereof to the income of the State, yet, in the present position of your finances, we must remind you, not only of the importance of closely watching all augmentation of expenditure, but of the indispensable duty of adopting effectual measures for the equalisation of income and charge. To this most essential object we must, therefore, direct your immediate and unremitting attention, and it is very important that the same consideration should be impressed forcibly upon the attention of the subordinate governments.

4. You will not fail to give us information of the progress that is made from time to time in the reduction of your expenditure, and we hope to learn that the prospect may be confidently entertained of its equalisation with your revenues at no distant period.

(A true copy.)

(signed) *J. Dorin,*

Secretary to the Government of India.

No. 50.—Home Department.

From *G. A. Bushby*, Esq., Secretary to the Government of India, to *J. F. Thomas*, Esq., Chief Secretary to the Government of Fort St. George, dated the 17th January 1846.

Sir,

I AM directed to acknowledge the receipt of your letter, No. 287, dated the 16th ultimo, submitting, with the recommendation of the Most Noble the Governor in Council in favour of the measure, a survey and sketch plan of a proposed canal, to connect the Ellatour Backwater with the Calicut River, in the province of Malabar, a distance of six miles, at an estimated cost of *Rs. 16,202. 2. 6.*

2. In reply, I am desired to state, that the President in Council regrets being obliged to discourage useful works of this nature, but he is of opinion, that it will be advisable for the present to suspend any outlay for purposes, however advantageous, which can be postponed without detriment.

3. The original enclosures of your letter are returned.

I have, &c.

(signed) *G. A. Bushby,*

Secretary to the Government of India.

Fort William, 17 January 1846.

No. 367.

EXTRACT from the Proceedings of the Honourable the President of the Council of India in Council, in the Financial Department, under date the 14th March 1851.

READ a communication from the Home Department, No. 512, dated the 20th December last, forwarding for consideration and orders, a despatch from the Government of Fort St. George, No. 1150, dated the 7th idem, with enclosures, soliciting sanction to the expenditure of *Rs. 31,475. 15. 11.* for the construction of an annicut or dam across the Cheyaur River, and for the excavation of a channel, to supply water from it to certain tanks in the Trivatoor and Wandivash talooks of the district of North Arcot.

Resolution.—The President in Council is of opinion, that in the present position of the Indian finances, the consideration of the question of constructing works on the Cheyaur River had better be postponed.

Secretary to Government.

These letters are but a few of several of like character.

OBJECTIONABLE Statements of the Commission.

Para. 223. . . . "Hitherto, indeed, though the ruling authorities have admitted, in general terms, the importance of promoting improvements, yet the view practically acted on has been, that all expenditure is an evil, and that it is the duty of the controlling authorities to check it, with but little reference to the valuable return to be obtained. But if this view is abandoned, and if it comes to be cordially recognised that such improvements are desirable, &c."

Para. 462. . . . "The splendid instances which we have quoted are only exceptional; the general tone of feeling in the Government is still narrow; there is still the same confined view of the field of operations; still the same feeling clearly apparent, though not avowed, that every outlay is an evil, no matter what and how great is the benefit to be so secured; still there is the narrowest and strictest economy in refusing trifling outgoings from the Treasury, combined with the same practical disbelief as of old, in those general truths which point to the sure means of vastly augmenting the income."

Para. 713. "With respect to the value of the property which will be under the charge of the road establishments, if we take the money value of the works of communication now existing, it will be found to be extremely small; simply because the vast importance of roads has been hitherto so lamentably overlooked by our Government. But we earnestly trust that the time has at last come when their value is more justly appreciated."

These statements, it will be seen from the following letters, are wholly without foundation.

LETTER to the Government of India, 3d January 1848.

No. 3.

To J. Doria, Esq., Secretary to the Government of India.

Sir,—Para. 1. Adverting to the observations of the Honourable Court on the military charges of this Presidency, referred to in paras. 12 and 13 of your letter, No. 1739, dated 30th October 1846, I am directed to forward copy of a letter* on the subject from the military auditor-general, together with the statements which accompanied it; and also two statements prepared in the Military Department of the Government Secretariat.

*Dated 10 May 1847.
Abstract Memorandum.

2. From these statements it appears, that taking the whole military charges of this Presidency, including the commissariat, from 1836-37 to 1845-46, and deducting charges involving increased expenditure on account of augmentations ordered by the Honourable Court of Directors, or by the Government of India, as well as extra charges on account of the employment of Madras troops in the other Presidencies, over which the Madras Government have of course had no control whatever; there has been, during this period, an increase, originating with the Government of Fort St. George, amounting to Rs. 12,393. 8. 6. and a decrease, also originating with the Government of Fort St. George, amounting to Rs. 16,62,220. 9. 6.

Military charges.
Ditto, ditto, Commissariat charges.

3. As far therefore as the Government of Fort St. George is properly responsible, the military accounts from 1836 to 1846 show a decrease of expenditure of very nearly 16½ lacks of rupees, instead of the large increase attributed to it in the Honourable Court's financial despatch of the 19th August, No. 22, of 1846.

4. The Government would also observe, with reference to the Court's observations (in paras. 217 to 220 of their despatch) upon the increase of expenditure in the Post Office Department, that it must be borne in mind, that there has been in recent years a very large increase of public and private correspondence, and that the usefulness of this department has been greatly extended.

Post Office.

5. It will be seen from the three memorandums accompanying, that the Post Office is now the instrument for distributing a correspondence, far greater in proportion to the expenditure than at any former period; and that, although from the absence of sufficient data, the actual proportion cannot be stated, there is no room to doubt that the State has derived more than a compensating advantage from the additional outlay.

6. The letters of all descriptions posted during the year 1845-46 are estimated as follows: sent

Through the General Post Office - - -	11,10,985
Through the Provincial Post Offices - - -	25,05,032
Through the Talook Tappals - - -	6,26,567

7. Whereas, so recently as 1838-39, through the Talook Tappals none were sent.

Through the General Post Office, the actual number was -	4,69,269
And through the Provincial Post Offices - - -	9,42,662

TOTAL - - - 14,11,931

or 14 lacks, 11,000 in 1838-39; against a total of 42 lacks, 42,000 in 1845-46. An augmentation of treble the former extent of correspondence within a period of eight years, or less than one-half of that to which the Honourable Court's remarks apply.

8. It is not therefore, the Government believe, too much to say that whilst the charge of the Post Office Department, as shown by the Honourable Court, including in it the loss of surplus revenue, has not been doubled from 1823-24, the service rendered has been at the lowest estimate quadrupled. In other words, that in 1823-24, one fourth or but one fifth of the present amount of correspondence was then distributed, at a charge equal to one half of the existing expense. The Government will continue to watch over this item of charge and revenue, but it appears to them one that must be always viewed rather with reference to its general public advantage and its indirect benefits, than financially, as a source of direct revenue, and they regard the extension of its usefulness as a matter of much importance, such as to merit some slight sacrifice of revenue.

Land Revenue.

9. In the 223d, 224th, and 225th paragraphs of their despatch, the Honourable Court direct attention to the decline of the land revenue of this Presidency, and observe that in their despatch of 30th August 1837, they instructed this Government "to institute inquiries with a view of ascertaining the causes which operated to produce so serious a falling off in the receipts." Prior to the receipt of the communication from the Government of India forwarding the foregoing despatch from the Honourable Court, this Government which had in view the examination of the state of the land revenue in each province, had, at the requisition of the President, called upon the several collectors to furnish a statement of land revenue collections for the 30 years from 1815 to 1845. These returns have been received from all the districts but North Arcot.

10. It will be seen from them that it would be an error to assume, as the Honourable Court's remark* would appear to imply, that the land revenue has been declining for a series of years throughout this Presidency, and that there was cause therefore for alarm, as regards this vital and all-important source of its financial prosperity.

11. Instead of a decline, there has been in the larger number, and those the most important districts of the Presidency, an advancing and in others a stationary land revenue within the last 30 years. This is apparent in the returns from the following districts:

Canara, Malabar, Malura, Tanjore, Tinnevelly, South Arcot, Vizagapatam.

These returns show an increasing land revenue, as seen in the annexed statement.

Years.	Canara.		Malabar.		Tanjore.		Tinnevelly.		Madura.		South Arcot.		Vizagapatam.	
	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.
1225	15,95,350	3 9	15,51,499	2 4	33,51,552	3 10	Not given	14,95,918	11 3	14,95,918	11 3	18,39,492	12 -	-
1226	16,99,649	14 7	17,12,246	13 5	33,35,947	4 7	14,42,028	10 6	14,56,648	15 9	18,38,683	15 4	11,51,297	5 -
1227	15,98,639	13 2	16,85,461	9 4	32,69,685	6 -	15,11,522	5 11	14,48,680	11 -	18,79,443	9 9	11,59,971	3 3
1228	15,48,895	12 7	16,81,928	10 6	31,02,204	4 5	14,47,685	12 3	14,69,802	- 9	18,68,120	15 5	11,79,220	9 3
1229	15,74,963	15 7	17,43,161	10 2	31,06,199	1 10	14,99,992	10 9	14,42,809	7 5	18,65,224	15 10	11,79,998	3 -
1230	15,67,480	12 11	16,79,732	4 -	31,71,171	4 2	15,97,457	2 5	14,26,022	7 10	18,68,623	7 7	11,51,014	- -
1231	15,97,952	6 2	17,47,208	3 10	30,69,278	6 2	15,80,502	2 1	14,51,379	6 11	17,93,957	- 7	11,50,741	10 6
1232	16,10,301	11 3	16,38,617	9 1	32,95,168	7 11	17,41,925	11 5	15,77,915	12 7	20,43,855	13 3	11,50,923	3 6
1233	16,04,889	- 3	16,08,916	9 11	41,41,349	14 8	16,56,659	6 6	13,92,375	4 5	14,96,561	12 3	11,51,741	10 1
1234	16,07,453	4 7	17,43,539	- 6	49,68,109	6 8	16,04,732	2 10	16,02,831	5 4	18,36,111	1 8	11,51,933	10 9
1235	14,86,640	- 4	16,47,917	11 5	35,59,050	3 9	16,41,032	4 4	16,33,930	3 11	20,07,025	13 2	11,52,365	13 2
1236	16,60,219	10 10	15,58,829	12 8	30,04,392	11 5	15,47,624	2 4	16,75,494	15 7	20,78,085	8 11	11,51,966	9 2
1237	15,84,977	- 9	15,69,663	- 7	28,07,213	4 11	13,91,325	10 11	15,81,065	10 5	18,41,317	12 8	11,45,549	1 9
1238	15,83,141	12 2	15,91,505	9 7	26,58,329	12 1	14,91,952	9 1	15,18,918	10 8	17,85,556	7 8	11,23,152	- 9
1239	15,49,924	13 10	15,98,979	5 2	32,21,667	15 3	14,42,018	5 2	15,17,323	- 6	16,67,664	4 -	11,76,531	2 4
1240	13,55,431	4 6	13,50,662	14 8	32,85,862	13 4	14,03,158	2 4	15,81,910	10 9	16,88,963	5 2	11,68,434	15 2
1241	15,18,295	8 11	14,23,331	- 10	34,91,758	- 6	16,25,348	4 5	14,21,167	10 4	16,81,327	10 8	11,73,311	11 5
1242	15,10,882	3 2	17,77,060	16 6	37,76,763	3 -	15,83,101	12 9	15,56,964	2 4	13,03,937	9 2	11,51,795	15 3
1243	15,73,829	3 5	16,07,664	- 10	38,50,613	7 7	15,51,507	12 6	15,93,607	2 6	16,15,152	3 7	12,43,824	3 -
1244	15,56,278	4 8	16,16,310	1 4	36,26,833	3 4	16,29,609	11 5	16,28,861	12 7	19,79,617	10 6	12,34,204	7 11
1245	16,79,820	1 10	16,33,843	9 5	34,39,847	5 10	15,88,171	8 10	17,47,460	9 -	19,74,357	13 3	12,38,099	- 2
1246	16,83,330	13 6	16,11,323	9 10	36,57,072	13 11	16,38,068	10 -	14,60,632	10 8	18,88,376	- 2	11,96,250	- 7
1247	16,96,278	9 9	16,10,747	4 1	36,89,451	15 3	16,38,040	- 2	16,30,346	14 10	20,29,324	- 6	12,39,971	13 4
1248	17,01,025	8 6	16,34,134	2 5	37,88,353	14 3	16,51,289	2 -	17,33,993	- 2	21,53,894	13 10	11,67,664	- 9
1249	17,12,908	12 9	16,32,110	15 -	39,02,551	14 7	16,23,352	13 11	17,77,834	5 5	23,27,654	1 10	12,49,643	14 7
1250	17,23,789	14 -	16,37,064	7 7	36,18,890	19 4	17,37,372	16 3	17,37,822	6 -	23,13,609	8 5	12,12,107	3 10
1251	17,33,778	2 -	16,46,639	3 4	32,86,138	8 8	16,38,898	1 8	18,13,618	12 1	26,87,925	12 -	12,55,618	9 4
1252	17,37,038	12 1	16,10,361	6 9	36,06,221	- 2	16,94,555	10 10	17,01,209	7 7	18,56,340	13 10	12,34,526	3 7
1253	17,43,909	16 4	16,28,673	3 1	37,51,749	13 3	16,84,523	9 4	17,69,947	12 1	19,83,143	6 1	12,04,944	11 2
1254	17,48,072	12 4	16,40,000	14 3	36,07,717	0 -	17,79,430	1 7	17,11,756	8 1	19,45,961	10 8	11,61,033	9 8
1255	17,34,308	- 7	Not given	-	42,17,698	3 6	19,60,581	7 4	17,41,619	7 3	Not given	-	9,72,571	7 6

Year.	Rs.	a. p.
1815	15,95,350	3 9
1820	15,84,942	12 11
1825	15,86,640	- 4
1830	15,55,431	4 6
1835	16,74,920	1 10
1840	17,23,789	14 -
1845	17,34,308	- 7

12. When the revenue in any particular year in these districts is much below the ordinary amount realised, and affects the Court's average, it will be found that it is owing entirely to extraneous causes, and not indicative of any decay of the sources of wealth. Thus the average of the series taken by the Honourable Court from 1829 to 1834 in Canara, is affected by the receipts of the year 1830-31 falling to 13 lacs. This was caused solely by the insurrection in the year 1830, and had nothing whatever to do with the capability of Canara, to afford its quota of revenue. Upon the whole, the revenue of Canara has been steadily advancing throughout the entire period examined.

* Para. 232. "We now come to the important heads of 'Land Revenue' at Madras, the declension in which for so long a period has occasioned us much anxiety."
Extract from a letter from the Honourable the Court of Directors addressed to the Government of India in the Financial Department, dated the 26th August, 1837, p. 10 of 1837.

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examined by the Court, after deducting the revenue* arising from the annexation of a portion of Coorg to the collectorate. *About 70,000 rupees.

13. In the following districts the revenue has been stationary, or nearly so.

FUSLIES.	SALEM.		COIMBATORE.		NELLORE.	
	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.
1225	18,05,633	15 10	20,62,609	11 8	13,50,697	10 6
1230	17,49,225	4 2	21,28,110	1 8	12,76,924	2 10
1235	17,86,814	3 7	22,99,054	7 6	11,98,647	1 10
1240	17,11,348	10 5	22,55,355	2 7	12,81,531	- 3
1245	16,38,957	7 5	20,76,305	1 1	13,11,991	- 2
1250	17,61,621	10 1	20,20,757	10 3	12,51,951	13 8
1254	17,15,238	15 10	22,17,962	10 9	12,91,523	11 2

14. It is also to be borne in mind that subsequent to the date on which the Honourable Court have commenced their comparison,* the rents in some districts have been reduced by the orders of Government, on the express ground that the revenue drawn, which forms the basis of the Court's first series of averages, was beyond the capabilities of the province, and was itself one cause, and an important one, of the following decline. * viz. 1815.

15. Thus in Bellary and Cuddapah the Government in 1821 reduced the land revenue 25 per cent. at once, on the recommendation of Sir Thomas Munro, upon the acknowledged ground that the land revenue taken was too high. This consideration greatly affects the conclusion to which the Honourable Court have arrived, and goes to show that no just inference could be drawn as respects these and other districts† similarly circumstanced, by commencing with the average in the Court's despatch.

16. The actual decrease of land revenue noticed by the Court will be found, therefore, this Government believe, greatly below the amount stated by the Honourable Court, viz., 40 lacs, and the positive diminution of revenue to have been caused chiefly and almost entirely by the severe droughts and famine, which afflicted part of the Northern Circars, and extended partially to other districts in 1831-32, 1832-33, and which involving in its consequence an enormous destruction of stock and agricultural capital, those districts could not rapidly recover. There was also a previous low state of prices, induced, it is probable, by the increase of lands under cultivation for ordinary grains.

17. The augmented collections and the more flourishing state of the revenue of later years, reducing, as the Honourable Court observe, the diminution from 40 to 8 lacs from the standard assumed of 1815-16, is to be ascribed almost entirely to more propitious seasons; and neither has the falling off nor the augmentation been, in the opinion of this Government, influenced in any great degree by any other cause. Prices of grain, at one time extremely low, have rallied, and if in addition to the relief afforded by the abolition of the transit duties the land is applied more largely to the raising of cotton, sugar, and other articles for a foreign market, they will not, it is expected, very greatly fall.‡

18. From these observations the Government of India will gather that this Government do not view the subject in the same light as the Honourable Court have done, and the detailed statements forwarded will, they trust, bear out the opinion they hold, that the financial resources of this Presidency are in as healthy and sound a condition, and perhaps more so, than they have been at any period in the 30 years reviewed by the Honourable Court.

19. The point to which this Government would desire to attract the attention of the Supreme Government is, that the returns submitted show an almost stationary or very slowly advancing land revenue during the last 30 years. This may be deemed unsatisfactory, considering the general security and the peace which has prevailed in Southern India

† Extract from Remarks of Acting Collector on Statement of Land Revenue in the District of Chingleput.

"The defects inherent in both the renting and amany systems led to a decline in the revenues, which did not recover their former height, until the survey field assessment was finally introduced into all the Government villages in fuslies 1248 and 1249."

‡ Extract from a Letter from the Honourable the Court of Directors, addressed to the Government of India in the Financial Department, under date the 19th August, No. 22, of 1846.

"Para. 224. From the above view, it appears that the greatest decline occurred in the five years from 1829-30 to 1833-34, which was in the alarming rate of between 30 and 40 lacs per annum, as compared with the preceding 15 years. In the five years from 1834-35 to 1838-39, there was an amelioration of 13 lacs per annum, as compared with the five years immediately preceding; and in the last five years from 1839-40 to 1843-44, there was a further amelioration of 13 lacs per annum. The present deficiency is, therefore, reduced in amount to 8 lacs per annum, as compared with the sum realised from land 30 years ago."

India for years past. It is no doubt in a great measure to be ascribed to the peculiar circumstances of this Presidency, which labours under the disadvantage of the want of navigable rivers, and of roads, and means of interior communication. These deficiencies cramp and even preclude a development of its sources of prosperity, and forbid the increase of the revenue. They limit the products of the soil to the common grains and other articles for home consumption alone; and whatever natural capability there may be for raising cotton, sugar, &c., or other raw produce for the British market, this Presidency is in a great degree disabled by these disadvantages from competing with other countries in the markets of Europe.

20. The remedy is plain, and is in the hands of the controlling authorities themselves. They have only to sanction and provide efficiently for the early construction of good and permanent communications from the inland districts to the coasts, and throughout the country, and to encourage the influx of European skill and capital, applied to the improvement of the indigenous cotton or sugar cane, &c., or to the raising a foreign and better species, by judicious and well-considered leases, to *bond fide* capitalists on favourable terms, similar to that granted to Messrs. Arbuthnot & Co. in Vizagapatam, and to Mr. Hudson in Malabar, and by perfecting the works of irrigation on the Godavery, and constructing similar ones on the Kistnah, inducing at the same time the influx of British capital and its outlay in such projects as the Arcot Railway, which would indicate a desire on the part of the Government for improvement, and the Presidency will prosper. By these means, which would not require a very large annual outlay, for the progress of the works must be gradual, the country will at an early date advance steadily, if not rapidly, and it is not easy to understand why measures of this nature, involving comparatively so small an annual expenditure, should be postponed.

21. The Government of India, in closing their letter, state their concurrence in the views expressed by the Honourable Court, and urge upon this Government the duty "of sparing no exertion to bring the public expenses down to the level with the public income, and the absolute necessity which exists for the adoption of the utmost economy in all branches of the Administration."

22. The returns now submitted will, the Government hope, go far to remove the impression entertained, and it will be perhaps recognized that the views as quoted above have been founded upon an erroneous estimate of the expenditure and resources of this Presidency by the Government of India.

23. First, as regards the military expenditure. If from the excess of expenditure in the six years, 1837-38 to 1842-43, assumed by them at nearly 30 lacs per annum; the amount of military disbursement not properly chargeable on this Government, as shown in the return from the Military Auditor-General, and from the statements prepared in the Military Department of this office, be deducted, it will be manifest that instead of alleged increase there has been, so far as the Government of Fort St. George is concerned, a decrease in military charges of not less than 16½ lacs within the last 10 years, from 1836 to 1846, and that the *bond fide* military expenditure of this Presidency at this date, 1846-47, is not larger than in 1836.

24. Adverting to the facts, that the land revenue is still increasing rather than diminishing, and that a large saving has been lately made in the civil charges, by the abolition of the provincial courts and of principal collectors, the Government of Fort St. George see no sufficient foundation for the further statement that Madras must be "dependent on external means for support." And whilst this Government would counsel a wise economy in all branches, it is of opinion that a considerable outlay of its revenues at this time on internal improvements, even if there were no surplus would prove in the end a more sound policy and more beneficial to the finances than any other course, and they would deprecate the view of its financial state taken by the Honourable Court and by the Government of India, chiefly from the apprehension that it might lead to restrictions greatly calculated to retard its general and its financial prosperity.†

25. The Board of Revenue have been called upon for information, and for a report on the subject reviewed in para. 246 of the Honourable Court's letter, and on its receipt it will be duly forwarded to the Government of India, but the Government have not thought it

* Extract from a Letter from the Honourable the Court of Directors, addressed to the Government of India, in the Financial Department, under date the 10th August, No. 22, of 1846.

† Para. 205. It is impossible to regard the financial condition of Madras as at all satisfactory while it remains in this state; and as we do not apprehend that the resources, after deducting the transit duties, will average 480 lacs per annum prospectively, we consider that it should be the object of Government to keep the total charges, including interest, &c., within a standard of 430 lacs, an amount which was but little exceeded in the year 1837-38."

† Extract from a Letter from the Honourable the Court of Directors, addressed to the Government of India, in the Financial Department, under date the 10th August, No. 22, of 1846.

"Whenever the local surplus, therefore, falls below this sum, you may feel assured that Madras is dependent on external means for support."

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it necessary to delay on that account, submitting the returns in the Military Department and the foregoing observations with the detailed returns of land revenue for the last 30 years.

(signed) J. F. Thomas,
Chief Secretary.

Fort St. George, 3 January 1848.

Appendix (B.)

DISTRICTS.	Wet Cultivation.		TOTAL
	Under Tanks and Nullabs.	Extent of Land in Acres.	CULTIVATION.
	Extent of Land in Acres.		Extent of Land in Acres.
1 Guntoor	21,408		7,19,004
2 Nellore -	99,522		3,79,462
3 Bellary -	90,690		18,95,717
4 Cuddapah	87,006		12,89,073
5 North Arcot	1,54,883		4,13,638
6 Chingleput	1,73,022		2,41,914
7 South Arcot	1,92,572		6,92,321
8 Salem	51,384		7,11,886
9 Tanjore -	6,79,299		8,89,885
10 Trichinopoly	1,26,831		4,26,235
11 Madura -	96,558		4,91,126
12 Tinnevely	1,66,565		7,63,987
13 Coimbatore	67,761		14,23,429
14 Kurnool	6,973		4,53,156
15 Ganjam	68,203		*1,12,308
16 Vizagapatam	12,044		*23,106
17 Rajahmundry	1,31,024		4,15,232
18 Masulipatam	38,562		*1,66,721
TOTAL - - -	22,64,307		1,15,08,200

* These, and other districts with low figures, are in a great part of the zemindary where the ryots do not hold directly of the Government, and the only lands entered in this statement are those paying rents directly to the Government officers.

Appendix (C.)

No. 318.—P. W. D.

EXTRACT from the Minutes of Consultation, dated 8 December 1846.

READ the following Minute.

By the Most Noble the President.

(Here enter 25 August 1846, No. 266.)

Para. 1. The Government entirely concur in the views and in the opinions expressed by the Most Noble the President in the Minute recorded above, and think that the suggestions offered for increasing the efficiency of the Department of Public Works in all its branches are well calculated to insure the object contemplated.

2. The principal features of the arrangements comprehended in the Minute are the following:—

Firstly. That the Department of Public Works shall not form, as at present, a subordinate branch of the duties of the Revenue Board, but be constituted a distinct and separate department.

Secondly. That an engineer officer shall be selected, to be one of the two stipendiary members of the Military Board, and shall be nominated to a seat in, and become the working and responsible head of the Board of Public Works.

Thirdly. That the chief engineer will, nevertheless, continue to be an *ex-officio* member of the Board of Public Works, to assist in the discussion of all important questions.

Fourthly. That to each collectorate shall be attached an executive Maramut engineer, who should undertake, on behalf of the collector, and under his orders, all the outlays now made in the Department of Public Works.

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3. The

No. 18.

No. 19.

9 at 150 Rs. 1,350
 10 at 100 " 1,000
 Per mensem 2,350
 Per annum 28,200

3. The subsidiary arrangements do not require particular notice in this place; and if the general principles declared in the Minute of the President are approved by the Honourable Court, these arrangements can be carried out without difficulty. The only point for observation is the expense; and as it is proposed that the Maramut engineers shall receive in some districts 100, and in others 150 rupees each per mensem, the annual charge on this account will be but 28,200 rupees, besides tent allowance, and probably a small establishment for each.

*See Memorandum
 annexed.

4. Considering that the bulk of the public revenue, and the development of the resources of the country are greatly, if not wholly, dependent on the efficiency of the works of irrigation, and that the system in force for the control and management of this department, generally, is now very defective, as constantly noticed in the correspondence of the Board of Revenue in the Department of Public Works,* the Government are of opinion that the additional expense is a secondary consideration, and agree with his Lordship that "it would be saved, not in the diminution of the outlay upon the Public Works, but in the threefold usefulness derived from them, and in the means of insuring that the large outlays annually made should not, as at present, be too often thrown away."

5. With these observations, the Government resolve to submit the views of the Most Noble the President, and the arrangements proposed in his Lordship's Minute, for the favourable consideration and orders of the Honourable Court of Directors.

The following Minutes by the members of Council, written since the foregoing resolutions were prepared, are ordered to be recorded and brought to the notice of the Honourable Court of Directors.

Minute by the Honourable Mr. Chamier (here enter 26 October 1846, No. 337).

Minute by the Honourable Mr. Dickinson (here enter 6 November 1846, No. 338).

Minute by the Most Noble the President (here enter 21 November 1846, No. 339).

MEMORANDUM.

To the Court of Directors, R., No. 40, 26 September 1844	-	1. This is a correspondence with the Honourable Court of Directors on the inefficient working of the Board of Public Works.
Ditto, " " 46, 26 October " (p. 9)	-	
Ditto, P. W. 12, 16 December " "	-	
From Ditto, Rev. 12, 29 May 1845	-	
Public Works Cons., 3 December 1844, Nos. 11 & 12	-	2. In these papers there are observations of Government on the defective system of the Board of Public Works.
Ditto, 3 " " 17 & 18	-	
Ditto, 15 April 1845, " " 1 & 2	-	
Ditto, 5 September " " 24 & 25	-	
Ditto, 23 " " " 5 & 6	-	
Ditto, 6 January 1846, " " 5 & 6	-	
Ditto, 7 April " " 13 & 14	-	
Public Works Cons., 2 January 1844, Nos. 6 & 7	-	3. In these papers are notices of delay, extra or unauthorised expenditure, works badly executed, or unsatisfactory explanation.
Ditto, 30 " " " 4 & 5	-	
Ditto, 13 February " " 1 & 2	-	
Ditto, 12 March " " 1 to 5	-	
Ditto, 12 April " " 3 & 4	-	
Ditto, 16 " " " 1 to 3	-	
Ditto, 7 May " " 1 & 2	-	
Ditto, 25 " " " 1 to 4	-	
Ditto, 25 " " " 5 & 6	-	
Ditto, 11 June " " 7, 8, 15, 16	-	
Ditto, 18 " " " 1 to 6	-	
Ditto, 30 July " " 3 & 4	-	
Ditto, 3 September " " 15	-	
Ditto, 17 " " " 1 & 2	-	
Ditto, 3 December " " 19 & 20	-	
Ditto, 7 February 1845, " " 2 & 3	-	
Ditto, 7 " " " 17 & 18	-	
Ditto, 25 " " " 1 & 2	-	
Ditto, 15 April " " 12 & 13	-	
Ditto, 6 May " " 2 & 3	-	
Ditto, 1 July " " " " " "	-	
Ditto, 23 September " " 5 & 6	-	
Ditto, 7 October " " " " " "	-	
Ditto, 11 November " " 11 & 12	-	
Ditto, 25 " " " 10 & 11	-	
Ditto, 10 March 1846, " " 13 & 14	-	
Ditto, 23 June " " 3 & 4	-	

Appendix (D.)

GENERAL REPORT of the Road Department, to the 1st May 1853.

1. THE nature of the country chosen for the several trunk roads has so frequently been remarked upon in the late Captain Best's reports to Government, that I purpose in speaking of each line in succession, commencing with the western trunk road, No. 1, to detail merely what works were in progress at the time of my assuming charge of the department, those for which estimates have since been sanctioned, the progress made in the same, noticing the large masonry works only, the extent of traffic, and adding some few particulars regarding the increased establishment, which has been found necessary as the operations of the department have been extended.

"No. 1. Trunk Road."

2. Lieutenant Forlong, of the 1st Regiment Native Infantry, the officer in charge of No. 1 trunk road, was engaged in superintending the annual repairs on an estimate of Rs. 39,178. 11. from the Presidency to Vaniembaddy in the 125th mile, and in order to avoid passing through the crowded bazaar street of that town in the alteration of the line on an estimate of Rs. 6,383. 14. from the 125th mile, to join the old road to Bangalore again beyond the Neycoondy river in the 129th mile.

3. Throughout the 125 miles, commencing from the Supreme Court limits, at the Female Asylum in the 4th mile from the Fort (measured from the Wallajah bridge) the average thickness of metal on the road in the month of March 1852 was 3½ inches, and the greatest thickness in any part of it, and that for a distance of 10 miles only, between the 73d and 83d miles, was 5½ inches, proving, as stated by Captain Best in his general Report to the 1st May 1851 (in which he observes, that in 24½ miles the crust was 6 inches thick, and more in 7½ miles), that the quantity of material worn off the road, exceeded the quantity replaced.

4. It was evident, therefore, that the annual allowance, which during the last five years had been increased from Rs. 15,610. 10. to Rs. 22,775. 12., and again to Rs. 39,178. 11. was still insufficient to keep the surface in repair in the then rapidly deteriorating state of the road; and I consequently took an early opportunity of submitting to Government an estimate of Rs. 1,16,543. 3., being a revision by Lieutenant Forlong, of one which had been prepared by Captain Best, for placing on it a thickness of six consolidated inches of metal throughout.

5. This estimate received the sanction of Government on the 1st June 1852, and the work commenced by Lieutenant Forlong has since been most actively carried on under the superintendence of Lieutenant Chauncy of the 39th Regiment Native Infantry, who was appointed to succeed that officer on his being ordered to join his regiment on foreign service in Burmah. The expenditure up to the present time has been about 94,000 rupees; those portions of the road which have been completed are now in perfect order, and much attention having been given to the side slopes and drainage, the condition of the road generally is greatly improved.

6. Probably the best criterion of its improvement may be formed from the trifling extent of damage it sustained during the late very severe monsoon, compared with former years, as mentioned by Captain Best in his general report of the department, to the 1st October 1848. The gradual improvement may be dated from the monsoon of 1846, during which no fewer than 11 bridges were destroyed; these having been substantially rebuilt, all the smaller tunnels and culverts carefully strengthened, others added to admit of the passage of water where necessary, and proper attention, as before stated, having been paid to the side slopes and drainage, I feel sanguine, that with the additional metal now being laid on, the present annual allowance of Rs. 39,178. 11. will be found sufficient to keep the surface of the road in good order for some years to come.

7. On the 23d October 1852, an estimate of Rs. 45,009. 12. 6. was sanctioned for improvements from Vaniembaddy to the Mysore frontier beyond Oossoor in the 193d mile, which provides for bridging and tunnelling the numerous rivers and streams, in all 51, which cross the line in this distance, and an effective establishment for superintendence having been organised the works are now progressing rapidly. The expenditure up to the present time has been about 21,000 rupees.

The principal bridges to be constructed on this portion of the line are:—

The Neycoondy of	- - - - -	4	arches of 8 yards span.
The Kullaur	- - - - -	1	" of 16 ditto.
The Natrapilly	- - - - -	3	" of 10 ditto.
The Burgoor Malapady	- - - - -	2	" of 10 ditto.
The Condaoopum	- - - - -	3	" of 5 ditto.
And Cooroobahully	- - - - -	3	" of 16 ditto.

8. In addition to the above estimates, two of trifling amounts have been sanctioned, one of Rs. 959. 10. for improving the road over the Begunhully tank bund in the 193d mile, and another

another of Rs. 424. 9., for strengthening the Coöum river bank in the 5th mile; the former work has been completed under the superintendence of the Collector of Salem, and the latter is to be undertaken by the civil engineer of the 4th division.

9. A sum of 3,100 rupees was sanctioned on the 23d August 1852 for the formation of direct bandy tracks from 13 of the principal quarries to the main line, between the Presidency and Cauveripauk, which will be of much importance, as at present the road operations are not only frequently stopped during the rains, but the price of stone and gravel is materially increased, by the bandies having to follow long winding tracks to avoid crossing deep channels, or patches of cultivated land. The surveys of these quarry tracks have been completed, and the formation of them commenced.

10. The road now comprises six divisions, averaging $31\frac{1}{2}$ miles in extent, each being under the charge of an assistant overseer. These divisions are again subdivided into districts of six miles, in which, in addition to the head coolies, are employed, according to the amount of work, pygusta and cart conicopolies, other conicopolies are placed in charge of the quarries, and the duties of the department maistries extend over a certain number of districts, to superintend, under the orders of the overseers, either the road or masonry works, or both, according to their qualifications.

11. As new estimates received sanction, Lieutenant Chauncy's charge became so extensive, comprising, as stated in my report for December 1852, 189 miles of trunk road, No. 1, 65 miles of No. 10; the number of masonry works to be constructed between Vanienbaddy and the Mysore frontier, the formation of quarry tracks, and the charge of the several quarries, which require frequent inspection, that I was induced to solicit the sanction of Government to my entertaining an intelligent assistant to travel about with, and relieve him from some portion of his work. For this purpose, Mr. Addis, who had gained considerable experience in road making in the Coimbatore district, and who was otherwise well qualified for the duties, was appointed to the department, and is now employed under the directions of Lieutenant Chauncy.

"No. 2 Trunk Road."

12. Overseer Graham of the sappers was engaged as now, in superintending the construction of the Feringypett bridge of one 15 yard arch, and the annual repairs from Fraserpett, *via* the Sumpajee ghaut to Mangalore, a distance of 105 miles, and reports great improvements to have been effected. The repairs of the branch road from Oopinungady to Pootoor, $7\frac{1}{2}$ miles, have been superintended by the department of the Collector of Canara, and an allowance of 200 rupees for its annual repair was sanctioned on the 23d November 1852. The only additional estimate which has been sanctioned on this road is one of Rs. 1,455. 1. for a bridge over the Huntiaur nullah of one 6 yard arch.

"No. 3 Trunk Road."

13. The operations on this line, on an estimate of 1,150 rupees for maintenance, from the north-western frontier of Mysore, *via* the Munzerabad ghaut to Buntwall, a distance of 46 miles, as well as the construction of bridges in Canara, between the foot of the ghaut and Oopinungady, on an estimate of 9,827 rupees, have been conducted under the orders of the Board of Revenue in the Department of Public Works.

On the former estimate, bills have lately been submitted to Government; amounting to Rs. 1,317. 5., for the years 1849, 1850, 1851; and on the latter, an expenditure to the extent of 9,753 rupees is proposed to be debited to the road funds, as explained in my letter, No. 207, dated 4th May 1853.

The construction of the bridge of one arch of 49 feet span, at a new site over the Conchicar Cootle stream near Buntwall, is to be delayed until the completion of the Feringypett bridge, in which will be tested the value of laterite stones as a building material for arches.

14. The additional estimates which have been sanctioned are:

Rs. 2,506. 15. 4. for making a new line of road at Buntwall from Mangalore, between the 15th and 18th miles.

Rs. 798. 12. 6. for constructing a bridge of one arch of 8 yards' span across a jungle stream at Buntwall, and

Rs. 13,589. 13. 7. for the construction of bridges in the Canara District, the particulars of which have not been furnished to this office.

"No. 4 Trunk Road."

15. Lieutenant Francis, of the 12th Regiment Native Infantry, who was engaged in the construction of the road from the Mysore frontier, *via* the Periaumbaddy ghaut to Cannanore, a distance of 68 miles, was, on the works being nearly completed, removed to the southern trunk road, No. 8, leaving assistant overseer Church, of the sappers, in charge, to carry on the annual repairs on an estimate of 3,400 rupees sanctioned in Minutes of Consultation, No. 238, dated 2 December 1850.

16. The only additional estimate which has been sanctioned on this line, is one of Rs. 1,398. 5. for rebuilding the Oorettee Todu bridge, of three arches of eight yards' span, near the foot of

of the ghaut; the cause of the failure of the original structure was explained to Government in my letter, No. 578, dated 14th December 1852. The expenditure during the year has been—
6,008 rupees, and the assistant overseer reports very favourably on the state of the ghaut and road generally.

“No. 5 Trunk Road.”

17. Lieutenant Chauncy now in charge of the western roads, Nos. 1 and 10, was engaged in superintending the repairs between Waliour and Ponany, 70 miles, in the annual repairs of the same. In the construction of the road from Coimbatore to Waliour, 16 miles, in placing additional metal on the same. In improvements between Waliour and Ponany, and in building the Nuragumpilly bridge of five arches, 13 yards' span, and Parlakadow bridge of 10 arches of 15 yards' span, both of which have been completed, the former at a cost of Rs. 6,518. 4.; for the latter the bill has not yet been received.

18. The rebuilding of the bridge of 26 arches of 47½ feet span of the Cauvery river at Bowany, on an estimate of Rs. 48,789. 11. has been completed under the orders of the civil engineer of the fifth division, but no bills yet received by this department, and the repairs between Perindoray and Bowany, 12 miles, have been carried on by the civil engineer of the seventh division.

19. The additional estimates which have been sanctioned are:
Rs. 4,830. 14. for repairs between Coimbatore and Avanashy, 12 miles.
Rs. 5,204. 5. for additional metal and masonry works between the same.
Rs. 1,566. 3. for repairs from Coimbatore towards Carumthumpetty, 4½ miles.
Rs. 1,370. 12. for annual repairs between Coimbatore and Waliour, 16 miles.
Rs. 13,066. 10. 4. for construction of the road between Paulghaut and Menjara, 12½ miles.
Rs. 4,781. 10. 9. for building a bridge of three arches of 10 yards' span, over the Wotapollum stream, in lieu of an old timber one which had gone to decay, and
Rs. 2,218. 14. 9. for repairs to the Chinna Nowkurray bridge, and Muddakaray road dam.

20. These works are being conducted by the departments of the Collector of Coimbatore, and civil engineer of the seventh division; and in consequence of a representation made by the latter officer regarding the want of some assistance in superintendence from the road department, overseer Downes of the Sappers was ordered, in March last, to proceed to Coimbatore for employment on Trunk Road No. 5, in the limits of that district.

“No. 6 Trunk Road.”

21. The works in progress on this road from the Presidency to the Bengal frontier were, annual repairs between Itchapoor and the frontier, 54 miles; repairs between the same, and the construction of a bridge of nine arches of 10 yards' span, over the Bimlipatam river, which has nearly been completed under the superintendence of Lieutenant Rundall, of the Engineers.

The repairs between Goomidipoondy and Ulloor, 102 miles; annual repairs between the same, and construction of the road between Madaveram and Goomidipoondy, 19 miles, under that of Assistant-supervisor Arnold of the Sappers.

22. The additional estimates sanctioned are:
Rs. 703. 4. 2. for repairs between Senkaram and Aukapilly, 12 miles.
Rs. 1,408. 1. 3. for repairs between Senkaram and Soobarum, 12 miles.
Rs. 3,688. 3. 9. for building a bridge of three arches of 10 yards' span, at the approach to the Bimlipatam river bridge.
Rs. 3,413. 7. 7. for repairs between Yellamanchelly and Cassimcottah, 12 miles.
Rs. 23,171. 4. 5. for repairs from Yellamanchelly to Toonee, 25½ miles.
Rs. 21,135. for the construction of two bridges, each of 10 arches of 10 yards' span, over the Aukapilly and Toonee rivers.
Rs. 3,600. salary of an officer, at 150 rupees per mensem, for two years.
Rs. 3,210 for annual repairs from Toonee to Soobarum, 53½ miles.
Rs. 781. 3. for repairs in the Guntoor district.
Rs. 952. 14. for construction of the road between Yerukenjairy and Madaveram, 3 miles.
Rs. 2,974 for annual repairs between Yerukenjairy and Goomidipoondy, 22 miles.
Rs. 59,268. 5. 9. for alterations and improvements between the 47th and 79th miles.
Rs. 6,310. 8. 8. for repairing the damage done in October 1852, from the fifth to the 28th miles, and
Rs. 28,753. 7. for repairing the damage done in November and December 1852, between Tada and Nellore.

In addition to the bridges before named, the following are to be constructed:

The Pamla Kalva - - - - of 5 arches of 10 yards' span.
Mannadi Kalva - - - - of 5 arches of 12 ditto.
Kalingee Nuddly - - - - of 7 arches of 10 ditto,
and two head sluices, one of one vent of two yards' span to the Ootoo Calva, a channel from the Kunlair river, and the other of six vents of 1½ yards' span in the bund of the Woojelly tank.

23. The first nine of these estimates were prepared by Lieutenant Rundall, and the works on them will be superintended by that officer, in communication with this department; assisted by Lieutenant Magrath, of the 21st Regiment Native Infantry, who arrived in the Vizagapatam district on the 23d April last; those on the last five estimates will be conducted by Ensign Marshall, of the 12th Regiment Native Infantry, who joined the department on the 10th October 1852. Assistant Supervisor Arnold, who has been in charge of the line as far as Nellore for the last five years, was obliged shortly after being relieved, to proceed to the Neilgherry Hills on medical certificate.

24. The inundations of the rivers Corteliaur, Ponair, and Pennaur and their channels, with the overflowing and bursting of several of the large tanks to the west of the line, again caused a great amount of damage during the last two monsoons. Nor will repairs be of any avail until the river and tank embankments are carefully strengthened, and the supply of water to the river channels properly regulated by head sluices, as represented in my Report for January last.

25. From Yerukenjairy to the Corteliaur river, a distance of 12 miles, the road has been completed, its surface metalled, all the smaller streams crossing it tunnelled, and a bridge of five arches each of eight yards' span, built over the surplus channel from the Red-hill tank, a bridge of nine arches each, of 12 yards' span, is in course of construction across the Ponair river, and a small one of three arches, of 12 yards' span, has nearly been completed in the 20th mile. By the end of the year, the metalling, excepting over those portions where the embankments were breached during the last monsoon, will be completed as far as Goomidipoondy, 22 miles.

"No. 7 Trunk Road."

26. On this road, which branches off to Hyderabad from No. 6, a little north of Ongole, no estimates for work have yet been submitted.

"No. 8 Trunk Road."

27. Captain Heathorn, of the 3d Regiment Native Infantry, who was in charge of the southern Trunk Road No. 8, from the Presidency to Trichinopoly, was obliged shortly after my joining the department, to proceed to sea on medical certificate. On the 26th April 1852, Lieutenant Tireman, of the 4th Regiment Native Infantry, was appointed to succeed him, and on the 29th October 1852, Lieutenant Francis was directed to take charge of the line from Vickravandy to the Oopaur river, near Semiaveram, a distance of 95 miles, Lieutenant Tireman's charge extending from Palaveram to Vickravandy, 80½ miles, and thence to the lower Coleroon anicut, 62½ miles on Trunk Road No. 9, on which latter, beyond the marking out and the preparation of materials for the Wallajah and Vuddavaur bridges, no work had been commenced.

28. On No. 8. The works in progress under Lieutenant Tireman's superintendence were: Completing the construction of the road from Chingleput to Vickravandy, 53 miles, and from Vickravandy to Oolundoorpett, 30 miles.

The annual repairs between Palaveram and Vickravandy, 80½ miles.

The construction of a causeway across the Oopaur river, near Semiaveram, which has been completed at a cost of Rs. 5,401. - 7.; of a bridge of 5 arches, of 10 yards' span, over the Chinnaur river, of which the abutments and piers were built before the last monsoon; and the annual repairs and metalling of the road from Vickravandy to Oolundoorpett. These last three works have now been placed under Lieutenant Francis, and the Chinnaur bridge, which was nearly completed, having unfortunately been destroyed by an unexpected fresh in the month of March, before the centerings had been removed, has to be rebuilt.

29. The works under Major Lawford, civil engineer of the 6th division, were:

The construction of the road between the Coleroon and Cauvery rivers, 2½ miles, and from the Coleroon river to Semiaveram, 5½ miles.

The construction of a bridge of 32 arches of 15 yards' span, over the Cauvery river, near Trichinopoly.

Of a bridge of 38 arches of 20 yards' span, over the Coleroon river, near Trichinopoly.

And the annual repairs between Semiaveram and Trichinopoly, 8½ miles.

30. The estimates since sanctioned are:

Rs. 42,099. 5. 9. for the reconstruction of 22 arches of the Coleroon bridge.

Rs. 1,937 for annual repairs between Semiaveram and Trichinopoly, 8½ miles.

Rs. 378. 11. for embanking the Oopaur, near Semiaveram.

Rs. 47,667. - 6. for the construction of the road between Oolundoorpett and the Vellaur river, 29 miles; and of

Rs. 57,263. 10. 4. from the Vellaur to Semiaveram, 36 miles.

Rs. 31,709. 12. for a causeway across the Paular river, near Chingleput, and

Rs. 25,000, for repairs between Moosree and the Salem boundary of these works; the three first have been conducted under the orders of Major Lawford; the two second are in progress under the superintendence of Lieutenant Francis, the sixth under that of Lieutenant Tireman, and the last is to be carried on under the directions of the civil engineer of the 5th division.

31. The

31. The rebuilding of the Coleroon bridge has been completed, but the bills not yet furnished to this department. The embankments and formation of the line generally from Oolundoorpett to the Oopaur river, are progressing rapidly under Lieutenant Francis, and by the end of the present year, the greater number of the smaller masonry works, with the abutments and piers of the larger bridges, will be completed. The principal bridges on this portion of the line are:

The Yeringee	- - - - -	8 arches of 10 yards' span.
Chepaukum	- - - - -	7 " of 10 ditto.
Oorungoor	- - - - -	1 " of 7 ditto.
Vapoor	- - - - -	1 " of 8 ditto.
Chunnaur	- - - - -	5 " of 10 ditto.
Jungle stream	- - - - -	1 " of 5 ditto.
Ditto	- - - - -	1 " of 6 ditto.
Agarun	- - - - -	1 " of 12 ditto.
Jungle stream	- - - - -	1 " of 5 ditto.
Ditto	- - - - -	1 " of 6 ditto.
Ootatoor	- - - - -	1 " of 12 ditto.

and the Vickravandy bridge, of five arches of eight yards' span, particulars regarding the destruction of which, during the last monsoon, were submitted to Government in my letter, No. 189, dated 21 April 1853, has to be rebuilt.

"Trunk Road No. 9,"

32. Which branches from No. 8 in the 94th mile, near Vickravandy, follows a direction nearly due south, and crossing over the Vellaur and Coleroon rivers at the sites of their anicuts, is continued on to Combaconum, a distance of 75½ miles, where it joins the high road from Trichinopoly, to the coast road from Negapatam to the Presidency.

33. The construction of a bridge of 19 arches of 31 feet span, over the Vellaur anicut, under the superintendence of Captain Heathorn, was completed previous to my joining the department, and Major Lawford is about to submit a plan, which, in connexion with other improvements to the Coleroon anicut, will provide for bridging it. Of the Vellaur Bridge, four of the arches at the north end fell in March last, the portion of the anicut under them having been destroyed during the floods in that month. Arrangements are being made for restoring the anicut, and if the work is completed sufficiently early in the season, I shall hope to get the piers rebuilt before the monsoon, leaving the arches to be turned next year.

34. The construction of the road from the Lower Coleroon anicut to Combaconum, 13 miles, of two ferry boats for crossing the Coleroon river, and of a head sluice to the North Rajah Voikal, to provide a roadway at a cost of 4,000 rupees to the department, have also been conducted under the orders of Major Lawford. An annual allowance of Rs. 300. 8. was sanctioned in Minutes of Consultation, No. 118, dated 27 March 1852, for the maintenance of the ferry boats, for which bills are furnished by the Collector of Tanjore.

35. The marking out of the line between Vickravandy and the Lower Coleroon anicut, a distance of 62½ miles, was completed on my joining the department, and the preparation of materials was in progress for the construction of a bridge, of one arch of 60 feet span, over the Vuddavaur channel, and of one of five arches of 10 yards' span over the surplus channel from the Wallajah tank.

36. The estimates since sanctioned are:

Rs. 3,240. for repairs between the Lower Coleroon anicut and Combaconum, 13 miles.

Rs. 49,150. 8. 6. for the construction of the road from the Geddalum river to the Lower Coleroon anicut; 43 miles; and of

Rs. 48,094. 12. 4, from Pauprumpett to the Geddalum river, 19½ miles.

The works on the first of these estimates are in progress under the superintendence of Major Lawford, and on the two latter of that of Lieutenant Tireman. The abutments of the Vuddavaur bridge, and abutments and piers of the Wallajah bridge, were completed before the last monsoon, and the turning of the arches, with the construction of all the smaller masonry works, as well as the embankments throughout, will be completed by the end of this season.

37. The principal bridges on the line, of which the abutments and piers only will be built before the monsoon, are the—

Pumby	- - - - -	of 2 arches of 10 yards' span.
Aullungaul	- - - - -	4 " 3 ditto.
Mullataur	- - - - -	2 " 10 ditto.
Comaramungalun	- - - - -	1 " 5 ditto.
Poolatanoor	- - - - -	1 " 5 ditto.
Wallajah	- - - - -	5 " 10 ditto.
Old Vuddavaur	- - - - -	2 " 5 ditto.

The expenditure during the year has been Rs. 27,850. 11. 11.

"Trunk Road No. 10."

38. Branches from No. 1 in the 71st mile, and crossing the Poinay River at Trivellum, continues on by Chittoor, the Moogly ghaut, and Palmanair, to the Mysore frontier, where it joins the high road from Nungly to Colar, a distance of 65 miles.

39. The construction of this road was conducted under the personal directions of Captain Best, the works on the death of that officer being carried on by Lieutenant Forlong, under whose superintendence the Palmanair bridge of five arches of 12 yards, the Eroowarum bridge near Chittoor of five arches of eight yards' span, since destroyed by the floods in March 1853, as reported in my letter No. 180, dated 18 April 1853, and the other masonry works were completed. On the departure of Lieutenant Forlong to Burmah the charge of the line was made over to Lieutenant Chauncy, who is now engaged in completing the works on the original estimates, amounting to Rs. 74,042. 5. 5., in superintending the annual repairs on an estimate of 6,813 rupees, and in rebuilding the Eroowarum Bridge.

40. From Arcot to Chittoor, 27 miles, bridges over the Poinay river at Trivellum and the Eroowarum near Chittoor, being the only two wanting on the whole line from the Presidency to Bangalore, the road is in excellent order; between Chittoor and the foot of the Moogly ghaut, 14 miles, some few portions require to be improved, for which funds are available, but the work has necessarily been postponed till the rains set in. The Moogly ghaut and road from its summit to the frontier, 24 miles, are also in very good order, and I have no doubt that by the end of the present year the whole line, with the exception of the two bridges before mentioned, will be perfectly completed.

"No. 11 Trunk Road."

41. This trunk road, in the late superintendent's reports, has been spoken of as the one from Madras to Bellary, *viâ* Sholingurh, Damulcherro ghaut, Goorumconda, and Hundy Anuntapoor; but the estimates and accounts for the Goolcherroo ghaut, and improvements of the road from Bankrapett having been numbered the same, I have thought it better to define the road from Madras to Cuddapah as No. 11, more particularly as by the order of Government, contained in extract from Minutes of Consultation, No. 392, dated 6 December 1852, the construction of the line to Bellary is to remain for future consideration, in consequence of the projected railway to that station.

42. Eventually, on the railway being extended from Méuit to Trivellum, it may be considered advisable to continue the road from Damulcherroo as far as Chittoor only, to join No. 10, as proposed in my letter, No. 190, dated 22 April 1853, in which case No. 11 will be comprised between Chittoor and Cuddapah, its continuation being by No. 10 from Chittoor to Rancepett, and thence by No. 1 to Madras.

On my assuming charge of the department, the only work in operation was the improvement of the Goolcherroo ghaut, under the superintendence of Lieutenant Hemery, of the Engineers, on an estimate of Rs. 14,592. 11., and the expenditure, up to the present time, has been Rs. 14,732. 8. 6.*

43. The estimates since sanctioned are:

Rs. 600 for the annual repairs of the Goolcherroo Ghaut.

Rs. 11,881. 7. 10, for improvements between Damulcherroo and Kulloor, including the Ghaut; and,

Rs. 16,903. 1. for the construction of the road from Bankrapett to Cuddapah.

On the first of these the repairs were carried on up to March 1852, by Lieutenant Hemery, since which a small establishment has been kept up to attend to the side drains, avenue trees, and other trifling works, and Assistant-overseer Dameram, of the Road Department, has now been sent to Cuddapah, to construct the road from that town to Bankrapett, and to continue the repairs of the Ghaut.

44. On the improvements to Trunk Road No. 1, on the estimate of Rs. 1,16,543. 3. being completed, Mr. Addis's services will be available for carrying out the second of these estimates, and I shall hope in the course of next year to see the work well advanced. In addition to the above, a sum of 15,000 rupees was sanctioned on the 14th August 1852, for clearing jungle and removing impediments to the common cart traffic on the Chitwail Valley road to Cuddapah; the work to be superintended by the departments of the civil engineers of the second and fourth divisions.

45. In carrying on the several works of the Road Department much valuable assistance in superintendence has been received from the departments of the collectors of Canara, Coimbatore and Salem, and of the civil engineers of the 1st, 3d, 6th and 7th divisions, and I cannot speak too highly of the services of my assistants, Lieutenants Tireman, Chauncy, Francis and Marshall; my opinion of the abilities of Captain Heathorn and Lieutenant Forlong was made known to Government on those officers being withdrawn for a time from the department.

46. I have

* The excess of Rs. 130. 13. 6. was received by the sale of unserviceable tools, and the expenditure received the sanction of Government in M. C. No. 311, dated 21 September 1852.

46. I have also every reason to be satisfied with the conduct generally of all the overseers, but more especially of Serjeant Arnold, Corporals Graham, Brown, Jolliffe, Church, Hopkins and Goodchap, Ordnance Artificer Damaran, and of Assistant Overseers Wakefield, Shopman and Ramanjooloo; Assistant Overseers Booth, Beveridge, McCarthy and Lawrence, who have lately joined the department from the artillery, also promise well.

47. Accompanying this report are maps of the several trunk roads, on a scale of four miles to an inch, showing the positions of all the towns, villages and large bridges, of which mention has been made, one map on a scale of 20½ miles to an inch, showing the relative positions of the roads, statements of the estimates sanctioned, advances drawn, balances of estimates, bills sanctioned and ready for sanction, and of the outstanding balances, from the first formation of the department to the 1st May 1853, with a general summary of the same, a prospective statement of expenditure for the year 1853, 54, a statement of traffic, and one of the marches I have made from December 1851 to May 1853.

48. It will be observed, by comparing the general summary contained in statement No. 14 with that submitted to Government to the 1st May 1852, that the estimates sanctioned during the past official year amount to Rs. 5,38,980. 1. 8., the advances drawn to Rs. 4,13,468. 1., and the bills sanctioned to Rs. 4,54,115. 11. 8.; of the expenditure no exact account can be given until bills for the several works executed are received, but the advances may be taken as an approximate amount.

49. I have been endeavouring to procure correct returns of traffic on the several trunk lines, a comparison of which, with the periodical reports furnished to my office on the condition of each mile of road, will in the course of time enable me to judge correctly of the annual amount of outlay required for repairs. This at present I am unable to do, partly on account of the traffic returns hitherto furnished at irregular intervals being very incomplete, and partly from not having as yet received a sufficient number of reports from which to form an opinion as to whether the roads generally are properly maintained.

50. From January 1852 to May 1853 surveys on a scale of eight inches to one mile, extending over a distance of nearly 400 miles, have been completed, each mile occupying a separate sheet, according to the arrangement of the late superintendent, on which are shown an extract from the field book of the surveyor, and elevations of the several masonry works, large and small. A very intelligent maistry, by name Annasawmy, has been employed exclusively on this duty, and the surveys, carefully made, have been plotted by him with a great degree of neatness and exactness.

51. The establishment for European superintendence which, on my first joining the department, consisted of 1 superintendent, 3 assistants, 1 assistant supervisor, and 14 assistant overseers, in all 19, has now been increased to 1 superintendent, 5 assistants, 1 second assistant, 1 assistant supervisor, 2 overseers and 19 assistant overseers; in all 29.

C. C. Johnston, Captain,
Superintendent of Roads.

Superintendent of Roads' Office, Camp,
Aurumbauk, 28 June 1853.

Appendix (E.)

MINUTE.

LETTER from the Commission on Public Works, 21st November 1851; Extract from the Proceedings of the Board of Revenue, reporting upon the same, 15th January 1852.

1. THE Commissioners propose, in the above communication, that the Government should at once abolish the separate Road Department, established under the orders of the Honourable Court, by their despatch of 23d September 1845, and revert to the former system, by again placing the whole of the Presidency roads under the charge of the Board of Revenue, Department of Public Works, and of the civil engineers of the districts.

2. I concur entirely in the opinion recorded by the Right Honourable the President and the Honourable Mr. Elliott, that the proposed change is open to the most serious objection in principle, and that it is not calculated to further the public interests. It is obvious to remark, that so long as the roads were under the charge of the Board of Revenue and of the civil engineers, little or no attention was paid to them, and, in fact, year after year passed, and nothing whatever permanent or effectual was done. The condition of the roads of this Presidency when the superintendent took charge of them is thus stated in the Honourable Mr. Chamier's minute of the 5th February 1845: "The state of the roads in the interior, with the exception of the Great Western Road, is discreditable to the Government, and detrimental to the best interests of the country; and the detention and difficulties to which troops marching are liable, are highly embarrassing to the public service."

3. Large sums of money had indeed at times been laid out by one civil engineer or another upon the roads, for instance, in the northern division; but whether through the neglect of the Board, or that one engineer did not take the same view of their importance,

or of the line selected, or of the mode of construction as his predecessor; the result was that, under the Board and the civil engineer, the money expended was wasted, and the Presidency was without a really good road.* No systematic attempt indeed appears to have been ever made, through a series of years, to form great lines of good road, and I see no reason to suppose that it will be otherwise in future, if the control is vested again in the Board of Revenue, Department of Public Works, and the civil engineers.

4. The only line of trunk road made prior to 1845 was, as Mr. Chamier noticed, the great western line, running to Bangalore; and this was done by taking this road out of the charge of the Board and of the civil engineers, and placing it under the exclusive control of officers responsible for it; at one time of the chief engineer, and afterwards of a separate officer (Captain Worster).

5. The Honourable Mr. Chamier also observed, and as it seems to me justly, in the same minute, para. 4., that there is nothing in the education of the officers of engineers "which particularly qualifies them for road-making;" there would not appear, therefore, to be any necessity for placing the roads under them, and it may be questioned whether practical experience in this particular department of work is not as necessary as mere scientific acquirements.

6. I can scarcely myself doubt, looking at the extent of the duties imposed upon a civil engineer, that if the great western road and the great southern line, two roads of primary importance, and both, for a long distance, within the same division, had depended for their execution upon the engineers of the division, they would not have been done at this hour; and if they are now to be left to be kept up by that officer, it will be at the cost of other important works; but if this be not the case, and his general duties are attended to, the Government will then constantly have, as heretofore, the just excuse offered for all omission and waste of funds, that it was not practicable for him to be responsible for those roads, as other works, which did not admit of delay, called him away at the moment when he should have been on the road, supervising the work going forward under his subordinates. Whilst the Board, it is certain, will deem that plea all-sufficient to exonerate the officer from responsibility; and the past irresponsible and defective system, if it can be called a system, would resume its full force.

7. Concurring also fully in the view taken by the late President (see Marquis of Tweeddale's minute, 21st January 1845, para. 4 †), of the duties of the superintendent, it is, I think, evident that if these duties are to be well and ably performed, it can only be by an officer who has this one separate and exclusive charge, and who will be content to take in hand at one time no more than he can thoroughly perform. These details never can be properly worked out, I believe, by the engineers of the divisions, who are not permanently attached to any one division, and whose hands are already more than full.

8. The very first instance adduced by the Board of Revenue, Department of Public Works, of improvements effected on the roads by the civil engineers of divisions, irrespective of the road department, viz., the Parumbaddy ghât, appears to me to disprove their view. This ghât was only made by withdrawing the officer entirely from his duties as a divisional officer, and by restricting him exclusively to the road department, showing, as I think, clearly that the divisional duties of an engineer are incompatible with the special duties required on large and important roads.

9. Again, in the case of the Coleroon bridge, also cited by the Board, it was only because the chief calls upon the civil engineer happened to lie in the immediate proximity of the site of the bridge, that he was enabled to undertake the charge. This exceptional case further demonstrates, therefore, that the civil engineer cannot ordinarily take the supervision of important road work and attend at the same time to his proper duties, and that the trunk roads must and ought, as a general rule, to be a separate charge.

* 10. I consider the Board to be in a great degree in error in their estimate of the work performed and the progress made by the late superintendent of roads. It was of course necessary, in the early stage of his duty, that he should prepare his way rather than undertake, with the limited number of subordinate officers in his department, at the same time, several lines of road in various parts of the country. His error was, in my view, in attempting too much in this way. But the rules prepared by Captain Best, drawn in part from his own experience, and in part from communications with the officers in charge of roads at the other Presidencies, and his numerous reports, show the mass of preparatory work performed; and much of this, it may be safely stated, the Board of Revenue had neither the time nor were in circumstances ever to accomplish; and I much question,

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* Salem is an exception; but here the roads were formed by the Collector and his assistants, and not by the civil engineer—nor under the Board's supervision,—but even I take it, without their cognizance.

† "So that it may be seen nothing is proposed to be undertaken without every detail and particular connected with it having been ascertained. To secure this, the foundation of the proposed line must be examined; the levels taken; the quality of the material tested of which it is to be made; plans for the site and construction of bridges prepared; the best mode of under-drainage explained, and determined on; and every part connected with its formation, or the material to be used in its construction, should be specified in writing, accompanied by plans regularly executed in accordance with the specifications."

looking at Captain Johnstone's late report,* whether there has not been fully as much done by the Road Department as could be expected, or was anticipated; for it will be seen, on reference to Lord Tweeddale's minute,† para. 20, that he limited the department, in the first instance, to three main roads.

* Founded on Capt. Best's papers, &c.
† 21 January 1845.

11. It may be as well to notice here, that the Commissioners in assigning as the grounds of their proposal the altered character of the Road Department, "under recent orders," are but imperfectly acquainted with the subject on which they treat. They observe in para. 2 of their letter: "The great defect in the constitution of the Road Department was, that it was required to be not simply projecting and controlling, but executive also; and this with very inadequate agency; and thus there was laid on the superintendent an accumulation of duties, beyond the powers of any individual whatever to discharge in a satisfactory manner. The practical evils found to result from this system, led the present Government in October 1850, to direct Captain Best to confine his movements, and give his best attention to the three roads of limited extent, and comprised within a comparatively small compass, which roads it was considered, would occupy the full time and attention of himself and his assistants. These orders were reiterated in January 1851, with the addition, that Captain Best should confine himself to the execution and completion of such great lines of road only as he could personally and efficiently inspect; and that no portion of any of the trunk roads on which workmen were engaged, should be for any period beyond a few days left without a personal supervision of the superintendent of roads or one of his assistants, these assistants being only two in number." And the Commissioners add, para. 3; "These orders totally changed the character of the Road Department; it ceased entirely to be what was intended at its creation."

12. These statements appear to me inaccurate, and at variance with the records. In one of the earliest orders of Government, 2 April 1846, para. 1, it was remarked, when refusing the superintendent a large office establishment, "Independently of the heavy charge it would create, a large establishment of this nature is open to exception, as tending to take the superintendent from his more direct and immediate duties, the constant personal supervision of the works under his care; and to constitute him rather the head of a fixed office establishment, when he would be superintending the routine office duties of an establishment. This would not meet the views of Government, as it is the object of his Lordship in Council to keep the Road Department a practical working department, rendered efficient by undertaking no more at one period than can be readily and thoroughly superintended, and by securing for all works, the constant personal supervision of the European heads of the department; and he is of opinion, therefore, that the establishment should be such as can move without difficulty under the superintendent." I can see no difference between these early orders and the recent instructions of Government referred to by the Commission, who would appear not to have read the records.

13. On their further proposal that the Government should at once nominate an assistant to the Secretary to the Board of Revenue Department of Public Works, they have grounded it almost entirely upon the supposition that the superintendent of roads would, or could be immediately abolished by the Government without a reference to the Honourable Court. If this should not be the case, there are clearly no funds available for the salary of the assistant secretary, and the proposition of the Commissioners necessarily falls to the ground.

14. I should, however, under any circumstances, consider it better to await their full report on the department before any change is made; but as I have no doubt that the secretary is now overburdened, some aid might perhaps be given in attaching an efficient uncovenanted assistant to the department, and this may be even eventually a better course than the withdrawing a young officer of engineers from the active duties of his profession, at a time when the services of such officers are greatly needed in the provinces.

6 March 1852.

(signed) J. F. Thomas.

Appendix (F.)

The facts of the case, as stated by the Board, are as follow:

No. 570.

EXTRACT from the Proceedings of the Board of Revenue in the Department of Public Works; under date the 3d August 1848.

1. In the first of the papers above recorded, the Board of Revenue are required to call upon Captains Dumas, Bell, and Birdwood, the three officers engaged in planning and building the bridge over the Cavery at Blowani, to submit such explanations as they may have to offer in reply to the statements made in Lieutenant-Colonel Lowe's report. These explanations the Board are further required to lay before Government, with their own opinion on the subject; and at the same time to furnish an estimate for rebuilding the bridge in the manner proposed by the chief engineer.

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2. The explanations received from the three officers above mentioned are contained in the four papers next recorded. Captain Ditmas, who is represented when acting as civil engineer in the division "for a short time to have drawn out an incorrect section of the river, it having been measured in a loose and careless manner," states in his first letter, that though he considered the sections taken by him "to be nearly correct, he never should have permitted them to be made use of without being verified and tested previous to their adoption;" and again, that "he made them merely to enable him to judge somewhat regarding the cost of bridges, should they hereafter be proposed." These, however, were not the views of the Board, to whose instructions Captain Ditmas does not appear to have adverted in framing his reply. In the letter despatched from this office on the 18th April 1844, he was requested to prepare plans and estimates for the bridges, and to forward them to Captain Bell for transmission, and it was added, "that the difficulty of obtaining memoranda regarding the sections of rivers, and the practicability of bridging them made it very desirable that the data should be recorded with care." The Board not deeming the first explanation satisfactory, referred a second time to Captain Ditmas, who, however, did not consider it advisable to make any change in his original statement, and adduced additional reasons to show that his section could not be considered in any other light than the one in which he had described it.

From Capt. Bell to
Capt. Pest, 6 July
1844.

3. Upon these sections, such as they were, Captain Bell prepared the plans and estimates of the two bridges. In his reply to the requisition of the Board now under consideration, he observes, "that in submitting them (*i. e.* the original plans and estimates) to the Board he distinctly stated that they had been prepared by him upon the sections and rough designs sent to him by Captain Ditmas;" and again, that he had "never had an opportunity of examining the (Cavery) river when accurate observations could be taken." He however did repair to Bhowani, and made such observations on the locale as circumstances permitted. The only point for determination between him and Captain Ditmas is, whether the sections and drawings transmitted by the latter officer were in such a state as to justify the preparation of working plans and estimates upon them without further surveys and measurements of the site, a point which can only be satisfactorily settled by professional men. Captain Ditmas' letter of 30 May 1844, certainly conveys the impression that his operations had been interrupted before he had been able to bring them to a satisfactory conclusion. Captain Bell, however, has observed that "the sections of both rivers" in Captain Ditmas' plans being "drawn on the same scale for heights and distances, the line of rock clearly traced, and the elevations of the bridges shown in pencil outline," he concluded that Captain Ditmas' remarks referred only to the incomplete condition of the drawings, not to the actual observations on the rivers, which he must have been aware could not have been repeated for a twelvemonth. It is due to Captain Bell to state that this Board appear to have viewed the matter in the same light, and with the concurrence of their late professional colleague, in whose sagacity, judgment and scientific knowledge long experience had taught them to place the highest value, to have submitted them to Government without a suspicion of their insufficiency. It may be added, that the bridge across the Bhowani was constructed on these very plans, and the success of the undertaking may be learned from the chief engineer's recent report to Government, in which it is stated "to have been finished, of a good height, and handsome appearance."

Para. 1.

4. The remarks of Colonel Lawe, as applicable to Captain Birdwood, refer,

1. To his having deviated from the sanctioned plan on his own responsibility.
2. To his having failed to report his proceedings regularly, so as to allow of their being checked and rectified in the progress of the work.
3. To his having adopted faulty expedients and erroneous methods of construction in the instances in which he departed from the approved plan.

To Governor in
Council, 1 August
1844.

5. With regard to the first point, it must be explained that the project was first submitted to Government exactly as received from Captain Bell, but the consideration of it was deferred pending the receipt of certain information regarding the general expenditure on public works which the Board have previously been desired to furnish. This plan, as approved by the Board, provided for the construction of 24 arches in the Cavery, and nine in the Bhowani bridge, the piers for all of which, it was supposed, would, with a single exception, rest on a rocky foundation. When, however, the subject was again brought forward after the interval of a twelvemonth, a second plan and estimate prepared in the Board's office for the Cavery bridge was likewise submitted, which, by allowing 11 arches of 62 feet, would, it was supposed, obviate the difficulty occasioned by the interruption in the supposed series of rocks to be employed as foundations. Both it was added were laid before the Governor in Council "in order that the design which hereafter might be found most easy of execution might be then adopted. In other respects it is not of much consequence which may be preferred, as there is no doubt that the large and small arches may be built with equal success under proper superintendence." Allowance was likewise made in the revised estimate for strengthening the piers of both bridges at the recommendation of the chief engineer, but the Board considered that discretion still remained with the civil engineer to act upon the suggestion or otherwise, according to circumstances. When Captain Birdwood came to carry the project into execution, he found that the bed of the river was not

To Governor in
Council, 4 August
1845.

not correctly represented in the plan, and that it was not only of greater breadth, but that there was no continuous line of rock to serve for foundations, the section, as explained by Captain Ditmas, not having apparently been carried across in a straight line. He therefore found himself compelled, as he has shown, to adopt one of the sanctioned plans, by some modifications to the altered circumstances of the case. These consisted in the addition of two arches to the original design, and of 18 inches to the span of each arch, the piers being left of the dimensions originally approved. The additional strength to the piers to correspond with this slight increase to the span of the arches would have been, according to Captain Birdwood's statement, $2\frac{3}{8}$ inches, which being in his opinion quite insignificant, no allowance was made for it. He also made use of that description of structure which to his judgment appeared best calculated to afford a secure basis for the piers.

From Capt. Ditmas,
19 April 1843.

MINUTE by the Right Honourable Sir H. Pottinger, Bart., G.C.B., Governor and President in Council.

Section I.

1. THE Commission, of whose proceedings the ample volume on which I am about to remark forms the First Report, was constituted in February 1851, in conformity with instructions from the Honourable the Court of Directors.

2. The members nominated to it by the Madras Government, were Mr. Bourdillon, of the Civil Service, Collector of North Arcot; Brevet-major F. C. Cotton, of the Engineers, Civil Engineer of the 7th Division, and Brevet-major George Balfour of the Artillery, Suspendiary Member of the Military Board.

3. I think it proper to specify the names and stations of these officers, with reference to observations which I have made already, and shall have to make on their Report. They were directed to include in their inquiries, "The whole subject of the superintendence and execution of Public Works," and as they state that they began those inquiries in March 1851, and their Report was handed up to Government in December 1852, it is observable that they were occupied a year and three quarters in its compilation and arrangement, a fact which may possibly, in some small degree, account for what I am forced to pronounce its perplexing and inconvenient verbosity; and which I conceive might have been advantageously avoided by compressing all the matter that is really useful in the Report into, at the outside, one third of the space it occupies.

4. The Report has been divided by the Commissioners into sections and paragraphs, and I shall endeavour to follow a similar course, with the object of ensuring perspicuity, as well as easy reference, as far as relates to the limited criticisms I design to make upon it. I use the term limited, partly with advertence to the extremely elaborate form which the Commissioners have thought it expedient to adopt in their proceedings; and of which I have above expressed my opinion; but chiefly with due regard to the very able and careful examination of these proceedings, into which my honourable colleagues, the civil members of the Madras Government, have minutely entered, and whose minutes I have had the advantage and privilege of reading, whilst placing my own final sentiments on record.

5. It is almost superfluous for me to say that the perusal of those minutes has been both highly interesting as well as satisfactory to me. It has given me a share of the benefit of the great local experience and knowledge of the honourable writers of those documents, who have necessarily, in the course of their long service in the Madras Presidency, gradually acquired a matured measure of information on every question connected with the past and present administration of its affairs; to which, notwithstanding the most earnest and sedulous application of my time and energies, since I have been at the head of the Madras Government, I am sensible I cannot pretend. I gladly avail myself of this opportunity to avow the obligation I feel, in this respect, to my honourable colleagues; and although I have incidentally seen cause to dissent from their views, and shall doubtless find like occasion in the course of the present minute, I always have felt, and shall feel, that such differences are merely matters of wholesome diversity of official sentiments, which is well calculated to elicit a sound decision on the points at issue.

6. But to drop this digression. On a copy of the Report of the Commissioners being first sent to me in a printed form, about Christmas 1852, I read it rapidly, though carefully through; making at the time marginal notes, some on points for inquiry, and some regarding points the inaccuracy of which obviously required refutation. Matters remained in this state till April last, when the Report was transmitted to the Home Authorities and the Government of India; and as up to that period I had been prevented, owing to unceasing and heavy calls of business on my time and attention, from even partially placing my individual sentiments in official shape, I deemed it advisable to explain, by a short minute, the circumstances which had led to the delay on my part, and likewise to state in a few words the general impressions which I had formed upon it. This minute will be found in Appendix (A.)

(A.)

7. I have now further to state that in a recent reperusal and careful examination of the Report, which I have just accomplished, I have not discovered the smallest reason to recall or modify those impressions. On the contrary, the more closely I have looked into and studied the tenor and bearing of the Report, the more convinced have I become that its tone is wholly unprecedented and unjustifiable; that it assumes on behalf of the members of the Commission, the unheard-of and unreasonable pretension of weighing and condemning "the actuating motives and real feelings of Government with regard to its measures for the improvement and amelioration of the country;" that that assumption is, in numerous instances, upheld by misrepresentations, as well as by the studied omission of matter that would have demonstrated them to be such; that even where facts are cited and admitted, they are disguised, as far as possible, in garbled and partial extracts and statements; that in no single instance that I can discern, are the arguments on both sides of the question fairly and candidly brought to bear on the topic immediately under discussion; that in what I conceive to be the preposterous tautology of many parts of the Report and its Appendix, the strictures and quotations which the Commissioners evidently fancied to be exclusively calculated to establish their views, besides throwing discredit on Government, are repeated to a tiresome and perfectly useless extent, whilst it cannot, I apprehend, fail to be evident to any one who may take the trouble to read the Report, that the observations and explanations of Government on the opposite side, are entirely eschewed and left out of sight. I therefore unqualifiedly subscribe to a remark, which I see has been made by the Honourable Mr. Thomas, that "it is difficult indeed to understand how, if the Records of Government had been fairly examined by them, the Commissioners could permit themselves to record these statements;" and to this remark I will add, from myself, my personal assurance that a great deal of the Report was devised and got up to serve particular purposes, and not at all framed for the information or enlightenment of Government, who are in various parts of it designated with a degree of contumely and undisguised contempt, for which I can trace no motive but to insult; which I also pronounce, after the experience of a very long public life, to be quite unique, and which I deem to be deserving of the strongest reprehension, and to require to be at once put down, as a baneful example in any public service.

Section II.

8. I now turn to a consideration of the Report, on which for the reasons I have already stated, and because I see no use in swelling these papers by repetitions, my remarks will be as concise as is consistent with clearness.

9. The second section contains a summary history of the past and present state of the Department of Public Works under the Board of Revenue; and it is self-evident, from the ample details which are offered, that the department urgently demands speedy reform, as well as a very large increase to the officers of all grades and classes who are to be employed in it. I must, however, observe that it occurs to me, that whilst the Commissioners invariably depreciate everything that has been effected of late years, and captiously enlarge on deficiencies and defects, they not only fail to point out, in practical reasoning, how these deficiencies and defects could have been obviated, with the circumscribed means which this Government has had at its disposal, but actually are reduced to contradict their own favoured postulate, by admissions which they are constrained to make as to the very want of means, to which I allude.

10. Had the Commissioners felt inclined to deal fairly with questions before them, they would, in the first place, have recollected that for some years past, the exigencies of the State rendered it expedient for the highest authorities to restrict the public expenditure to the narrowest scale; but this they not only have esteemed it befitting to overlook, but have taken on themselves to lay the whole blame on Government, whose bounden duty it was to obey the commands of their superiors; have stated in unequivocal language, that expenditure on the roads had almost always been an unwelcome subject with Government, who had discouraged the submission of projects of improvement; an assertion which, as well as that, that the Board of Revenue have frequently urged on Government, with very scanty success, the necessity for giving them more assistance in their office, I distinctly pronounce, so far as I am concerned, to be at variance with the truth.

(B.) and (C.)

11. A great many valuable and requisite hints, relative to the future formation of the establishment of the Mahramut Department of this Presidency, are to be found in the section of the Report on which I am treating. I am myself strongly in favour of a great extension of the European subordinates in that department, as being far more energetic, active, and trustworthy than natives. I am, of course, well aware that the service of Government cannot be carried on in this or any other department without the agency of the latter; but I fully coincide with the Commissioners, that men like the superintendents and maistries, who form a necessary ingredient in the general good management of the important, though minor, duties of the departments to which they are attached, should be better educated, better paid, and better cared for than they now appear to be.

12. I cannot, however, at all approve of the suggestion of the Commissioners, that the overseers ought to have the power of fixing the price of all articles, and providing the materials that are required for works going on under their superintendence. They will, of course, see that no inferior materials are used, and they will pay the people, or at least see that that is properly done, which will secure full and prompt payment to the workmen, and thereby effectually put a stop to the highly objectionable practice which is said to exist, of the civil engineer's retrenching the workmen's wages, even months after the work has been executed.

50.

13. I cannot pass over in total silence the inflated attempt which the Commissioners have got up, when speaking of the European overseers, to establish that they had been unfairly treated, and were therefore in a state of discontent and despondency. The members of the Commission seem to have thought this topic held out too inviting an opportunity to be missed of indulging in their usual invective; but it is to be noted that they must have known, full 18 months before they handed up their proceedings, that the Madras Government had obtained the sanction of the Supreme Government to what was thought to be a proper measure of promotion for the overseers at the time, and yet they allowed their mis-statement to stand in the text of their Report, accompanied by a footnote which rather aggravated their original comment. The fact is, as I have before asserted, they would appear to have begun writing on one exclusive principle, that of vilifying Government, and eventually had not the good sense and right feeling to modify their errors, so that, in this case, what might have been assumed to be a mistake at first, became, in the result, a positive deviation from fact.

45.
52 to 54.

14. I have no means of knowing to a certainty whether the European overseers and other subordinate classes of the Public Works Department, are, in Madras, worse off than similar grades under the Bengal and Bombay Presidencies; but, should it be so, I most unhesitatingly recommend that in the contemplated revision they should be placed on the same footing precisely. In saying this, I beg to add that I do not believe that any promises were ever made to the overseers by Government, who alone had power to either make or fulfil them.

52.

15. I agree with the Commissioners in all they say on the subject of compulsory labour, as well as the causes of it, on which I had occasion to express my strong opinion formerly, and the means of preventing it. I also fully concur in their views respecting the superintendents of Mahramut, the talook maistries, and the excellent plan of apprentices, which appears to have been successfully introduced

66 to 74.

76 to 90.

duced by Captain Horsley and the late Captain Best, and which ought most certainly to be persevered in until a more enlarged and comprehensive system can be fashioned, and introduced generally for the Madras Presidency. Such a system I trust will be shortly sanctioned by the authorities on whom it rests, in compliance with the urgent advice and solicitation of this Government, which have been long since submitted.

91 to 106.

16. I have given my best consideration to the observations of the Commissioners on the orders and rules promulgated by Government, under date the 31st of January 1851, together with the reply of the Board of Revenue, of the 10th of April following. The Commissioners, as the Honourable Mr. Elliott justly observes, "entirely overlook that those rules were proposed as a temporary provision, to make the most of the existing establishments, until the thorough reform of the Department of Public Works, which had been submitted for the consideration of the Government of India, should be authorised."

17. I will not needlessly swell this Minute by combating the somewhat intricate and very lengthened reasons assigned by the Commissioners for disapproving of those rules; I will content myself by saying, that if, as I am persuaded is correct, they were advisable at the time they were issued, they are still more applicable to the present conjuncture, and therefore I earnestly recommend that they be strictly enforced until a final and better arrangement can be introduced in their stead. It is almost superfluous to observe that this can only be effected by a large and universal augmentation to the existing establishments.

18. In the foregoing paragraphs of the Commissioners' Report, from paragraph 96 to the close of this section, there are instances, in my estimation, of the usual amplification and distortion of the motives and intentions of Government, conveyed in supercilious language; but as I differ altogether from the conclusion at which the members have arrived, I purposely refrain from offering any refutation of the assertions to which I advert.

Section III.—*Review of the Condition and Treatment of the Roads in former Times, and of the Working of the Road Department.*

107 to 124.

19. The paragraphs of this section numbered in the margin do not appear to demand any particular notice from me; they contain an epitome of the state of the roads in the countries comprehended within the limits of the Madras territory from an early period, and show the attempts that had from time to time been made to form and improve them, including a small experimental cattle railway or tramroad that was sanctioned, from Madras to the Red Hills, and which did not succeed.

20. In the year 1845, the Road Department was, for the first time, formally constituted under the sanction of the Honourable the Court of Directors, at the recommendation of the then Governor, the Marquis of Tweeddale. The sum of four lacs of rupees annually was set apart to be expended on trunk roads only by the Government of Madras, without reference to higher authority, and the orders and instructions which were then issued and laid down for the guidance of the able and excellent officer who was appointed to be the head of the department, were, I have grounds for knowing, through my personal intercourse with him, in a great measure framed at his own suggestions. The great error I saw in them when they first came under my consideration was, that they promised too much at their early introduction; but, with competent establishments and sufficient superintendence, I now hold that they are perfectly practical and the best that can be devised for the duty to be performed; it being my decided opinion, as I observe it is that of the Honourable Mr. Thomas, that the Road Department should be kept distinct from all others, under one officer, who shall have nothing else to think of or attend to.

125.

21. I note that the Commissioners speak of the incongruities which they have described, and assert that they have inevitably led to the total failure of the Road Department. I wholly repudiate this assertion as applicable to present circumstances. I did at one time myself freely admit that it had failed in the high hopes which were at first held out regarding it, but it has been subsequently admitted that the difficulties of introducing it had not been sufficiently foreseen and

and estimated, and that the very commendable willingness and zeal of Captain Best himself had chiefly led to that mistake, from his undertaking what has been demonstrated by experience to have been impracticable. I would likewise here remark that I entirely concur in the opinion offered by the Commissioners, that the employment of the civil engineers of divisions in executive duties on the roads has been a very great evil in every respect, and I am at a loss to understand how they came, with these views, to propose that the trunk roads should be replaced, even as a temporary measure, under those officers. See Appendix (C.)

163.

(C.)

22. The Road Department has now, I conceive, been placed in good working condition, and should on no account be disturbed or incorporated with any other; the only precaution that seems to be required is to afford the officer at the head of it, who has hitherto given the utmost satisfaction by his efficient proceedings and management, every available assistance he may ask for, whether in assistants or subordinates; and, that being done, I cannot myself perceive any reason to apprehend but that all the expectations that can be fairly indulged regarding it will be gradually and perfectly realised. I therefore am most strongly opposed to the idea of the abolition of the department, as advised by the Commission.

164.

23. I will only reiterate, in closing my remarks on this section, that, adverting to the statements in the last report of the superintendent of roads, of the 1st of May 1853, which, in my estimation, wholly refute the assertion that Government had never recognised the value of roads, and remembering how much has been done, in spite of the unforeseen difficulties and impediments that have occurred to impede the progress of the department, I am forced to denounce this portion of the Report of the Commissioners to be wilfully overstrained and hypercritical, and, consequently, greatly calculated to mislead.

107 to 168.

Section IV.—*Engineer Department under the Military Board, with Suggestions, &c.*

24. It is quite unnecessary for me to attempt to follow the Commission through the details of this section which may have their use for such as wish to make themselves acquainted with them; but, after the experience I have necessarily acquired, during the period I have been at the head of the Madras Government, of the working of the Military Board, I beg to state my unqualified opinion, an opinion, I may observe, which will be borne out by reference to innumerable condemnatory remarks which I have had to make on its proceedings, that it has been, and is, not simply inefficient for the duty assigned to it, but that it has invariably been, and is, a clog to public business, and ought accordingly to be forthwith and finally abolished.

169 to 205.

25. I was led to fancy, when I first came to Madras, that the chief objects of having such a Board were to expedite and promote the rapid performance of the duties of the officers who are subordinate to its authority, and further, to assist Government by its advice and judgment on every occasion when they might be required, more especially with respect to questions of outlay and expenditure in the Department of Military Works. Instead, however, of these objects being attained through the medium of the Board, I have experienced exactly the reverse; delay and ineffective supervision have been the marked feature of the Military Board's procedure in great as well as in small matters, and in some very important cases it has acted in such a mode as almost to lead me to believe that it was throwing impediments in the way of the orders of Government solely to force them to adopt its recommendations.

26. One very striking instance I think it worth while to note; it is connected with the long delayed and difficult subject of the drainage of Black Town. Government had issued, after years of anxious discussion, their final orders. The Military Board neglected to give effect to them, and when called on for explanation as to the delay, represented that they were about to submit a project which could not fail of success, and which would be far more effectual to the desired end than any other scheme that had been devised. Government waited patiently until the project was sent up by the Military Board, and I then looked into it most carefully, and recorded my opinion upon it. It has since remained in abeyance, and is, I perceive, quoted as a proof of the disinclination

(D.) of Government to sanction outlay. I need scarcely say that this is not correct. I showed my well-considered reasons for differing from the asserted feasibility of the project, as well as from the extraordinary views which the Military Board built upon it, but beyond that I did not oppose it. I am very glad to be able to conclude this topic by recording my sanguine hopes that the desideratum of the drainage of Black Town, so far as it is possible, is likely to be shortly accomplished, not under the auspices of the Military Board, but through the suggestions of the justices in session, aided by the judicious directions of their officiating assessor and civil engineer.

27. My opinion is that the future duties of the Military Board, as it is now termed, should be confined to the Ordnance Department, under a field officer of artillery, with a secretary and an assistant secretary, should the work be found too much for one person. This I do not however imagine is likely to be the case. The detail of the chief engineer's duties will best be defined by the local Government when the proposed abolition of the Military Board is perfected. In the meantime I cannot help saying that the enumeration of that officer's tasks, in connexion with the Public Works Department, carries with it, in my eyes, an air of ridiculous exaggeration, and tempts me to inquire, if he be relieved from them all, what will be left for him to attend to.*

Section V.—*Proposal of a New Board of Public Works.*

28. Before I had an opportunity of reading the Honourable Mr. Thomas's remarks on this section I had made up my mind to dissent personally to the new Board, which the Commissioners have recommended shall be established, and I was therefore gratified to find that my ideas corresponded with those of that gentleman.

29. I have witnessed so much unnecessary trouble and delay from the existence of Boards since I have been at Madras, as well as elsewhere previous to coming here, that I am strongly opposed to any such arrangement. Even had I been inclined to favour a Central Board to sit at the Presidency, I should certainly have voted against the contemplated third, or civil member, whose nomination to it I should have felt to be not simply useless, but actually pernicious, as introducing into the whole plan an element of constant opposition and strife, nor can I recognise one compensating motive for this proposal. The civil member cannot be expected, unless perchance in a few isolated cases, to have the intimate knowledge of the peculiarities of each district, which it is to be presumed will be possessed by the respective Collectors, and in the event of his not agreeing with the recommendations which they support, it follows that Government will have to be referred to, and in all likelihood will, after lengthened delay and much unsatisfactory correspondence, be constrained to decide in opposition to the views either of the local authorities, or those of the very officer whose special duty it would be to advise.

30. I am however, as I have said above, adverse to a Board in any shape, as striking at the root of that most essential point, personal responsibility; and after mature and deep reflection I cordially adopt the suggestion of the Honourable Mr. Thomas, that the Presidency should be divided into four convenient divisions, to each of which an engineer officer of rank and experience should be appointed under the appellation of general superintendent, who should constantly be on the move within his own range, consulting with the officers stationed in the different districts that compose it, and who, having satisfied himself by personal examination of the desirability and advantage of the works that may be pointed out and recommended to his notice by the local functionaries, should thereupon report his sentiments direct to Government, whose province it would then become to sanction their execution, or to call for any additional information or explanation that might seem to be requisite. In highly important projects, which

* *Note.*—Since this was written, I have observed in paras. 198 and 199, the proposed future duties of the chief engineer. I differ from the 1st, 2d and 3d clauses of para. 198, and from the 4th, 5th and 6th of para. 199. The 1st clause of the former para. strikes me to contain an unprecedented proposal, subverting all rule of authority.

which are certain to involve a very heavy outlay, and respecting which the Government should happen to entertain doubts, it has occurred to me that two, or even more, of the general superintendents might be directed to assemble in committee on the spot to confer together, and to report the result of their deliberations. This expedient should however, I conceive, only be had recourse to in suitable and peculiar instances.

31. Having unconditionally rejected the recommendations of the Commissioners, relative to a new Board of Public Works, it is perhaps supererogatory to notice the rules for its procedure which they have laid down. I nevertheless deem it worth while to direct attention to them, as exhibiting the extraordinary anomaly of the Government of a country being virtually placed out of sight in considering plans for its control and good management, if we except indeed the irksome duty prudently reserved to the Governor in Council by the 3d rule of the 231st para., of acting as mediator and moderator of the doubtless frequent dissensions and disputes of the members of the ill-digested Board and its co-ordinate partners in authority. It had not escaped my notice that something, very much to the same purpose, is advanced in a foregoing para., attended by the customary misstatement and sneer, in making which it has been entirely overlooked by the Commissioners that Government were the fittest judges of what was proper, and moreover, had sufficient reasons for withholding their ready assent to proposed outlay. Of those reasons one very cogent one will be found in a memorandum which I wrote on the 24th of May 1850, and to which I likewise add other instances. See Appendices (F.) (G.)

231, 232.

219.

(E.)
(F.)
(G.)

Section VI.—*The value of Irrigation to the Revenue, &c.*

32. I concur with my honourable colleagues that this section contains a great deal of matter of the highest importance, but at the same time I am bound to add that that matter has been spun out by a vast quantity of redundant quotations, some of which I conceive to emanate from loose and very questionable authority, interspersed with overstrained and, in many places, erroneous and even contradictory statements, to an extent that greatly deducts from its value, and is in no respect called for in a fair and honest examination. The Commissioners indeed seem to me to have set out, in the composition of this section of their Report, with a predetermination to concoct what might be technically termed a strong case, and this has, I think, led them into wearisome repetition and disquisitions on points on which I can trace no system of opposition to their views.

33. I cannot, for instance, suppose that there is any one who doubts the value, both to the Government and people, of works of irrigation in a country like Southern India, where local and sometimes very extended failures of the periodical rains are of frequent occurrence, attended with much wretchedness, and even dire famine; but whilst I willingly go hand in hand to this extent with the members of the Commission, I advisedly assert that I hold the inference which they try to establish to be altogether erroneous, inasmuch as I distinctly deny that there has been any, however minute, want of due encouragement on behalf of Government of late years towards works of irrigation, where the means of giving effect to well-considered plans were forthcoming, and the recommendations, whether from the Board of Revenue or the executive officers, came up with proper explanation and estimates, for the want of which latter I have, I allow, often personally withheld my support, because I did not choose to take the initiative in what I must always consider a highly objectionable mode of carrying on Public Works, by making advances for purposes on which Government had had no sufficient information. Besides this strong argument, it ought likewise to be borne in mind that throughout the whole period that I have been in my present office this Government had to obtain the sanction of superior authority to any expenditure exceeding a limited sum, and this fact necessitated that it should not merely be assured of the expediency of the proposed outlay, but that it should be enabled to assign reasons to satisfy others.

34. Great weight is very naturally and properly laid by the Commissioners on the admirable results of the improvement and extension of works of irrigation in Tanjore and elsewhere, and no one with common sense would, I should

213.

N

say,

(H.)
(I.)
(J.)

say, venture to gainsay them. This Government has certainly of late evinced its hearty conviction of their almost incalculable benefits, by its earnest recommendation in favour of the construction of anicuts on the Kistnah and Palar rivers, as well as by its unlimited encouragement of the "gigantic undertaking," now in progress on the Godavery river. With regard to this latter, whilst I unfeignedly trust that it will more than realize all the best anticipations and aspirations set forth by the Commissioners and its projectors, I should be acting hypocritically did I not confess that I have always had my misgivings of its permanent stability and consequent perfect success. I hold it to be an undertaking absolutely without parallel in this or any other country on earth; and when I recall the almost incredible violence which I have myself witnessed the Godavery river exert when in high flood at points possibly a thousand miles above where the anicut on it is built, and further reflect that that overwhelming force is inevitably increased many many hundred fold before its action reaches that magnificent structure, erected on an artificial foundation in a vast plain of unstable alluvial soil and sand, my reasoning faculties compel me to doubt if any combination of art and science will effectually and safely restrain the physical power opposed to it. I however reiterate my very anxious and most sincere hope that my apprehensions will prove groundless, though it is due to myself to add that recent accounts of damage done by the last inundation in the river have rather tended to strengthen them.

293.

(H.)

35. The Commission have dwelt, in an enlarged form, on the effects of the disastrous famine which occurred in 1833, which fell with peculiar severity on the collectorate of Guntoor, and it is impossible to overrate its hapless effects; but they seem to me to have been here introduced and expatiated on, with the chief object of attempting to establish that it was a consideration of the profit and loss of the cost of an anicut on the Kistnah river that influenced the views of Government. Nothing was ever more distant from the truth, and the delay which occurred in its commencement, after it was approved of by the Honourable Court, was solely caused by the engineer officer at the head of the Godavery anicut (Lieutenant-colonel Cotton), declining to spare any of the officers employed under him. I stated expressly on this refusal coming before me, that I would not attempt to withdraw any of those officers, which would, of course, have been made a handle for complaint; but even with this delay, the work was in full operation many months before the Commission stated, "with much pain," that it had been indefinitely postponed. I leave those who may peruse these remarks to draw their own conclusion from them. It is unnecessary for me to designate what it amounts to.

298 to 301.

(J.)

311.

36. So far as I am informed, I look on the prolix discussion in the paras. noted in the margin, as to the fear of a want of a sufficiency of labour, to be quite gratuitous, seeing that I had never heard of that fear until I saw it spoken of in the Report. For the same reason, I dismiss, unnoticed, the remarks of the Commissioners as to the ryots coming forward to cultivate where irrigation is provided, unless prevented by too high an assessment on the land, which I fancy is a truism universally admitted; but as to the declaration that the civil engineer had experimentally shown the ryots that cotton can be grown successfully on their nunjah land, it would, if correct, be so gratifying a fact, that I am sorry to say I believe it to be a mistake. Major Lawford did himself try certain experiments in growing cotton by means of irrigation, but the specimens of the produce which he sent to the Horticultural Society at Madras were pronounced worthless, and I always understood the thing fell to the ground.

316 to 319.

321 and 322.

323.

37. I am at a loss to comprehend what the Commissioners had to do with the financial questions touching the circulating medium, and the Accountant-general's bills on the district treasuries, which in no way appertain, so far as I can perceive, to the Department of Public Works; and are moreover, long ago, and fully provided for. The sudden transition from those extraneous points to the culture of rice, cotton and sugar, to the publication of information, and to the opening of new roads, seems quite out of place here; and those topics are again immediately followed by some dogmatical remarks on the mohiturpha tax. These instances of forward assurance tend, in my estimation, to demonstrate; what I have before had cause to observe, that a great deal has been purposely put forward in this Report, foreign to the duty assigned to the Commission, and introduced

introduced solely as the groundwork of tacit insinuations, that everything demanded their attention and reforming hand.

Section VII.—*Roads of the Presidency and Harbours.*

38. The Commissioners begin this section by assigning their reasons for the details which they propose to give on the subject of it; and whilst I am perfectly willing to admit that there is considerable force in many of the opinions and facts they have collected and brought to bear on the topic, I will only premise that the whole appear to me to be studiously exaggerated; and that assertions are made to uphold that exaggeration, which are not authorised by facts. 324 to 376.

39. I observe, for example, in the very first paragraph of this section, that it is declared that "an effort must be made to put the Madras Presidency more on a footing with the rest of the civilised world in this all-important particular." If this remark is intended to be applied to other portions of India, I deny its fitness, because I believe that at this hour there is as great a proportion of serviceable fair weather roads within the Madras territory, as in any one of the other Presidencies. In recording this belief, partly grounded on personal observation, and partly on information gleaned from inquiry and printed reports, I am far from meaning to dispute that there is a vast field for both extension and improvement on this score; but I must qualify even this admission, by coupling it with the same extenuatory explanation that I propounded in remarking on "Works of Irrigation;" namely, that as much has been of late years effected with regard to roads, as the means at the disposal of Government rendered feasible. 324.

40. In the matter of a road from Samulcottah* to Cocanada, on the refusal to sanction which the Commissioners have largely expatiated, I conceive that Government were perfectly right, as well as respecting that proposed from Russelcondah and Aska. In the former case, the chief objection was the attention of Captain Orr being diverted from the all-important works under his supervision at the Godavery anicut; and in the latter a second-class road appeared to me to be all that was needed; as I take this opportunity, once for all, to assert, in plain contradiction to the opinion of the Commissioners, that trade does end, and has always ended, when the rainy season begins, not merely in the Madras territory, but in every quarter of India where the monsoon prevails. 336. 337.

41. The remarks on the roads of Chingleput seem to me to be penned in the worst taste. It happens that the collector does not come up to the desired mark of the Commission for total condemnation in his Report upon them; and therefore his sentiments are scouted, and occasion is seized to state, that cart drivers are fined if they pass along the gravelled road. When this was alleged, the Commissioners must have known that the road referred to leads to the coast road to Pondicherry and Cuddalore, which it had been decided to abandon, and which was actually superseded by the southern trunk road more inland, and that even admitting the asserted rule to be in force, which I do not, Government had nothing to say to it. 354.

42. It is to be noted, that the assertion made regarding water communication in Malabar is both distorted and incorrect. The civil engineer (the second member of the Commission), had grossly failed in the superintendence of a very important work entrusted to him, and which has not been completed to this day; and I accordingly declined to afford him a pretence for showing additional neglect on more important works. That which is here remarked upon has been since ordered to be carried out. 370.

43. The comparisons which the Commissioners strive to get up in this section, and in other parts of their Report, between the size and extent of districts under this

* *Note.*—In a Report just received from the Board of Revenue, it is notified that in consequence of adopting the bank of a canal lately cut, the road originally proposed between Cocanada and Samulcottah, will not now be required; so that if the estimate had been sanctioned when it was laid before Government, the expenditure would have been wholly thrown away. But the Commissioners' own words, as given in para. 275, page 110, of their Report, afford substantial reasons for the course pursued by Government, which in para. 336, page 134, they have inconsistently condemned.

383. this Presidency and the United Kingdom, with the object of drawing inferences from them, are so far fetched and inappropriate, that I hold them to be unworthy of comment; and with reference to the allegations which are so undisguisedly uttered in the 383d para., it seems only expedient I should here observe, that they betoken, in my conception, great meanness of mind, and absence of proper feeling.

44. The distorted and shortsighted arguments of the Commission relative to what they term the "Surplus Ferry Funds," much surprise me; they are described as a valuable means of local improvement, which Government has intercepted, and swept into the Treasury; and yet in no district, except Malabar, are they found to have been nearly equal to the expense incurred on ferries. It is, I see, admitted to be close on 40 years since the Honourable Court authorised the ferry funds to be set apart for building bridges, providing ferry boats, &c., but I look on it to be pretty evident that the outlay was meant to be limited to the receipts, and that the local Government have, consequently, during this long period, exercised a degree of liberality not contemplated by their superiors: At all events, all I can say is, that I now, for the first time, have learned the purport of the Honourable Court's orders.

394. 45. I have recently had cause to look carefully into the present state of Cochrane's Canal; and I heartily coincide in the measures which are in contemplation for its general improvement, as well as extension, though I dissent from some of the details that have been proposed, as will be seen in the Appendix. (K.) The improvements would have been begun upon, in real earnest, long ago, but for the want of a qualified officer to superintend them.

400 to 406. 46. The introduction by the Commissioners of their notions on the salt revenue seem to me to be of a piece with those relative to the circulating medium, Accountant-general's bills, &c., on which I have before animadverted, as being equally obtrusive and useless.

407 to 425. 47. I have no intention of attempting to follow the Commissioners through their very lengthened observations on roads. I have already declared my unqualified acquiescence in the advantages of, and necessity for, their great extension and improvement. I have likewise said that the trunk roads seem to me to be now progressing very favourably, and that I think they could not be under a better system of management. But with regard to the number, length, and description of roads proposed in the "outline of a general system of roads," 407. I hold them to be beyond the bounds of reason, if not of possibility; and I also 467. think that the deductions and calculations arrived at and formed upon them, 418. embracing the dogmatism, that the present classification of roads must be abandoned, and the opinions of Messrs. Boothby and Wight, acted on, though opposed 423. to sense and experience, as to the necessity for roads being rendered equally serviceable throughout the year, are mere idle declamation formed to deceive, and grounded on error and quibble, of which a notable proof is afforded when speaking of the traffic on the Palghat line, which is said to have fallen off in the rainy season, not from rain, but from the "muddy" state of the road, as if there ever had been a road in any part of India that did not become muddy from rain.

Harbours of the Presidency.

431 and 432. 48. The assertion with which this portion of the seventh section opens, viz., that the harbours have been neglected, is doubtless true to a certain extent; and the reasons assigned for that neglect are, in my ideas, shown to have been the want of officers to afford practical information and supervision. It is also quite true that I objected to the trifling expenditure spoken of, as "indispensably necessary to keep the new passage open" at Cocanada, both because I was convinced, from the plan submitted to Government, that it could not have had that effect; and because Captain Orr, the civil engineer, had more duty of high urgency and importance than he could attend to at the Godavery anicut. A Minute which I append, will demonstrate, however, that the delay exclaimed against in this and other instances has been erroneously laid at the door of Government. (L.)

433 to 439. 49. I should be very happy could I join in the flattering anticipation which appears to be entertained, that the Godavery river will be found navigable, and capable of being adapted to purposes of trade, but that I cannot candidly do. I expressed

expressed my doubts, to the same purport, when a plan was two years ago agitated for exploring the river. Even then I declared that I considered the experiment worthy of public support, and proposed that it should be strongly recommended to the Government of India. This recommendation has been since acceded to; and has, in truth, been partly put to the test, but I lament to have to say, that nothing that has yet come before me, either privately or officially, has tended in the least degree to shake my original impression. I will only add, that I warmly trust I shall be proved, eventually, to be in error, though I do not expect such a satisfactory result, judging either from my former or more recent information on this highly interesting topic. The closing observations of the Commission in this paragraph I esteem to be mere superficial conjecture, without an iota of proof to uphold it.

430.

50. The ports of Masulipatam, Negapatam, Cuddalore, Porto Novo, and Cochin are next noticed by the Commission. The mismanagement evinced in the effort made to improve the former some years back, is slurred over very discreditably; and the eventual failure attributed to "subsequent neglect," while it is notorious that nothing was accomplished with the large sum expended; and neglect could not be exhibited towards nothing.

440 to 445.

440.

51. My opinions relative to the three ports on the Coromandel coast will be found in the annexed Appendices. I do not mean to adduce them as conclusive on either side of the question, but they will vouch for my habit of judging for myself, and that I do not hastily pass opinions. The Commission should have stated the probable expense of opening up the harbour of Cochin. I have visited that port twice in my life, and have never understood till now that such a scheme was thought possible; I must therefore be permitted to doubt it, notwithstanding Lieutenant Selby's favourable opinion. The bank, which is formed outside that port, seems to be an appendage of every river in India, that disembogues directly into the sea. That off the Indus now extends out of sight of land, though it is well known that vessels of war, as well as merchant ships, used, within the last century, to sail into the river; and several of the largest bunders, or sea ports, which were vast marts of commerce in former times, are now perfectly inaccessible even to boats of the smallest size, except in the very highest floods. Those who talk so glibly of restraining great and unexplained natural causes by dredging machines and other trifling human expedients, would do well to ponder on these facts.

Cuddalore (M.)
Negapatam (N.)
Porto Novo (O.)
441 to 445. (P.)
446 (Q.)

52. With the record of my most cordial concurrence in the opinions of the Honourable Mr. Thomas, as to the desirability of both a pier and a breakwater at Madras, I take leave to say, that I deem the very notion of either one or the other being effected by private enterprise of the people of Madras to be an illusion. One of the earliest steps I took, on assuming charge of this Government, was to recommend and obtain an Act of the Legislative Government for a pier, and the instant it was promulgated, those who had been clamorous and loud regarding the delays of Government, set about discovering some pretence for abandoning the scheme, which was accordingly done. I recommend that, should one or both be attempted again, only professional scientific men of tried talent, from Europe or America, be employed.

Section VIII.—*Proposed Scheme of Expenditure on Works of Irrigation and Communication.*

53. It seems to me that the Honourable Mr. Thomas is quite right in his view, that the Commissioners, in this section, only reiterate and enlarge on the views of the Madras Government, as enunciated in 1848; and as I cannot agree that those views are opposed to what has been practically acted on, I deny, at once, the axiom which is attempted to be established, that "there is the narrowest and strictest economy in refusing trifling outgoings from the Treasury, combined with the same practical disbelief, as of old, in those general truths which point to the sure means of vastly augmenting the income."

54. I have before expressed my sense of the necessity for, as well as benefit that must result from, a greatly increased expenditure on works of irrigation; and I have no objection to offer to the amount indicated by the Commission when "the means of superintendence likely to be available" are realised, and when thereby the money can be expended "under able and judicious direction;"

but I am very apprehensive that both these *desiderata* can only be looked for at a rather distant day. I therefore see no good at present attainable by fixing the amount to be annually laid out, which I think will be best considered and determined upon when "the superintendence likely to be available," and "the able and judicious direction" are forthcoming. I may here anticipate my further remarks on this section, by saying that I fully agree in the opinion, that the amount devoted to Public Works should be (henceforward) at the exclusive disposal of the local Government.

- 492.
- 464 and 465. 55. I neither agree with the Commission in their sentiments, as to the item of revenue which they term "The Tank Cess," nor in the forced deduction at which they arrive. It seems, from the explanation offered, to have been wisely abolished, and, incorporated with the general land revenue; and were the colouring, which is here striven to be given to the transaction correct, it is strange that it should have been lost sight of by successive Governments during a period exceeding half a century. For myself, I never even heard of it till now, and I opine, that it is some obsolete matter, ripped up to cavil upon, since it can scarcely be presumed that it could make any difference in the deliberations of Government at this day.
- 467 to 471. 56. In the preceding section I have stated my ideas of the overwhelming propositions of the Commission on the subject of roads, as well as on the extraordinary scope of their calculations. I have no intention of analyzing the details of the latter with regard to the "outlay and saving" to be incurred and effected; but I must observe, that the heedful examination which I have bestowed upon them has absolutely astonished me, as far outvieing anything that I have ever before seen or heard of. For the grounds of this one unqualified assertion, I confidently refer to the 471st paragraph, which talks of a yearly net saving of 960 lacs of rupees in the cost of carriage.
- 473 and 474. 57. There are one or two other points I may notice before I close this section. I do not approve of tolls, unless under very peculiar circumstances, such as on difficult ghauts, or on bridges, over broad rivers; and even there the greatest care must be taken, to prevent their being turned into sources of extortion. I consider the cart tax in Salem to be unobjectionable. I object to this Government attempting local railroads, which, if once allowed, would certainly clash with the general plan under consideration for all India. The opinions stated in para. 480 seem to me to be contradictory, as to the people willingly making village or cross roads. Besides being contradictory, those opinions seem to me to be upheld by arguments of absolute fatality and childishness, betraying a total want of knowledge of the general native character and ideas. I am wholly opposed to loans being taken up for Public Works; they will progress, I conceive, quite as fast as is desirable, through the appropriation of the overplus or available revenue. I have doubts whether steam-boats are not prohibited on canals, as being destructive to the banks. This question ought to be carefully inquired into before plans are submitted, or even any theory is built on the use of steam-boats on canals, which, instead of being "the best and cheapest species of communication" would, I suspect, prove the worst and most costly. Their being used on rivers within the Madras territory, unless for very confined local purposes, such as ferries, I hold to be chimerical. I append three important Minutes which it has become my duty to record in connexion with this subject. I leave them without comment to speak for themselves.
- 475 to 477.
- 480.
- 482 to 487.
- 491.
- (R.)
(S.)
(T.)

Section IX.—*Enlargement of the Public Works Establishment; &c.*

- 494.
- 495 to 510. 58. Having repeatedly and distinctly, in preceding passages of this Minute, expressed my hearty concurrence in the necessity for a large augmentation of expenditure on works of irrigation and roads, it follows, as a matter of course, that the establishments to give effect to that augmentation must be increased in the like proportion; and to this extent I cordially coincide in the views of the Commissioners.
59. I cannot, however, say that I have derived either information or edification from what I deem their tedious and intricate dissertation on "superintendence," and of which I am unable to guess the object, unless it be to swell the Report, as I cannot discover anything in it that the most superficial observer can fail to be acquainted with.

60. One or two observations have struck me as worthy of being cited: in para. 497, the Commission say, "the very limited scale of our professional establishments compels the employment of young and inexperienced officers in the projection of works, who, as a necessary consequence, fail to see how the object aimed at may be most cheaply and most effectively attained. In short, our engineers are unavoidably put to actual work while they ought to be only under instruction; and they gradually acquire skill and experience by a succession of errors, of which the State bears the cost." And again, "the Civil Engineer Department is looked to as the means of improving and extending irrigation, and it has already effected not a little, considering the small means placed at its disposal; but everywhere we find statements made of the insufficient strength of the establishment; and as this has been admitted by all concerned, by the civil engineers, by the Board of Revenue, by the Government, under Lord Tweeddale, and by the Honourable Court itself, it would seem hardly necessary for us to write on the subject now; but when we see that what has been universally allowed as an essential want of greater or less extent for the last 15 years, has only been nominally supplied by an addition of six subalterns to the engineer corps, we must take up the subject once again, and treat it as if it had never been understood."

60. Reading the foregoing quotations, and referring to the remark in another paragraph to this effect: "There has been a determined stand made against every suggested increase; and when the want of engineers, or any subordinates of the Engineer Department, has come so prominently forward, that it could not be denied or refused, the addition has been made on a scale too low for thorough efficiency, under the impression that the money spent was to yield no direct return;" it seems to my comprehension, that the Commissioners' notions are a compound of facts and sophistry, which directly go to refute each other; although the very arguments which are adduced, with evident opposite intent, clearly demonstrate, that Government exercised a sound, and in fact, an unavoidable discretion in the measures that are impugned.

61. Instead of the inspecting engineers proposed by the Commissioners, I have already stated in para. 30 of this Minute, that I approve of the Honourable Mr. Thomas's plan of having four general superintendents to an equal number of divisions of the whole Presidency, to be defined by Government, and who would likewise perform the duty of a central Board. To enable the general superintendents to fully carry out their important trusts, I would advise, that there should be a civil engineer and two assistant civil engineers, as soon as they can be provided, in each Collectorate. These three latter officers as well as the general superintendents would belong to the engineer corps, to be augmented accordingly, or at least to the regular military service, if qualified candidates for such employment can be selected from it, and which I see no reason to doubt will be the case.

62. In addition to them, I would further adopt the suggestion of the Marquis of Tweeddale, which I also perceive the Honourable Mr. Thomas supports, of having an executive civil engineer, who had received a practical scientific education in England or elsewhere, and who was perfectly fitted for all the duties comprised in his designation, attached permanently to each collectorate; I would place this latter class of valuable functionaries solely under the general superintendents and collectors; and would make them entirely independent of the civil engineers and their assistants, with respect to the execution and supervision of all works entrusted to their charge and guidance. The rules, to give full effect to these arrangements, would naturally emanate at the proper time from the Governor in Council, and I need therefore here say little further regarding them, except that I entirely dissent from the views of the Commission, that that authority which can only, in my estimation, properly appertain to Government, should be in any degree "reposed in the chief engineer and Board of Works." Such an idea seems to me to amount nearly to laying Government aside altogether; besides which, I have learned nothing during my five years' residence at Madras, that should induce me to favour a proposition, which I esteem to be equally anomalous and open to the very strongest objections.

63. In paras. 34, 49 and 52 of this Minute, I have offered my views on some of the projects referred to by the Commission in the 537th para. of their Report; 213.

(U.)
(V.)
537. and I need not therefore repeat them here; but I beg again, to call particular attention to Appendix (D.), which distinctly and wholly refutes the unconditional assertion, that the questions, as to the sewerage of Madras, and the provision of a sufficient supply of good water for domestic use, "have recently been indefinitely postponed by Government after some inquiry, on the mere ground of expense." I desire, by soliciting special reference to that Appendix, to hold that assertion up to the reprehension it merits, as a glaring misrepresentation. It will be seen, that I took the greatest pains to examine most carefully the scheme to which it refers, and because I did not see cause to concur entirely in it, or in any measure in a quantity of appended extraneous nonsense, the Members of the Commission have forsooth forgotten what was due to honesty of report, and have indulged in the misstatement which I have quoted above, and which I hereby denounce in plain terms.

537. 64. The insinuated threat or warning with which the paragraph I am reviewing closes, strikes me to be the very acme of absurdity. I believe there exists neither "knowledge" nor "public feeling" on any such question amongst the population of Madras; and I further believe, that were it practicable, "at this hour, to ask the 700,000 people of whom that population is said to be composed, their opinion, individually, on the project so "important to their health," and "in a measure to their lives," there would not be found five indifferent persons of all classes, who had either ever heard of, or thought of it; nor one man, whose interests are in any way concerned, by its meddling with his grounds, gardens, tanks or wells who would not earnestly vote against its adoption.

65. As I have stated my opinion to be against the establishment of a central Board of Works; and have also pointed out the mode which I would propose for the discharge of the duty of civil assistant, civil and executive civil engineers in the provinces; and as the whole system to be hereafter introduced must necessarily, in a great measure, hinge on the decision that may be come to on those points, it would be quite fruitless for me to enter into any examination of the comprehensive plans of the Commission for subordinate establishments. I must however say, that they occur to me to be both extravagant in allowances, and excessive in number; and did it rest with me, I would strike out the whole of the newly proposed class of sub-engineers, and reduce the overseers and sub-overseers to 50 of each class, for the whole Presidency; paying them on the most liberal scale that may be granted to the same classes in Bengal, the North West Provinces, and Bombay.

(D) 66. I agree not simply with the Honourable Mr. Elliot, that it is not expedient that Government should continue wholly dependent on the corps of military engineers for the supply of officers required for civil engineering; but I go farther, and, as I have said in para. 61 of this Minute, I think that officers from the artillery and line should be employed, in all branches of the Public Work Departments, including irrigation, roads, &c., wherever they can be spared from their corps, and are found by actual practical tests, in contradistinction to theoretical chamber examinations, which I utterly decri, to be possessed of the necessary scientific qualifications. My sentiments on this much-mooted question will be learned from the annexed Appendices connected with my nomination in December 1852, of Captain Greenlaw, of the 46th Regiment, N. I., to be assistant secretary to the Board of Revenue Department of Public Works.

67. Those documents exhibit my conclusions upon the exclusive, and, as I conceive, short-sighted policy which that Board suddenly thought fit to adopt, at direct variance with their original application to Government; which only extended to procuring an uncovenanted assistant to their Secretary. I saw no reason, as the Minutes will explain, to change my views, to conform with those of the Board, and the appointment of Captain Greenlaw took place. The result was, that the officer at the head of the engineer corps (Lieutenant-Colonel Cotton), and several junior officers of that corps, avowedly acting under the instigation of their superior, had recourse to the unprecedented and indefensible step of addressing individual memorials to the Home Authorities, exclaiming against what was arrogantly set forth to be an invasion of their prescriptive rights. For the opinion which I formed, and hold still, on that presumptuous transaction, I request that reference may be made to the annexed Appendices.

CONCLUSION.

Sections X. & XI.

68. A considerable portion of the X. and XI. Sections appears to me to be formed by repetitions of "thrice-told" exhausted topics; and in a good deal of the remainder, I cannot help thinking that the Members of the Commission have wholly gone beyond their proper field and sphere, by intermeddling with subjects with which they had no sort of concern; as well as by advancing opinions on momentous questions, which I hold to be for the special and exclusive consideration of the highest authorities alone; and those opinions, moreover, conveyed in numerous instances in offensive and presumptuous language.

69. I admit it to be true, that some useful hints may be gleaned from even these two sections, and so far they may, perhaps, be tolerated; but I confess I cannot forbear smiling when I see that the Commissioners assume to themselves the right to dictate what augmentation is to be made to the engineer branch of the Madras army; to criticise and correct the established course of education at the Military College at Addiscombe in England; to point out, and provide for the defects of the course of instruction of young officers, on their first arrival in India; and finally, to lay down rules and regulations for the establishment of an institution, on the principles of that at Roorkee in the North Western Provinces, in such terms as might, and certainly would, lead those who were not cognizant of the truth, to fancy that the Government of Madras had never before thought or heard of that institution; and assuredly, not to suspect that they have repeatedly, during the last three years, solicited authority to found a similar one under this Presidency. Indeed, it strikes me that it displays no little evidence of ingenuity in the art of subterfuge and evasion on the part of the Commission, that they should have been able to compose so many high sounding and prolix paragraphs on what they term the outline of a college; without the most distant allusion to the fact I state, and of which the members were perfectly conversant.

612 to 637.

70. I beg to conclude this subject by expressing my hope, that whenever such an institution shall be sanctioned at Madras, it may be placed under the guidance and direction of Major Maitland of the Artillery, now Superintendent of the Gun-carriage Manufactory, an officer eminently qualified for the charge; that he may be granted whatever subordinate assistance he may apply for, and that he may not be interfered with by the chief engineer as visitor, or under any other capacity or denomination; such interference being, in my judgment, certain to lead to continual and useless disputations.

71. I cordially adopt the following remark from the 84th para. of the Honourable Mr. Thomas's minute: "I should therefore, notwithstanding the institution of a college, advocate the introduction into the Public Works Department of men from all departments, or wherever they might be found, with the requisite qualifications of civil engineers, and advance such men, as Lord Tweeddale proposed, to the highest posts and duties in the Civil Department."

SUMMARY.

72. In section 11 the Commissioners briefly sum up their opinions on the different sections, and I will adopt the same course.

Section II.—*Condition and Wants of the Department of Public Works.*

73. I concur with the Commissioners that the Department of Public Works, in its present footing, is wholly unfit for and unequal to its duties; I therefore recommend that it should be at once set aside, and a large increase made to all branches of a new one, to be fashioned on a plan explained in a subsequent section.

Section III.—*Department of Trunk and other Roads.*

74. I am strongly and unqualifiedly opposed to the recommendation of the Commissioners, that the present Road Department shall be abolished. I have no objection to its being enlarged and strengthened; but beyond this, I must withhold my acquiescence, as to either the correctness or advantage of anything that is advanced by the Commission respecting the existing Road Department.

Section IV.—*The Military Board.*

75. The Military Board ought, in my ideas, to be at once abolished. I speak from my immediate personal observation and experience, as stated in the body of my minute, when I declare it to be worse than useless, and a mere cloak for official neglect, delay, and the avoidance of any shade of personal responsibility.

Section V.—*New Board of Public Works.*

76. A Board, such as the Commissioners advocate, would be, I conceive, merely prolonging the present evil system; I cannot therefore accede to it on any terms whatever. I recommend general superintendents to certain divisions of the country, which would, as I have explained, comprise personal inspection, individual responsibility, and vastly improved efficiency.

Sections VI. and VII.—*Value of Irrigation and of good Roads, Harbours, &c.*

77. I include these two sections under one head, because I have only to observe that I coincide generally with the Commission as to the value of the works to which they refer; but I neither agree in their highly exaggerated estimates for the future, nor in the erroneous deductions respecting the past. The former seem to me to depend almost solely on means that have yet to be created, and which have at no period existed within the Madras Presidency. My ideas as to harbours, rivers, canals, &c., will be fully gathered from the text and appendices, and I have nothing to add to those points.

Section VIII.—*Expenditure on Public Works of Irrigation and Communications.*

78. I can see no object to be gained, or use, in laying down at this time the amount to be expended on the works named at the head of this section. That, I think, will most conveniently and properly be left to be fixed by the local Government when proper supervision is forthcoming; I will only state that I am not myself inclined to recommend that money should be borrowed to carry on Public Works, unless in cases of evident emergency, such as are not likely to happen.

Sections IX. and X.

79. I have nothing to add to the observations which I have offered in the body of my minute on these sections.

80. I am sorry to end this minute as I began it, by observing that I believe it to be an unexampled instance of individuals, in the station of the members of the Commission, failing to acquit themselves of a duty entrusted them, of reporting truthfully and impartially on important public matters referred for their consideration. That I cannot by any means allow they have done: in fact, I affirm that they have not only so failed, but that they have vitiated whatever may be really beneficial in their Report, by mixing it up with low contempt towards their superiors, combined with exaggerations and misstatements; so that in lieu of being perused and studied with that entire confidence which such official documents usually inspire, it will only be examined and read with distrust. I think this is much to be regretted in a public point of view. The Commission had an excellent opportunity of doing great good service, which I conceive they have signally thrown away. They may perhaps, however, gain by their procedure the applause of parties, both in Europe and India, whose standing maxims would appear to be that Government neither ever do that which is right, nor are actuated by wise and proper perceptions and motives. On the other hand, I am much mistaken if they do not lose the favourable opinion and respect of honourable and rightly-thinking men, who judge of others by that high standard that guides their own actions, whether of a public or private nature, through life.

Madras, 23 October 1853.

Henry Pottinger.

APPENDIX.

Appendix (A.)

MINUTE.

THE draft of the letter to the Government of India has just been returned to me, with certain remarks embodied in a minute of the 12th instant by my honourable colleague, Mr. Thomas.

I have not had time to devote to a complete and careful perusal of the First Report of the Commissioners on the system of Public Works, and therefore I passed the draft of the letter above denoted without comment; but as the Hon. Mr. Thomas has since briefly recorded his sentiments,* and as they have just come back to me, and my silence might be interpreted into dissenting from his views, I beg most distinctly to say that I entirely coincide in them, and shall endeavour at some future period to show my reasons for the opinion I have formed, that this First Report of the Commissioners is one-sided; that it misrepresents the actuating motives and real feelings of Government with regard to its measures for the improvement and amelioration of the country; and therefore, that it is not entitled to that confidence, though some facts set forth in it may be well supported, which such a document should command to render it of any general practical use.

* Minute dated 12 April 1853.

(signed) *Henry Pottinger.*

13 April 1853.

Appendix (B.)

MEMORANDUM.

I CONCUR generally in all the remarks of the Hon. Mr. Thomas, which contain many valuable hints, and much information which will be very useful to me when the question comes finally before me.

I am still inclined to press the appointment of an efficient assistant secretary to the Revenue Board D. P. W. I do not see that it need be an engineer officer; one of any branch of the service who is qualified for the important duties that will devolve on him, even as an assistant in that department.

I know of no one myself at this moment, but I should hope some officer might be found. He would require a competent knowledge of engineering, &c., and above all, to be a good man at calculations and with his pen.

(signed) *Henry Pottinger.*

15 March 1852.

Appendix (C.)

MEMORANDUM.

LETTER from the Public Work Commissioners, No. 390, dated the 21st of November 1851; and Extract from the Proceedings of the Board of Revenue D. P. W., No. 20, dated the 15th of January 1852.

THE summary of the proposal of the Mahramut Commissioners, as contained in the first of the above documents, is so clearly given in the Hon. Mr. Elliott's memorandum of the 10th of December last, that I need not repeat it.

I observe that the Board of Revenue, D. P. W., recommend that proposal for adoption, and support their recommendation by quoting various instances in which the plan which it advocates, of placing the trunk roads in charge of the civil engineers of divisions, has worked well.

I am equally satisfied with the Mahramut Commissioners and the Board that a radical reform is urgently required in the Road Department, which I have before been unwillingly forced to declare has, as I conceive, totally failed in the high hopes that were formed of it when it was first organised on its present footing; but when I look to the unceasingly laborious and responsible duties with which the civil engineers are already charged, I cannot,

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after much reflection, bring myself to think that it would be for the public good, or even fair towards those functionaries, to heap more duties on them.

Besides the above cogent reason, I see many objections to any change in a temporary form. Changes inevitably bring with them a certain degree of confusion and attendant references and delay; and as I trust we may now soon expect to receive the final report of the Committee which has been so long sitting on the Public Works Department, I strongly advise that that report be waited for, before any orders on the papers now before me are issued.

In the meantime, however, it is impossible not to see that the Secretary to the Board of Revenue D. P. W., has more work to do than he can possibly get through with every exertion; and should my honourable colleagues be of the same opinion, I am ready to apply to the Government of India for sanction to an assistant secretary being added to the Board of Public Works. The vast increase in that department of late years, and which is certain to progress, demonstrates, in my estimation, that something must be done to render it more efficient and equal to the work it has to perform; and whatever final arrangements may be decided upon, it is to me self-evident that the addition I now suggest will be one of the first steps to be taken.

(signed) *Henry Pottinger.*

27 February 1852.

Appendix (D.)

MINUTE.

PRINTED LETTER from the Military Board, No. 723, dated the 20th of April 1853; with a Printed Collection of Documents regarding the Drainage, Waterage, and Sewerage of *Black Town*, and other parts of *Madras*, &c., &c.

THE above documents have been with me for some days past, and I had before looked into them, but it is only now that I have had leisure to read them through regularly, and put my sentiments in writing.

Whatever conclusion other persons may come to as to the varied projects which are therein developed, I am constrained to avow that I rise from a careful and unbiassed perusal of these papers under strong personal impressions that the plans they propound are all but impracticable. I conceive that the arguments brought forward in support of those plans are altogether one-sided and partial; that, whilst blinking all the difficulties and obstacles which are inseparable from an examination of this or any similar scheme, they display and extol its facilities and recommendations, and apparently assume, as a matter of course, that its objects and advantages are of certain and easy attainment.

Although, as I have just stated, I personally entertain very decided ideas of the non-practicability of the whole scheme, yet I am ready to admit that, could it be carried out, it would prove a vast boon to Madras. This admission, however, leads me to add, that I do not believe that, admitting there are no insuperable obstacles, and under the most favourable circumstances, so great an undertaking could be completed under a less cost than six, or possibly eight times the amount of the comparatively trifling sum spoken of in the chief engineer's memorandum; and therefore, before any step is taken in connexion with the matter, I deem it to be imperative that it should be submitted for the information and orders of the Honourable Court; and further, that should they be pleased to approve and authorise its consideration, the most minute surveys and estimates of every part of the work to be performed, be made and prepared by the officer who may be selected to superintend it; and who will accordingly, fully and perfectly understand, that he will be held personally responsible for their accuracy; and will not in the event of failure, whether complete or partial, be allowed to exculpate, or screen himself under the opinions and views of any other individuals.

It seems hardly necessary, with advertence to the foregoing observations, that I should enter into any details or analysis of the grounds of them, but to show that my views are not based on a mere superficial examination of the question, I will, as briefly as possible, state certain points that have occurred to me to be open to considerable doubt, and which will hereafter require to be minutely looked into.

1st. I believe that the area of the proposed tank, or reservoir, comprises a large portion of the lands of several villagers, who must be compensated for it, before it is appropriated.

2d. I have no sketch or plan of the locality to refer to, but my impression is, from having once or twice ridden over it on horseback, that the site of the intended reservoir lies on the southern and western side of the Adyar, or that at the best, that river runs along one edge of it, and I cannot at all comprehend how any bund or embankment can be formed in such a position, to overcome and resist the violence of what is frequently swelled to an irresistible and tumultuous flood.

3d. Supposing

3d. Supposing it, however, possible at a very heavy outlay to restrain the water within the area of the tank or reservoir, how is it to be raised to the top of the northern and eastern bank of the Adyar, which at the point opposite the tank, where I presume the mouth or inlet to the canal is to be fixed, cannot, I should roughly guess, be less than 100 to 150 feet high.

4th. No provision is made that I can see, for either a total or partial failure of the periodical rains, or even for what might be termed a very dry hot season, in which during the, comparatively speaking, few years I have been at Madras, both the rivers Adyar and Cooum have oftentimes ceased to flow in the least degree, and have been consequently formed into stagnant pools. In such cases, I would inquire what is to be done for water to supply the great reservoir and its appendages?

5th. Granting, however, that the difficulties which have appeared to me as above described shall be surmounted, excepting of course, those proceeding from natural causes, like the want of rain, I have the greatest misgivings as to the practical working of the chief canal; the detailed distribution of the water to the variety of purposes to which it is to be applied; the provision of ground in the thickly inhabited and populous quarters of Madras, for the beds of the multiplicity of minor channels, locks, sluices, reservoirs and cisterns; and I hold it to be quite certain, that the owners of the extensive lands, all of which are I fancy "Meerasese," and which are now kept in a permanent state of very high cultivation, by irrigation from the waters of the existing tanks, which the canal is to absorb, will never be contented to forego their immemorial rights and advantages, to meet the far-fetched and questionable project before me.

I have now stated my candid and unprejudiced sentiments, as to the proposition brought forward by Lieut.-Colonel Cotton, and here perhaps I might fitly decline any further remarks; but before closing this Minute, I feel it to be a duty I owe to the public and to Government to express my great surprise at the extraordinary course which the Military Board have seen fit to adopt, by mixing up the original subject of Lieut.-Colonel Cotton's plan with long, and I must add unmeaning, dissertations on the healthiness of Madras, as though the one chiefly depended on the consummation of the other.

In former remarks, which I have had occasion to offer on the general salubrity of Madras, when discussing the long mooted topic of the drainage of Black Town, I have said, that I consider it, looking to its extent, dense population, and natural position, the very healthiest town in India, if not in the world; and I perceive nothing in the dissertation with which we are favoured in this "printed collection," that tends to shake my confidence in that assumption.

I observe no reply from the chief magistrate, to the call made on him for his opinion on the multifarious schemes of the Military Board, in their letter to him of the 8th of November 1852; and I confess, I am inclined to applaud that first-rate public officer for his discrimination and good sense in not attempting to fathom those schemes, many of which appear to my mind to be based on downright theory, without an approach to the smallest practical reasoning.

The article under the head of "Sanitary Report on the 4th District of Madras," occurs to me to be absolutely contradictory. It sets out with stating, that "it is unquestionable that there are many circumstances in the peculiar character of Madras which are at all times predisposing to affect unfavourably the sanitary condition of its inhabitants;" and a little further on it observes, "I consider that the immunity from endemic and epidemic diseases which Madras generally enjoys, is attributable to the dry character of its climate, whereby the unhealthy influences enumerated above, are in some degree negatived, but in the event of unusually humid seasons, or under that peculiar constitution* of the general atmosphere which produces the invasion of epidemic cholera, or other disease, there can be no doubt that we possess an alarming degree of the elements likely to favour and to aggravate such visitation."

I ask any impartial person to explain what the above extracts mean. For myself, I not only differ "in toto" from the doctrine which either of them advances, but I unqualifiedly and cordially concur in the opinion laid down some time ago, by the Honourable Mr. Thomas, that there is something in the air, soil, and general features of Madras, peculiarly tending to the salubrity of its climate, and consequent healthiness of its redundant population; I will only add, with reference to a remark contained in the same paper, that I am wholly at a loss to comprehend what the clearing of the banks in the bed of the Adyar River, which flows through a quarter celebrated for its healthiness, has to do with the sanitary condition of the 4th Division. I read, with a certain portion of surprise and humiliation, the vapid attempts which are evinced in this printed collection of sensible and well-informed men, to countenance the schemes, which it has been my task to protest against.

16 May 1853.

(signed) Henry Pottinger.

Appendix (E.)

* I should like to have this defined for universal information. I have met with no medical man who pretends to such occult knowledge.

(signed) H. P.

Appendix (E.)

MEMORANDUM.

THE neglect and total want of system, which have called for this Draft Minutes of Consultation, are so wholly at variance with anything that I have ever been accustomed to, that I am at a loss to express my surprise and reprobation of them. Can it be wondered at, that I hesitate to sanction new estimates and expenditure, when I find that those which have been already authorised are allowed to remain in so unsatisfactory and discreditable (to all concerned) a state? I desire, that the Accountant-general's letter and these papers may be sent to me on return from circulation; that I may consider the proper means of relieving myself personally from any further responsibility in such matters, and may suggest steps for forcing the different revenue and other officers to do their duty to the public.

(signed) *Henry Pottinger.*

24 May 1850.

MEMORANDUM OF UNADJUSTED BALANCES.

	Rs.	a.	p.
Rajahmundry - - - - -	1,838	2	4
Masulipatam - - - - -	12,322	7	3
South Arcot - - - - -	20,942	2	9
Tanjore - - - - -	6,172	11	3
Vizagapatam - - - - -	1,344	13	1
Coimbatore - - - - -	9,098	5	4
Ganjam - - - - -	136	1	7
Madura - - - - -	20,299	15	8
Nellore - - - - -	73	8	-
Malabar - - - - -	12,646	2	5
	84,874	5	8

Appendix (F.)

MEMORANDUM.

I HAVE always declared, and I repeat that declaration, that there is only one mode of having such items settled, and if necessary, recovered. That is, by making a collector when he is first appointed to a district, immediately and personally responsible, and obliging him, as is done under the Bombay Presidency, to give a certificate to his predecessor that he has looked into and understood all the outstanding balances, and is prepared to account for them. Here we find items of charges lying over for 18 years, during which repeated changes have taken place in the Revenue Head of the Collectorate, and now Government are annoyed by lengthy references from which no possible good, that I can see, is to be expected. I recommend that the matter be dropped, or else the present collector be called upon at once to refund the disputed sums.

(signed) *Henry Pottinger.*

15 November 1852.

Appendix (G.)

MEMORANDUM.

I do not agree with the observation in the margin, by the chief secretary. A collector who is resolved to do his work, as it should be done, will always find time to call for, and examine, the balances; and the laxity which pervades this Presidency on the subject of accounts is to me quite surprising. In fact, were matters properly conducted, I do not see how these balances could possibly exist. In my notion, not only should the accounts of every collectorate be finally and perfectly closed at the expiration of each fasly (showing any unadjusted balances, even to a rupee—in a separate statement), but, that the accounts of each taluacdarce should be closed each month.

This

RETURNS RELATING TO PUBLIC WORKS, INDIA. 111

This is the only remedy to apply to these arrears. Where money is advanced to engineer, or other officers, for particular duties, it should be debited to them personally until completely accounted for. I shall probably have an opportunity of recording these sentiments more formally ere long; and in the meantime I propose that this useless correspondence be ended.

(signed) *Henry Pottinger.*

30 November 1852.

Appendix (H.)

MINUTE.

CAPTAIN Lake's Project for an Anicut across the Kistnah River, with former Proceedings and Report of the Committee appointed by Minutes of Consultation of the 5th of September 1848.

On first reading Captain Lake's Report, with those of the collectors of Guntoor and Masulipatam, which were submitted to Government with the proceedings of the Board of Revenue of the 7th of August 1848, the impression I imbibed (and of which I made a note at the time) was, that the estimate framed by the former officer was far below the probable expense. This impression has, I see, been fully corroborated by the Report of the Committee, which has calculated the outlay on the annicut alone at (in round numbers) seven and a half lacs of rupees, being, as nearly as possible, seven-eighths ($\frac{7}{8}$) in excess of Captain Lake's first computation.

400,000
750,000
Rs. 350,000

It was not, however, to the annicut alone that my apprehension of the inadequacy of Captain Lake's estimates extended. I fear he has under-rated the cost of all the subsequent improvements, intended to give the annicut "full effect." On reference to his Report, it will be observed, that he allows only 1,000 rupees a mile for making roads, which seems to me far below the mark; and after the charges which I have seen sanctioned for channels, sluices, embankments, &c., in other places, I can place but little confidence in the sums he has put down.

I am aware that the sums detailed in the para. which I have cited, point to ulterior measures; and I find that the Board of Revenue D. P. W., in their proceedings, handing up Captain Lake's Report, say, "probably not more than one lakh (independent of repairs) will be required for the actual distribution of the waters upon the lands, exclusive of the Delta, for some years. Thus the proposed present outlay will be,—

Para. 30.

For Anicut - - - - -	402,639
Distribution of water - - - - -	100,000
	<u>Rs. 502,639"</u>

But this is avowedly only a conjecture, and moreover, does not include the Delta; of the extent of which (in comparison with what it does include) I am necessarily ignorant. With these uncertainties, I confess it appears to me to be impossible to pronounce with any degree of confidence, whether the annicut, when perfected, according to Captain Lake's most enlarged plan, will have cost 20 or 30 lakhs of rupees; and even to render it available, on the modified scale described by the Revenue Board, I do not think we can reckon on a less outlay than one moiety of the first-named sum, viz., 10 lakhs of rupees.

I trust it will not be imagined from the preceding remarks, that I am wishing, or meaning, to throw cold water on the project. On the contrary, no one can be more anxious for its completion, or more alive to the advantages and blessings which it is calculated to diffuse by its operations, than myself; but I feel that it is right not to allow my judgment to be biassed by my anxiety to see the project carried out, and therefore I have, after mature and lengthened reflection, candidly stated my opinions; to which I will only add, that laying aside the question of the undoubted benefit that must accrue, in due time, to the State by a great increase of revenue, I esteem it to be a positive duty which the British Government owe to the inhabitants of the districts which the annicut is meant to fertilise, to adopt a measure which, under God's blessing, will for ever avert the horrors of famine, under which they have before so deplorably suffered.

I have only to further state, that from a careful consideration of all that is recorded in the papers before me, I entertain no doubt of the feasibility of Captain Lake's plan; and that I am likewise satisfied, that the point which that officer has selected for the site of the annicut, is the proper (or perhaps I might say only) one. I accordingly recommend that the whole of the documents and plans which are now circulated be transmitted to the

Honourable Court, with the earnest recommendation of this Government in favour of the project; but at the same time accompanied by an intimation that, should it even be fully approved and sanctioned, no steps will be taken for commencing on the work until the Godavery annicut shall not only have been completed, but shall have stood the test of at least one season of floods and inundations.

(signed) *Henry Pottinger.*

18 June 1849.

Appendix (I.)

MINUTE.

LETTER from the Secretary to the Board of Revenue D. P. W., No. 632, dated the 12th of May 1853, with various Inclosures and Plans, submitting a project for an Annicut across the Palaur River near Arcot, at an expense of rupees 7,95,963. 13.

I HAVE read with great attention and interest the above letter and the correspondence with it, and have also minutely examined the map and plans to which they refer.

I consider the project of an annicut across the Palaur river at Arcot to be a very admirable one, and one of which the benefits can scarcely be over-rated.

It is impossible that I can follow the civil engineer of the 4th division through the calculations, plans, and estimates, nor does it appear at all necessary that I should attempt anything of the sort, but I may say, that they appear to me to have been prepared with the greatest care and skill, such as to entitle them to perfect confidence.

The eventual out-turn of this desirable project is shown to be likely to far more than repay the outlay as soon as the ryots shall have the means, and shall have acquired confidence, to avail themselves of the vast facilities which it will afford them to extend and improve their cultivation.

This is undoubtedly a very important object, and one which ought never to be lost sight of in schemes of this nature, but it occurs to me, that a still more momentous desideratum is sure to be attained by the Palaur annicut. I mean that of effectually protecting the districts which it is intended to fertilize from all possibility of scarcity or famine—so far as human means are available to effect that end.

I therefore cordially and unhesitatingly commend and concur in the design, and propose that it be immediately submitted to the Honourable Court, with the strongest recommendation of this Government that it may meet with their early sanction.

(signed) *Henry Pottinger.*

25 May 1853.

Appendix (J.)

MEMORANDUM.

MINUTE by the Honourable Mr. Thomas, dated the 25th of July 1853, on the project for an Annicut across the Palaur River.

I SUPPOSE the above Minute, though placed on record after the Draft Mins. of Cons. was prepared, will require to be forwarded with the rest of the papers on the matter to which it relates; and so far as it rests with me I entirely approve of that being done.

I consider the remarks made by the Honourable Mr. Thomas to be equally sound and well grounded; and it strikes me to be desirable that they should be looked into before the matter goes further.

The chief point to be ascertained appears to me to be the capability of the Palaur river to supply the tanks that are to be fed by means of the annicut with water, in seasons in which the north-east monsoon may wholly or partially fail; as it is self-evident, that such scanty seasons will be those in which the advantages and blessings anticipated from the work will be of the greatest value to the country and people.

I would therefore advise that the Board of revenue be called on to Report, in concert with the civil engineer of the 4th division, on this momentous question to the success of the whole plan.

The

The next point to which the Honourable Mr. Thomas refers is, the possible necessity for a revision of the assessment, so as to assist in retaining prices of grain, when the full effects of the annicut shall have brought a large additional extent of land under cultivation, at such rates as will prove remunerative; and I concur with my honourable colleague in proposing that this point be likewise referred for the mature consideration of the Revenue Board. At the same time I think it right to state, so far as I can judge from my comparatively short experience of the fluctuations of the seasons in this part of India, that I deem it probable that the superabundant produce in one district will often be needed to compensate for deficiency in others; and I also see abundant reason to hope that extension of cultivation under the different annicuts will in due time not be confined to rice and grain, but will embrace a vast increase of sugar, indigo, the manufacture of rum, and other articles adapted to the markets of England, and foreign Europe.

The improvement and extension of roads, to open up the districts to be fertilised by the annicuts, are of the highest moment, and ought to engage early attention. This seems to me to be particularly desirable in the districts through which the waters of the Palaur Annicut are to flow, as there are, I fancy, in them no means of forming canals, such as will partly answer the purpose of roads in Rajahmundry, Masulipatam, and the other northern districts where the face of the country is level, and the supply of water certain and superabundant.

(signed) H. P.

2 August 1853.

Appendix (K.)

MINUTE.

LETTER from the Secretary to the Board of Revenue, D. P. W., No. 917, dated the 18th of July 1853, submitting Estimates for a Lock and Calingula to be constructed at the north end of Cochrane's Canal, and for extending (a Branch of) the same Canal to the Railway Terminus near Clive's Battery, the former amounting to Rs. 15,469. 4. 9, and the latter to Rs. 35,734. 6.

On the 4th of March 1852, the Military Board handed up an estimate amounting to Rs. 1,995. 13. 4. for removing the accumulation of mud and sand from the bed of the Cooum River, agreeable to custom, and in conformity with the sanction of the Honourable Court, who had authorised an annual outlay of 2,000 rupees for that purpose.

In sanctioning this estimate the Government expressed their doubts whether any permanent advantage was gained by this outlay, and directed* the Military Board to obtain the opinion of the chief engineer as to the advisability of continuing it in future; as well as regarding the improvement of the Cooum River, to which the Military Board's particular attention had been previously directed.†

* Mins. of Cons.,
16 March 1852.

† Mins. of Cons.,
23 April 1851.

On the 7th of June last the Military Board, in reply to the above, addressed a letter to Government, accompanied by a memorandum, drawn up by the chief engineer, proposing the construction of a lock at the northern or Ennore end of Cochrane's Canal, as the best means of retaining at all times a large volume of water in the canal, and likewise in the Cooum River, and thereby improving both.

After giving my best consideration to the letter from the Military Board and its enclosure, I stated my personal sentiments, grounded on actual observation, in two memorandums of dates as per margin,† and of which I here annex transcripts:—

124 June 1853.
3 July 1853.

"Memorandum (A).—I have no objection to an application being made to the Government of India for sanction to this expense (12,000 rupees), but must say, that I do not clearly see how the project is to answer the proposed purpose, even so far as keeping the bed of the Cooum River clear and free from noxious smells. I also strongly apprehend that a lock on the Cochrane's Canal at the point indicated (or in fact any other) will interfere most seriously with the free navigation. The passage up and down of boats appears to me, from recent observation, to be almost incessant; and if it is intended that they should all be kept in or outside the lock, till the tide suits for its being opened, I fear loud complaints will be justly made against such a system. I further apprehend that the observation that 'only an insignificant body of water will escape when the lock is opened,' will prove erroneous. The rush of water outwards will be tremendous, and the management of the lock will be, I suspect, attended with much difficulty.

"24 June 1853."

(signed) "H. P."

* *Memorandum (B)*.—I see no satisfactory explanation as to the fears I have expressed in my memorandum of the 24th ultimo, regarding the navigation being seriously impeded. If the lock is to be kept open at the fall of the tide, it seems to me that the whole of the water will run out. After heavy floods I believe the lock will be wholly useless.

"3 July 1853."

"H. P."

Whilst the matter was under discussion, his Excellency the Commander-in-chief left the Presidency, and the Honourable Mr. Thomas being also absent, the Members of Council present were reduced to two. The Honourable Mr. Elliott did not appear to share in my doubts, and as the only objection I felt to the scheme arose from my apprehension of its success, and I had fully given my reasons for dissenting, I did not deem it proper, on my single judgment, to oppose it further; and I accordingly concurred in the application made to the Government of India on the 6th of July, for sanction to the required amount (12,000 rupees).

* Rs. 12,000.

The Board of Revenue D. P. W. have now submitted the two estimates, described at the head of this minute. That for the lock and calingula at the northern end of Cochrane's Canal, shows an increase of Rs. 3,469. 4. 9, on the original sum.* The other, for a branch canal to run at right angles from the present one, and parallel to the railway, to Clive's Battery, amounts to Rs. 35,734. 6. 0.

The proposed augmented expense on the lock and calingula at the northern end of Cochrane's Canal is not apparently intended to cause any alteration with regard to those works, beyond the additional outlay; and as I have already stated distinctly my opinion on them, it is not necessary that I should repeat it here. As, however, the letter from the Board of Revenue D. P. W. may be assumed to have re-opened, as it were, the question, I feel it right to declare that my opinion continues unchanged, as will be seen by the annexed copy of a Memorandum (C.) which I made on the Revenue Board's letter when it first came to me:—

"*Memorandum (C)*.—I should wish this letter to be laid before Council; I have seen no reply to the remarks which I made on the letter from the Military Board of the 7th of June, and as I cannot approve of the proposed lock at the mouth of Cochrane's Canal, and am also doubtful of the efficacy of the extension of that canal proposed to Clive's Battery, I want the matter to be further considered before we apply for sanction.

"5 August 1853."

"H. P."

With regard to the contemplated branch to the present canal, to extend to Clive's Battery, I have given it my very best reflection, and have likewise looked at the ground through which it is to be dug. I cannot, I confess, see the object of digging a basin or canal that is to be close to and parallel to the railway, and which must be rendered passable to the public by the erection of not less than five or six bridges, even if that number will suffice. Should the traffic so increase hereafter as to call for additional basin room, the present canal might, I conceive, be advantageously widened and enlarged in close proximity to the bridge by which the railway is to cross "Cochrane's Canal," either above or below it, or on both sides; and an extensive and convenient wharf built along the eastern bank, for landing all goods from boats, with facilities for transferring them to a rail or tramway, instead of transporting them to the beach at Clive's Battery, down the proposed basin or canal, attended with the serious and obvious inconvenience and labour of the boats conveying them, being obliged to pass under half a dozen of bridges in a distance of somewhat less than half a mile.

In conclusion, judging from the local experience I have acquired during my residence at Madras, and also weighing the opinions of those whom I have consulted on the subject, I am bound to say, that I do not think that any expedient that can be hit upon will prevent the bar at the mouth of the Cooum River being naturally opened on each and every recurrence of a high flood from the interior; and on all such cases it is self-evident, that both the lock and calingula at the northern end of Cochrane's Canal, and the newly dug basin, will, for the time, cease to be of any use, however slight. This fact indeed seems to me to be admitted in all the papers; and though it is made as light of as possible, yet it strikes me to be a vital objection to the whole project.

Did I believe that the projects were feasible I should cordially support them, but as I do not think either will answer the desired purposes, owing to natural obstacles that cannot be overcome, I desire to place that opinion on record, and only hope I may prove to be mistaken.

I request that a copy of this minute may be sent with any application that may be decided on, and likewise transmitted to the Honourable Court.

(signed) Henry Pottinger.

29 August 1853.

Appendix (L.)

MINUTE.

LETTERS from the Secretary to the Board of Revenue Department Public Works, No. 168, dated the 2d of June, submitting Plans and Estimates for the Improvement of the Ports of Coringa and Cocanada, with a Memorandum by the Chief Engineer.

I HAVE read the above letter, and the papers that are in circulation with it, very carefully.

As the works at Coringa and Cocanada appear to be quite separate, I suppose it is competent for this Government to sanction the aggregate amount* asked for, and I have no objection to that being done; but to any further expenditure on "more extensive improvements," I wish it to be clearly understood that I will not grant my consent without the previous authority and approbation of the Honourable Court, to whom the estimates, &c. will therefore require to be sent. **Rs. 17,887. 13. 4.*

Had the Board of Revenue D. P. W. not frequently before committed the same fault, I should have felt some surprise at their handing up, without offering any remarks on it, a paper so full of groundless assertions and errors as the memorandum by Lieutenant-colonel Cotton. That officer broadly asserts, that the River Godavery is navigable for 450 miles, and speaks of the success of Messrs. Palmer & Co.'s enterprises; whilst I happen to know, from my personal knowledge, that they were all utter failures, and abandoned in consequence years before that firm became bankrupt.

I consider a great portion of Lieutenant-colonel Cotton's memorandum to be highly improper and disrespectful in its tone and purport; it attempts to establish as a fact, that the delays of which he complains have been solely caused by the supineness of Government. He, as well as the Board of Revenue D. P. W., seem to have forgotten, that a report on the harbours of Cocanada and Coringa was called for above seven years ago, and that that call was repeated in 1848, a few months after I assumed charge of this government. He and the Board likewise overlook, that by the Minutes of Consultation of the 11th of January 1850, the Government declined to approve of Captain Orr's plans for improving the port of Cocanada, partly for the reason that that officer's time and thoughts were believed to be fully occupied with the Godavery Annicut, and partly because the plans, specifications, and estimates, so long called for, had not then been submitted, nor have they, it is to be noted, been so till this hour.

With these truths staring them in the face, it does strike me to be rather inconsistent and absurd, the Board of Revenue D. P. W. writing in the following terms:—"This work is stated to be urgently required for the communication with the shipping, and the civil engineer hopes it will receive early sanction to admit of its being executed in time for the approaching freshes;" they add, "the works are in conformity with Colonel Cotton's recommendations, are approved by the collector, and appear to be indispensably necessary," whilst the present civil engineer begs "that these estimates may not be detained."

I see that Lieutenant-colonel Cotton expatiates in his memorandum on the manifold and inestimable benefits and advantages that might and would accrue to the country, to the people, and to Government, were the local engineers and authorities vested with the power of expending the public money *ad libitum* in carrying out their own projects without the interference of Government or necessity for its sanction. The Board of Revenue might have known, whatever Lieutenant-colonel Cotton's ignorance may amount to, that such a scheme was at variance with the rules of this or any other service, as well as opposed to the commands of the Honourable Court, who have even been pleased to set a limit to the sums to be expended by the different Governments of India without their previous sanction.

I have said more, perhaps, in reviewing these documents than they at first sight may appear to call for; but as I believe that some of them are written, not for the information of Government, but to serve particular purposes, I do not choose to allow them to pass without exposing their fallaciousness.

21 June 1853.

(signed) Henry Pottinger.

I DESIRE that a copy of this Minute may be sent to the Honourable Court, with the papers to which it relates.

21 June 1853.

(signed) Henry Pottinger.

Appendix (M.)

MINUTE.

LETTER from the Marine Board, No. 2,377, dated the 3d of November 1852, submitting Correspondence respecting the deteriorated state of the Ports of Cuddalore and Porto Novo.

21 December 1850.

I THINK it right to offer the brief remarks I have to make on the above letter in the form of a minute, because the Marine Board appear to me to have forgotten or overlooked what they wrote to Government two years ago respecting the port dues of Cuddalore, and now seem to wish to show that the falling off in those dues arose from other "elements tending to so unsatisfactory a result."

11 December 1850.

I am not sure that I fully understand what is intended to be conveyed by the remark I have cited; and I am free to confess that I place but slight reliance in any opinion offered by the then collector of South Arcot (Mr. Wroughton), who deceived me in all the communications, both verbal and written, that I had with him on the important question of cotton cultivation; but I do think the report* of the superintendent of sea customs at Cuddalore bears reason and fair argument on the face of it, and that it ought not, therefore, to be hastily set aside to make room for any speculative schemes, such as I look upon those here submitted:

I can discover nothing in these documents to prove that either the port of Cuddalore or of Porto Novo has recently deteriorated. From the description given of them, they appear to partake of the universal feature of all the creeks or mouths of rivers along the eastern coast of the Peninsula, and, so far as I am aware, it yet remains to be tested whether that natural feature can be overcome by art. I have understood that it has been tried at Cocanada or Coringa, and been there a perfect failure. I have also known it to be tried in various native ports of the Gulf of Kutch, where they were open to the full influx and reflux of the sea; and, although they succeeded apparently for a short time, they speedily fell into utter disrepair, and had to be abandoned on account of the expense of keeping them in order, far outbalancing any gain that could be anticipated.

This is exactly the point which it strikes me this Government should keep before it in considering these propositions; and as that lately submitted regarding Negapatam is precisely, so far as I can form a judgment, of a like description, I am strongly disposed to think that nothing should be done at Cuddalore or Porto Novo until the result of the Negapatam projects is ascertained.

I have, however, no objection to the plans and estimates for one or both being called for; and, as I conclude the outlay will exceed what this Government can take on themselves to sanction, I recommend that the whole question be laid before the Honourable Court for their consideration and orders.

(signed) *Henry Pottinger.*

29 November 1852.

Appendix (N.)

MINUTE.

LETTER from the Secretary to the Board of Revenue D. P. W., No. 322, dated the 25th of April 1853, submitting Projects, accompanied by Plans and Estimates, for Improving the Harbours of Cuddalore and Porto Novo, in South Arcot.

I HAVE read the above letter and its accompaniments with great attention, and have studied and considered the plans most carefully, with a view to master them, which I think I have now done.

I must say that I have the strongest personal misgivings as to the practicability of permanently improving the harbour of Cuddalore at an expense of 15,000 rupees, by altering the current of the two rivers that meet at its mouth. I have had some experience of attempts of this nature, and I have seen how futile they have proved in projects which have promised, at least as favourably as those before me, in controlling adverse natural causes. I cannot, therefore, on my own judgment, support the civil engineer's project, even to the above extent; but, should it be thought worth the trial, I am prepared to join in an application to the Government of India for their sanction to the expenditure, no part of which should, in my idea, be charged to the surplus Chattram-Fund.

As to the second scheme for bringing the waters of the Vellaur River by a canal to the harbour of Cuddalore, it is, perhaps, feasible; but it seems to me that it should, under any circumstances,

circumstances, be delayed until the result of the project referred to in the preceding paragraph, should it be sanctioned, is demonstrated. I hold that to bring those waters, admitting its feasibility, whilst the success of the first project is doubtful, would be an ill-advised and premature outlay.

With regard to the third scheme, that of running a pier out into the Bay of Bengal to a distance of 400 yards, I most unqualifiedly record my opinion that would prove an absolute waste of public money. I do not believe that it ever could be effected on any part of the coast of Coromandel, without reference to the cost; and I must hold it to be a chimera which no human power or art could carry out.

I have deemed it right to state my sentiments in the form of a minute in case reference to the Honourable Court or the Government of India should be thought advisable.

(signed) *Henry Pottinger.*

14 May 1853.

Appendix (O.)

MINUTE.

I HAVE no objection to offer to what the Honourable Mr. Elliott proposes in this Minute. I merely should wish my Minute to go with any application that may be made to the Government of India. I have stated my reasons for doubting the success of the proposed plans.

(signed) *Henry Pottinger.*

23 May 1853.

Appendix (P.)

MEMORANDUM.

I RECOMMEND that the Board of Revenue Department of Public Works, and the civil engineer of the 6th division, be referred to the Minutes of Consultations of the 14th ultimo (not yet a month old), and informed that the question has been submitted for the sanction of the Government of India, whose orders this Government do not deem it proper to anticipate. I have frequently had occasion to remark, that when a matter is once referred to supreme authority, I deem it highly objectionable and disrespectful to go farther in it, pending a reply. Had the matter been submitted three months earlier, it might even have been settled one way or another.

(signed) *Henry Pottinger.*

12 July 1853.

Appendix (Q.)

MEMORANDUM (No. 1.)

AFTER the very large sums sanctioned in 1845, for the improvements of the Port of Negapatam, and which were reported by the Board of Revenue under date the 12th of April 1849, to have been attended with complete success, I am surprised at this application, and must decline sanctioning it.

(signed) *Henry Pottinger.*

18 July 1850.

(No. 2.)

I THINK it right to say that I greatly question the stability of the proposed pier, if, as appears to me from the sketch, it extends into the sea, and is wholly exposed to the surf and strong currents. I further think that Government should have some idea of the eventual total expenditure on the Negapatam Harbour, as well as a return of the import and export duties for the last five years. It may be very practicable to improve the harbour at a very heavy outlay. It is the duty of Government to see that it is worth while to incur such an outlay.

(signed) *Henry Pottinger.*

13 May 1853.

(No. 3.)

I SHALL not attempt further to withhold my concurrence to the proposed charge, but I must repeat my doubt of the success of the project. I conceive that any person of common sense and observation, is as capable, or nearly so, of judging of the probable success of such schemes

schemes as any engineer whatever. When a bridge is to be built, or any other work that simply requires science, I am free to coincide with the remarks of the Honourable Mr. Elliott; but when the physical powers of natural obstacles are to be overcome, then I consider my own judgment to be quite as sound as that of any other thinking man, and I am not prepared to put it aside.

With these observations, which I desire may be placed with the correspondence, I withdraw my objection to the outlay.

(signed) *Henry Pottinger.*

1 June 1853.

Appendix (R.)

MINUTE.

LETTER from the Secretary to the Board of Revenue, No. 393, dated the 21st of March 1853, regarding the Dowlaishwarum Foundry.

I STATED my opinion on this question in a Memorandum dated the 11th instant. The papers have again come round to me, with the remarks of my honourable civil colleagues, and having most fully reflected on the matter, I am obliged to adhere to my first view.

I know, of course, nothing of the practice at Roorkee, Casseepoor, or Calcutta, in this respect; but even should it be as the Honourable Mr. Elliott seems to suppose it is, it would not change my ideas; as I consider, with the Honourable Mr. Thomas, that the single result of such a Government establishment, would be that of impeding and interfering with private enterprises, and the outlay of private capital.

I recognise no authority whatever on the part of Government for the promise which is asserted to have been made to Mr. Falkener in favour of the firm which he represents; and the sentiments of the Board of Revenue D. P. W., as expressed in their secretary's letter, strike me to be altogether based on erroneous principles and arguments; inasmuch as they would seem to advance, that Government is bound to incur heavy expense and to keep up establishments to promote the objects, and to purchase, as it were, the interested (for it can be nothing else) advice and assistance of private persons and establishments.

I request that the Memorandum adverted to at the commencement of this Minute may be appended to it.

I have no objection to this question being referred to the Honourable Court, but beyond that I am unable conscientiously to go.

(signed) *Henry Pottinger.*

30 April 1853.

Appendix (S.)

MINUTE.—Dowlaishwarum Foundry.

THE opinions of the Members of Government regarding the Dowlaishwarum foundry being equal, it devolves on me to pronounce the casting vote.

I have again read and considered the whole of the correspondence with great care, and must adhere to the views I have already expressed.

6 September 1852.

20 April 1853.

I consider, that had the orders of Government been carried out as they should have been, ample time has been afforded to the private individuals who urge the foundry being retained, to have made other arrangements; and I have, in a recent Minute, explicitly explained why I am unable to subscribe to the arguments of the Revenue Board D. P. W., on that portion of the question.

In addition to my former remarks, I am now sorry to be compelled to say that I have reason to believe the foundry is, and has been, applied to objects which are unsanctioned by and unknown to Government; and which I conceive call for immediate and full investigation and report.

Not very long ago, a proposal was made through the Board of Revenue D. P. W., to establish a steam ferry on the Godavery River, and the sum of 8,000 rupees was asked for to build a steam ferry-boat. I opposed this scheme, which I looked upon to be altogether premature in a wild and thinly inhabited part of this Presidency, like Rajahmundry; but the proposal led to my making private particular inquiries, in the course of which I was informed, that there were no less than four steam-boats now ready at Dowlaishwarum, and a fifth in a forward

forward state of preparation, besides a very large flotilla of other boats and vessels, to the asserted extent of 1,000 or 1,200 tons.

About the same time I observed it set forth in a petition from the Madras Native Association to Parliament, that permission to survey and examine the Godavery river had been refused by the Madras Government to Lieutenant-colonel Cotton, who had built a steam-boat for the purpose at his own expense. I placed, of course, little or no confidence in this absurd assertion, but I here allude to it as corroborative of the alleged fact of steam-boats being at Dowlaishwarum, of which I had no previous personal knowledge from anything that had come officially before me.

I consider it probable, if my information be correct, that some of the steam-boats are employed on the works of the annicut, but I cannot recognise that as the slightest reason that their existence, as well as the cost, manner, and course of their being built, should have been kept a secret from Government.

The sum of 10,000 rupees have been lately applied for, and, at the recommendation of the Madras Government, sanctioned by the Government of India, to meet the expense of exploring the Godavery River, and I have all along supported the project, notwithstanding my personal apprehensions, from my former acquaintance with the failure of similar attempts, that this one will likewise end in disappointment. I however here specially allude to it, for the purpose of observing that should it be intended, as I have heard is the case, that some of the steam-boats above alluded to, are to be employed in the enterprise, I conceive that that fact should be made known to the Supreme Government, as it seems to me to be a pure deception to lead those high authorities to fancy that the expenditure is limited to what they have authorised.

The Military Board recommended, within these few months, that iron railways for the Esplanade, and other places in the vicinity of Madras, should be procured from the Government Foundry at Dowlaishwarum. I did not myself at first perceive the drift of the recommendation; but as soon as I discovered that it was meant to set Government up in opposition to all private capitalists in iron, I strongly opposed the plan. I have since been told, that it was one of the various contrivances for finding work for the foundry; or, in other words, supporting it at the expense of checking all private enterprise.

It will be understood, from the general tenor of this Minute, that my unqualified opinion is, that the Government Foundry at Dowlaishwarum is a useless, expensive establishment, calculated to do harm, and to repress the outlay and efforts of private capitalists. I therefore advise that its final abolition be proposed to the Honourable Court, and that, pending a reply, the public work done in it shall be confined to the smallest practicable amount, and that none on private account shall be permitted on any pretence.

This Minute, and the whole of the correspondence connected with it, should be sent to the Home authorities by an early opportunity.

(signed) *Henry Pottinger.*

30 May 1853.

Appendix (T.)

MINUTE.

CORRESPONDENCE regarding the Foundry at Dowlaishwarum, and the Steam and other Boats on the Godavery River.

I HAVE taken the pains to go regularly through the whole of the papers and correspondence, commencing at the close of the year 1846, and extending up to the present time, on the topics named at the head of this Minute.

Nothing that I have seen in these long and somewhat confused documents has tended to alter my views as to the inadvisability of establishing a steam ferry on the Godavery, or of keeping up a foundry at Dowlaishwarum to perform work for private persons as well as for the public; but as I have already assigned, in the Minute and Memorandum of dates noted in the margin, my detailed and fully considered reasons for the views I entertain, it would answer no good purpose to repeat them here.

11 April 1853.
18 " "
30 " "
2 May "
30 " "

The perusal of the papers referred to above has, however, confirmed the impression I had imbibed, from parts of the more recent correspondence, that neither the establishment of a foundry at Dowlaishwarum, nor the building and setting-up of steam-boats at that place, has ever been authorised.

Para. 1.

With respect to what is now designated the "foundry," I see that a "workshop" was sanctioned, and an officer appointed to the charge of it; but from the description of work which is enumerated as proposed to be done in it, it seems to me to be quite clear that nothing like a "foundry" was not only intended by Government, but, as I shall show presently, was expressly prohibited. If, therefore, the "workshop" is to be continued on any footing

Min. of Cons.,
28 April 1846.

as a "foundry," I repeat the sentiments I have already recorded, that that should only be done with the approbation and permission of the Home authorities.

As regards steam-boats, there seems to me to be, if possible, still less grounds or justification for the proceedings of the local authorities.

Mins. of Cons.,
31 July 1846.

Mins. of Cons.,
29 November 1846.

It will be found that application was made by those authorities for permission to construct a steam-boat of five-horse power, as a tug, and that the proposal was disapproved on what I hold to be conclusive grounds; that, subsequently, a reference was made to Calcutta respecting an engine of the requisite power being procured there, and that, failing that, Government resolved, at the recommendation of the Board of Revenue D. P. W., to ask the Honourable Court to send one out from England.

24 December 1846.

Very shortly after this, a further reference was made to the Government of India relative to an iron steam-boat called the "Lotus," which was stated to be for sale for 6,000 rupees, and which Major Cotton had suggested, through the Board of Revenue D. P. W., should be bought. On this boat being, at the request of this and by orders of the Supreme Government, examined by the controller of Government steam-boats and the superintending engineer at Calcutta, those officers stated, that she was ascertained to be "so much out of order (the chimney and fire-bars entirely worn out, and the covering of the boilers also much worn) that it is impossible to get the steam up to try the engines without a considerable repair. The iron hull was also much corroded. Under these circumstances, and having learnt from those who have had opportunities of seeing her under steam, that the 'Lotus,' even if repaired, would not, from want of power, answer the purpose of Major Cotton, I could not recommend her being purchased by Government."

A copy of the letter of which the above is an extract was furnished to the Department of Public Works, on the 23d of March 1847, with an intimation that an application would be "immediately made to the Honourable Court for the supply of a steam-vessel of the dimensions and construction that had been recommended by Major Cotton" in the specifications forwarded by him, under such and such dates.

Why this intention was not carried out there is nothing in the papers before me to show; but I understand that Major Cotton left his station without leave about this time, and proceeded to Calcutta, where I am told he bought the "Lotus," in the face of the above report declaring her to be useless. I can discover neither any authority for this step, nor what the boat cost in price and repairs. I think, therefore, the Board of Revenue should, even at this late period, be required to explain the matter, and to show from what funds the whole expense was defrayed. I surmise that it was so from the amount afterwards sanctioned for the Godavery Annicut; but surely some record of such a transaction should have been kept, and Government made acquainted with it.

Mins. of Cons.,
31 July 1846.

Touching the steam-boats now on the Godavery, I have said above, that they have not only been built without authority, but in direct disregard of the orders of Government. I cannot but consider that maintaining an establishment like the foundry at Dowlaishwarum, for such purposes, is altogether at variance with the public interests and the good of the service. Whatever specious reasons may now be advanced to the contrary, I cannot but hold, that all that has been and is being done in this respect is a mere cloak for indulging in personal schemes and predilections, in which the public money is unauthorisedly squandered; and I cannot for an instant doubt but that the Honourable Court and the Supreme Government will learn with surprise, that such extensive and expensive projects have been going on for a long period wholly unknown, so far as I am informed, to the Government of this Presidency. I have before stated, in other words, that I entirely concur in the following observation of the Madras Government: "His Lordship in Council doubts the expediency of Major Cotton engaging in the construction of a five-horse power steam-engine. The time and labour which must be given to this object by Major Cotton and the officers attached to him, may, he is disposed to think, take their attention from more important duties." When it is found that, in defiance of this prohibition, one steam-vessel of 20-horse power has been built, and that several others are completed, or nearly so; that Captain Hutchison, the officer appointed originally to the charge of the workshop, is stated to have been occupying his time and thoughts in constructing a steam-boat on his own behalf; and that Major Cotton, the civil engineer of the Godavery division, has been doing the same, I would calmly inquire, if this is becoming and proper in their positions towards the Government who pays them, as well as what the artificers and people employed on such work must suppose! Whatever colouring may be given to or plea urged for these admitted facts, I am compelled, from the experience I have acquired during a long public life in every part of the world, and especially in India, to think that they (the artificers and people) can have imbibed but one impression, and that the example which has been thus set is, both in theory and practice, most objectionable and improper.

7 July 1847.

I note that the Board of Revenue D. P. W., in one of their letters, speak of the large profits to be derived from building boats, as well as of the impetus which such a measure would give to trade. If the Board intend by this allusion to recommend that Government should build boats to hire out, and carry on the traffic of the country, I wholly differ from them. I conceive that all such arrangements can only emanate from private capital and speculation, at the present day, in the districts to which the Board's letter refers, and that the

the interference of Government would be premature, and is quite uncalled for. Besides these reasons, I can trace no connexion between such objects and the legitimate duties of the engineer's department in the Godavery and Kistnah Divisions. Should the course of events render it hereafter, at some future distant period, desirable for Government to take steps to promote the transport of commerce on the rivers of the Carnatic, as is now done in the Ganges and Indus, a separate establishment, under a responsible head, must be organised for the proposed end; by which means Government will not only be kept apprised of the proceedings of their servants, engaged in the work, but large sums will be saved which it is my conviction are now literally thrown away in the crude and ill considered designs of speculative and enthusiastic projectors, who are, moreover, irresponsible for their acts.

In conclusion, I hold that that undefined sort of "Imperium in Imperio," which seems always to have obtained in the Godavery Division since it was first formed, and unquestionably does so at the present moment to a great degree, is irreconcilable to proper authority and supervision. I believe, from careful reflection and consideration of all these papers, that Government are only made acquainted with what goes on there in every department, as far as it suits the local and executive officers to communicate their acts; and I hereby record my final and solemn opinion, that the only effectual course to remedy the evils attendant on the so called foundry at Dowlaishwarum, and the unauthorised large outlay to which it has led, and is hourly leading, is to suppress it at once, and, further, peremptorily to prohibit the formation of any more steam-boats, as well as any crews or establishments being longer kept in the public employ to work those that have been already built, contrary to orders.

(signed) Henry Pottinger.

4 August 1853.

Appendix (U.)

MINUTE.

LETTER from the Secretary to the Revenue Board D. P. W., No. , dated the 23d of December 1852, regarding the nomination of Captain Greenlaw, of the 46th Regiment N. I., to be assistant to the Secretary to the Revenue Board, D. P. W., vice Lieut. Foord, going to Europe.

I see nothing in the above letter or its accompaniments that should alter my opinion as to the fitness of Captain Greenlaw, of the 46th Regiment N. I., to be assistant to the Secretary to the Revenue Board, D. P. W.

I believe Captain Greenlaw to be as well if not much better qualified for the duties which will devolve on him than any available engineer officer, and when I sent the Minute appointing him to the Chief Secretary to Government, to be put in circulation, I wrote a private note to Sir Henry Montgomery to point out that Captain Greenlaw had proved himself hardworking and zealous, and that I consider him quite equal to taking charge of the office in any temporary absence of the Secretary.

Had I not felt assured that Captain Greenlaw was qualified, I certainly should not have appointed him, and I shall as certainly not remove him until it is proved that he is unfit. On the contrary, I consider it highly desirable, that in the present state of the engineer corps of the Madras Presidency, experienced officers, if fully qualified, should be selected to assist in the important duties appertaining to that branch of the service; and that the exclusiveness which the letter before me appears to advocate, should, under present circumstances, be wholly laid aside.

(signed) Henry Pottinger.

29 December 1852.

Appendix (V.)

MINUTE.

EXTRACT from the Proceedings of the Board of Revenue, D. P. W., No. 277, dated the 11th July 1853, reporting on Captain Greenlaw, &c.

1. As I have been informed that the Memorandum which I made * on the above letter is not in that form that necessarily requires that its purport should be made known to the Board of Revenue D. P. W., or that that document should be submitted for the information of the Honourable Court, and as it is my wish that both should be done, I beg to place this minute on record, reiterating my conviction that Captain Greenlaw was much better qualified to fulfil the duties of the situation of assistant secretary to the Board of Revenue D. P. W., than one half of the engineer officers in this presidency, and, decidedly so, than any one of

the young officers who have been discredibly instigated to address memorials to the Honourable Court connected with that appointment.

2. I say this advisedly, because none of them have had, I believe, one-fourth of his experience, and none of them would have brought to the situation, had they been named to it, that devotion and zeal for the service which Captain Greenlaw would have been glad to have displayed had he been given an opportunity of so doing.

* Captain Greenlaw was appointed, at his own request, paymaster in the ceded Districts.

3. Had it not suited Captain Greenlaw's purpose to be removed* from his late appointment, I should have assuredly required clearer proof of his unfitness for it than anything that is brought forward in this partial report, which I further look upon to be uncalled for and intrusive, after Captain Greenlaw had left the situation.

See Appendices (B) and (C.)

4. The strongest conclusion as to the accuracy of what I say with respect to Captain Greenlaw's qualifications, is to be found in the fact that the Board of Revenue Department Public Works cannot produce an officer to take his place; and though they now declare that they would rather have no assistant secretary at all than one who is not an engineer, and fully qualified, according to their newly formed and inflated standard, I do not forget that their original application for some assistance to their secretary was limited to an uncovenanted servant, and that it was my personal suggestion that it should be provided for by a commissioned officer being appointed.

Since Captain Greenlaw resigned, I have offered the situation of assistant secretary to the Revenue Board D. P. W., to Captain Reilly of the 10th Regiment N. I., now employed on the Jackattalla Barracks, but he has declined it; and I know of no other officer to whom I could confidently entrust the duty, else I would not hesitate an instant to appoint him.

I request that copies of the letter of the Board of Revenue D. P. W., and of this Minute, may be transmitted to the Honourable Court by the next mail, that they may clearly understand that Captain Greenlaw was not removed for any fault or inefficiency, notwithstanding the one-sided sentiments of those who have thought proper to intrude them on Government.

(signed) *Henry Pottinger.*

15 August 1853.

Appendix (W.)

MINUTE regarding the Memorials by Junior Engineer Officers to the Honourable Court.

I ENTIRELY concur in the above sentiments of the Honourable Mr. Thomas. I only refrained from offering any remark on the letter proposed to be transmitted to the Honourable Court, from a feeling of delicacy and repugnance to again revive the question of Captain Greenlaw's nomination; but I must say that I felt most strongly that there was a total want of common respect towards their superiors, and an assumption of a right to appeal in the young lieutenants who had done so, and who, I had no doubt, would come under the marked displeasure of the Honourable Court.

I now request that these brief remarks may be sent to the Court with the memorials, should they be forwarded.

(signed) *Henry Pottinger.*

5 April 1853.

Appendix (X).

MINUTE.

DRAFT of a Despatch to the Honourable Court, transmitting a Memorial from Lieutenant-Colonel Cotton, of the Engineers.

I HAD heard by common rumour of Lieutenant-Colonel Cotton's proposed memorial, but had not seen it until it came to me two days ago, in circulation with the draft of the despatch which is to accompany it to the Home Authorities, and to which draft I have most readily affixed my initials in token of approval, as I conceive it contains all the explanation which the Honourable Court are likely to require on the topics to which it refers.

I will not condescend to follow Lieutenant-colonel Cotton through his long strain of self-complacency and approbation, contrasted with his depreciation of the merits and claims of others; but in the situation which I have the high honour to fill, I deem that I am called upon to record my well-weighed opinion, that this memorial is a most overbearing and impertinent production; that it is, so far as anything emanating from the author of it can be, a premeditated insult to the Government of which he is a servant; and that when coupled with other memorials which have been recently addressed to the Honourable Court by junior officers of the Engineers, it approaches, in my ideas, very closely to what might be designated

designated mutiny, and, to say the least of it, is a gross and unequivocal breach of subordination.

I must here beg that it may not for one instant be imagined that I offer these strong animadversions from any immediate personal sensitiveness or perception with reference to the memorial of which I am speaking. Had I never been at Madras, or seen or known a single individual named in that document, and had it been submitted to me as a stranger, I should have expressed precisely the same sentiments respecting it, and should have looked on it as a reproach to any officer holding a commission in any well-regulated army.

With respect to the insinuations in which Lieutenant-colonel Cotton has thought it right to indulge, as to the motives that led to the appointments which he has been pleased to denounce, I simply desire to distinctly say that those insinuations are false. In making these appointments I can most solemnly and conscientiously assert, that I exercised the trust reposed in me under a full conviction of their appropriateness, and nothing has to this hour come to my knowledge to cause me to doubt that I was right.

The nomination of Major Atkinson to the situation of superintending engineer of the Presidency Division, has been already explained to and approved by the Honourable Court.

That of Captain Johnston to be superintendent of roads, I need only declare was given to him entirely unsolicited, and I may here note, that I have never to my knowledge seen or exchanged one word with that officer up to the present hour. It is, however, due to him to add, that he has proved himself most efficient, and has given Government the very highest satisfaction as the head of the very important department which he now controls.

The appointment of assistant secretary to the Revenue Board Department of Public Works I offered (unsolicited) to Captain Greenlaw on Lieutenant Foord's departure, from my conviction of his fitness for it; and I here take occasion to state, that I believe him to possess much higher qualifications as a hardworking, scientific, zealous public servant than any one (I make no exception) of those officers whose names I see are cited by Lieutenant-colonel Cotton, on whose individual judgment of true merit or estimable qualities I am unable to place the smallest reliance.

I must here explain, that I have for a length of time past looked upon Lieutenant-colonel Cotton to be a person who required to be carefully watched and restrained in his ebullitions. I conceive him to be led away by overweening egotistical vanity as to his own qualifications, deserts, and services, which vanity is, I doubt not, pampered by the ill-judged flattery of others. I esteem him to be ready at all times to enter into any new and ill-digested project which crosses his mind, or is suggested to him through the medium of books or men; that were he left to himself he would be absolutely reckless of the public interests on the score of expense, when placed in opposition to his own schemes; and I hold that his attempt, as exemplified in the memorial now before me, to set himself up as a controlling authority above all his compeers and colleagues, and even to throw the necessary and legitimate power of Government behind his back, is an undeniable proof of a want of proper feeling, as well as of how little he is deserving of the confidence he seems to expect.

In closing this Minute I must repeat my earnest request that no syllable of it may be ascribed to any emotion of fancied annoyance as excited by Lieutenant-colonel Cotton's memorial. I am incapable of any such emotion, particularly as regards an individual for whose judgment I feel no respect, and whose criticisms on my conduct, whether official or private, I regard with indifference. I have, in what I have said here, viewed the memorial solely as a point of duty, and stated my sentiments upon it out of respect to the Honourable Court, to whom I wish a copy of this Minute to be forwarded with the despatch.

(signed) *Henry Pottinger.*

Guindy Park, 4 May 1853.

GENERAL APPENDIX.

No. 120.

Public Works Department.

EXTRACT from the Minutes of Consultation under date 13 April 1853.

Read the following Report from the Commissioners appointed to inquire into and report upon Public Works.

(Here enter 23 December 1852.)

Ordered, that five copies of the First Report of the Commissioners upon the Department of Public Works be forwarded to the Government of India, with the following letter.

Ordered also, that the same number of copies be forwarded to the Honourable Court of Directors, with a copy of the letter addressed to the Government of India.

(A true extract.)

(signed) *H. C. Montgomery,*
Chief Secretary.

No. 121.

Public Works Department.

To J. P. Grant, Esq., Secretary to the Government of India.

Sir,

1. In obedience to the instructions conveyed in Officiating-Secretary Major Wylie's letter of the 21st December 1850, a committee was appointed at this Presidency to investigate and report on the system of Public Works.

2. The Commission was composed of Mr. Bourdillon, of the Civil Service (Collector of North Arcot), Major Fredk. Cotton, Civil Engineer of the 7th Division, and Major Balfour, of the Artillery, member of the Military Board.

3. These officers assembled at the Presidency, and commenced their labours on the 21st March 1851. Early in January 1853, they laid before the Government their first report, of which I am now directed to forward five printed copies for the use of the Government of India, and to intimate that a similar number has been forwarded by the mail of the 13th instant to the Honourable Court of Directors.

4. The Government of India will perceive, from this very voluminous report, extending to 725 paras., that the Commissioners have entered most minutely into the subject which they were appointed to investigate, and their very lengthened proceedings will in some measure account for the time these inquiries have occupied.

5. It was, I am instructed to state, the intention of the Government to submit the report, with a full view of its contents, but finding it so comprehensive that the review contemplated cannot be accomplished within any definite period, they deem it proper not to detain the report longer, but to forward it for the information of the Government of India, and the Honourable Court of Directors respectively, transmitting separately the expression of the views of this Government as soon as the whole subject has undergone the necessary discussion.

6. The present report, it will be seen, is divided into 11 sections, the last of which, as intimated by the Commissioners, is a recapitulation of the contents of the preceding chapters.

7. The first four sections are devoted to the past history and present state of the department in all its branches, and to an exposure of the defects which the Commissioners conceive to exist in it.

8. The Commissioners in the subsequent chapter (V.) proceed to develop the changes which they consider necessary to make the departments thoroughly efficient in every respect.

9. The proposition of the Commissioners for withdrawing from the Revenue and Military Boards and the Superintendent of Roads,* the control now exercised by them, and vesting the sole charge of Public Works in a new Board, composed of one revenue officer from the civil service and two engineer officers, with the chief engineer as an *ex officio* member, requires careful deliberation, and will meet with due consideration from the Government.

10. Passing on to the Executive Department, the Commissioners press on Government the urgent need of a large increase of the Engineer establishment.

11. They recommend that the corps of Engineers, which now consists of two battalions of 46 officers, exclusive of nine supernumeraries, shall be augmented to 112 officers, to be disposed in four battalions, one of which shall be added immediately, and the other gradually in the course of six years.

Vide Appendix DD—EE—FF.

Proposed Establishments	No.	Charge.
Commissioned - - -	112	5,31,500
European Subordinate - - -	204	2,96,201
Native - ditto - - -	725	2,35,560
Office Establishments - - -	1,879	2,66,734
College - - - - -	-	50,000
<i>Rs.</i>	-	14,69,075
		5,79,471—Present Establishment, vide Appendix H. H.
		8,89,604—Increase.

12. The subordinate European engineer and native professional departments are also proposed to be largely increased with office establishments of a suitable extent. Provision is also made for an Engineer College of Instruction. The recommendations of the Commissioners on the score of establishments thus involve an aggregate charge (in the proportions marginally shown) of *Rs.* 14,69,075, or *Rs.* 8,89,604 in excess of the present charge under that head.

13. The

* Under date the 21st November 1851, the Commissioners had proposed that the Road Department should be placed under the existing Board of Revenue Department Public Works, and this proposition was considered by Government, and minutes recorded, copies of which are annexed, under date the 6th April 1852.

13. The Commissioners dwell on the alleged neglect of roads and irrigation works, and calculating the profitable returns, directly and indirectly, from expenditure on such undertakings, they propose that the future outlay on Public Works shall be about 48 lacs annually, or about 29 lacs in excess of the present expenditure; the whole to be at the unfettered disposal of the local Government.

	Present average. of 5 years.	Proposed.
Irrigation	10,37,898	22
Roads, &c.	4,20,762	30
Buildings	4,29,491	4
About	19	Lacs - 48

14. The proposition of the Commissioners thus provide that the annual expenditure in the Public Works Department shall be raised from about 25 lacs to 63 lacs, being an increase of about 38 lacs per annum.

	Present.	Proposed.
Outlay	19 lacs	48
Establishment	6 "	15
	25	Lacs - 63

15. The Right Honourable the Governor in Council will content himself with this brief summary of the suggestions of the Commissioners. The comprehensive nature of their report, the great changes advocated, and the importance of the questions discussed both financially and with regard to the improvement of the country and the welfare of the people, obviously call for careful and mature deliberation.

16. The Right Honourable the Governor in Council will not here notice the comments of the Commissioners on the alleged parsimonious policy of the Government of this Presidency and the Supreme Government in regard to Public Works, further than to observe that they appear to have overlooked the restrictions on expenditure necessarily imposed on Government by the financial condition of India during the late wars. The irrigation works of Tanjore, Trichinopoly, and Tinnevely, the fine ghauts and passes of Malabar and Canara, and the trunk roads leading west and south from Madras, and later, the magnificent works in progress on the Godavery, Kistnah, and Pennar rivers, evince the interest taken in the progress of improvement, and the manner the Government have made use of the means placed at their disposal.

17. I am directed to request the attention of the Government of India to the separate minutes herewith transmitted.

I have, &c.

(signed) H. C. Montgomery,
Chief Secretary.

Ordered that the following minutes be recorded.

MINUTE.

DRAFT LETTER forwarding Report of P. W. Commission.

It is, I think, very desirable that this draft should point out distinctly the misrepresentation of the views of this Government, into which the Commissioners have been led by their ignorance of the records.

In various passages of their report they ascribe to this Government a practical indifference to, and even an unwillingness to sanction any expenditure on works for the improvement of the country, and the Government is represented throughout the report as opposed for a series of years to such outlay. Such appears to me the general tone and character of its statements.

It will be seen from the following extract from a letter to the Government of India in 1848, how entirely this representation is at variance with facts. It was there observed, and proposed to the Government of India, that "whilst this Government would counsel a wise economy in all branches, it is of opinion that a considerable outlay of its revenues at this time on internal improvements, even if there were no surplus (revenue), would prove in the end a more sound policy, and more beneficial to the country."—See also para. 21 of the same letter to Government of India, Financial Department, 3 January 1848.

Like misconception and misrepresentation of the views of Government exist in the statements of the Commission on the Road Department; and as the Commissioners brought this subject under the notice of Government in their letter of the 21st November 1851, that letter, and the views of Government, with the minutes pointing out their error,* should be adverted to in this review of their proceedings.

12 April 1853.

(signed) J. F. Thomas.

MINUTE.

* Para. 11, Minute of 6th March 1852, on letter from the Board, 15th January 1852.

MINUTE.

THE draft of the letter to the Government of India has just been returned to me with certain remarks embodied in a Minute of the 12th instant by my Honourable Colleague, Mr. Thomas.

I have not had time to devote to a complete and careful perusal of the first report of the Commissioners on the system of Public Works, and therefore I passed the draft of the letter above denoted without comment; but as the Honourable Mr. Thomas has since briefly recorded his sentiments,* and as they have just come back to me, and my silence might be interpreted into dissenting from his views, I beg most distinctly to say that I entirely coincide in them, and shall endeavour at some future period to show my reasons for the opinion I have formed, that the first report of the Commissioners is one-sided, that it misrepresents the actuating motives and real feelings of Government with regard to its measures for the improvement and amelioration of the country, and therefore that it is not entitled to that confidence—though some facts set forth in it may be well supported—which such a document should command, to render it of any general practical use.

(signed) *Henry Pottinger.*

13 April 1853.

MINUTE.

DRAFT of LETTER to the Government of India to be transmitted with the First Report of the Commission on Public Works.

SINCE this Report came to me I have been so engrossed with other important subjects, particularly the Reports of the Special Commissioner on Malabar, that I have not been able to give attention to it, I am therefore unprepared to make any comment upon it. Having now nearly disposed of the business which has so much occupied me, I hope to have leisure to study the Report deliberately, and I shall diligently apply all the time I can spare from the papers passing in circulation to a careful review and digest of it, in order that I may be able, as early as possible, to express my views upon the many important subjects of which it treats so largely and discursively.

(signed) *D. Elliott.*

13 April 1853.

No. 1 of 1853.

No. 122.

Public Works Department.

To *James Cosmo Melvill, Esq., Secretary at the India House,*

Sir,

I AM directed by the Right Honourable the Governor in Council to forward, for the purpose of being laid before the Honourable Court of Directors, five printed copies of the first Report furnished by the Commissioners appointed to inquire into and report upon the Department of Public Works, together with a transcript of a letter addressed on the subject to the Government of India.

I have, &c.

(signed) *H. C. Montgomery,*
Chief Secretary.

Fort St. George, 13 April 1853.

* Minute dated the 12th of April 1853.

RETURNS RELATING TO PUBLIC WORKS, INDIA. 127

EXTRACT Public Works Letter from Madras, dated 10 February 1854.

No. 1.

We have the honour to forward two memorials to your address, from Lieutenant-colonel A. T. Cotton, Chief Engineer, dated 5 January last.

2. In the first of these this officer complains that the Government have printed a book, which has been extensively circulated in Madras, containing minutes of the members of Government on the report of the "Public Works" Commissioners, besides several minutes by the President, most severely reflecting on him, and one of which minutes is that which the President wrote on the memorial addressed by him to your Honourable Court in March 1853, and forwarded with our letter of the 3d June following, No. 4.

* * * * *

4. As connected with the first of the memorials alluded to above, we forward copy of a letter from Lieutenant-colonel Cotton, dated 4 January, applying for permission to print certain public documents, in defence of charges brought against him (as he represents) in the proceedings of Government on the First Report of the Public Works Commission, and likewise take the opportunity of submitting copies of the papers recorded in the Consultations noted in the margin as having reference to the subject of the second memorial.

Rev. Cons.
2 August 1853,
No. 21, 22.
Ditto, 23 August
1853, No. 33 to 39.

5. The Right Honourable the President, and the honourable the members of Council having recorded their views at length upon the subject of each of the communications addressed by Lieutenant-colonel Cotton in minutes of the dates noted in the margin, copies of which also accompany, we do not consider it necessary to do more on the present occasion, than to refer your Honourable Court to those documents.

Minutes by the
Right Hon. the
President, dated
19th, 20th and 21st
January 1854.

6. Your Honourable Court will observe from our resolution of this date that we have not considered it open to us to accord to Lieutenant-colonel Cotton the permission solicited by him to print certain documents, pending the orders of the Government of India and your Honourable Court, on the reports of the "Public Works" Commissioners.

Ditto, by the Hon.
Mr. Elliott, 21
January 1854.
Ditto, by the Hon.
Mr. Thomas, 24
January 1854.

7. We beg to acknowledge the receipt of your despatch in the Public Department, 9 November 1853, No. 48, relating to the appointment of Captain Greenlaw, of the 46th Regiment, N. I.; to the office of assistant secretary to the Board of Revenue in the Department of Public Works, a subject to which we shall do ourselves the honour to reply separately.

EXTRACT Fort St. George Public Works Diary to Consultation of
14 February 1854.

January 5, received the following letter :

No. 2.

From Lieutenant-colonel A. T. Cotton, Chief Engineer, to the Chief Secretary to Government.

Sir,

It is now a matter of common notoriety that in the book which has been printed, containing the minute of the Right Honourable the President and members of Council on the subject of the Public Works Report, several minutes by the Right Honourable the President are inserted, most severely reflecting on my conduct.

I most respectfully submit, that not having been one of the Public Works Commissioners, I am not connected with that matter, and my case is essentially different from theirs in two respects.

1st. No paper of mine has been published, and therefore in appealing to the public in my case the Government have brought forward only the charges against me, without any papers which could enable that public to form their own judgment in the case.

2d. I understand the two civil members who have recorded their views on the Public Works Report have not given any opinion either on the minutes animadverting on my conduct, or on their publication.

At present I am therefore brought before a tribunal without any opportunity being given me of making my own defence.

I speak of the minutes being made public, though nominally they have not been so, because they have in fact. They are printed; they have been placed in the hands of various individuals, both in the service and out of it, and have been seen and commented on by one, at least, of the editors of the Madras newspapers.

The Honourable the Court of Directors have my papers as well as the minutes before them; and had I been brought before a court-martial, I should of course have been allowed to produce any papers I thought necessary; but I am now brought before the public, both without defenders and without being allowed to make my own defence, as matters stand. I have therefore the honour respectfully to request that I may be permitted to print and circulate to those who have seen the charges brought against me such public documents as may appear to me necessary for my defence.

(signed) *A. T. Cotton*, Lieutenant-colonel,
Chief Engineer's Office, Fort St. George, Chief Engineer.
4 January 1854.

MINUTE by the Right Honourable the President.

LETTER from the Chief Engineer, No. 7, dated the 4th of January 1854, asking for permission to print such documents as may appear necessary for the defence of certain charges, &c.

I HAVE not earlier had time to attend to the above letter, owing to other pressing important matters.

So far as I am personally concerned, I have no objection to the chief engineer's request being now acceded to, as nothing that that officer might point out can possibly affect me; but, viewed as a public question, I do not think that the orders which may be shortly expected, either from the Government of India or the Home authorities, should be anticipated, and I not only conceive that that would be done by granting the chief engineer the permission he applies for, but that a very objectionable precedent would be established.

I am not going to discuss the validity of the chief grounds on which the chief engineer places his application, but it is quite superfluous to remark that although that officer was not a member of the Commission of Public Works, he has been held up by that body as their great oracle and authority, and as such is quoted by the public press, both in India and England.

I repeat that I have personally, in my private capacity, no objection to permission to print what he likes being given to the chief engineer; but that, as the head of the Government, I doubt the propriety of acquiescence.

(signed) *Henry Pottinger*,
19 January 1854.

RETURNS RELATING TO PUBLIC WORKS, INDIA. 129.

No. 4.

From Lieutenant-colonel *A. T. Cotton*, Chief Engineer, to the Chief Secretary to Government.

Sir,

I HAVE the honour to forward a memorial in triplicate addressed to the Honourable Court of Directors, and request that you will be so good as to submit the same to the Right Honourable the Governor in Council, with a view to its being forwarded.

(signed) *A. T. Cotton*, Lieutenant-colonel,
Chief Engineer's Office, Fort St. George, Chief Engineer.
5 January 1854.

MINUTE by the Right Honourable the President.

LETTER from Lieutenant-colonel *Cotton*, Chief Engineer, No. 8, dated 5 January 1854, forwarding a memorial to the Honourable Court.

THE above memorial will of course be sent to the Honourable Court by the next mail.

The only part of it that appears to call for any reply from me, is to explicitly repudiate the idea that Government have made any appeal to the public; I can safely say that such an idea never entered the mind of my honourable colleagues or myself. Government could hardly be expected to sit silent under the load of misrepresentation that had been heaped on it by the First Report of the Commissioners of Public Works, and as that Report had been prematurely forced before the world to suit a particular object, it necessarily appeared to be requisite that the refutation should be equally extensively circulated, and on that account it was printed. It has not, however, been yet made public by authority, and at the last meeting of Council, it was, after due consideration, decided that that should not be done, pending orders from the Government of India or the Honourable Court.

20 January 1854. (signed) *Henry Pottinger*.

No. 3.

From Lieutenant-colonel *A. T. Cotton*, Chief Engineer, to the Chief Secretary to Government.

Sir,

I HAVE the honour to forward a memorial, in triplicate, addressed to the Honourable the Court of Directors, and request that you will be so good as to submit the same to the Right Honourable the Governor in Council, with a view to its being forwarded.

(signed) *A. T. Cotton*, Lieutenant-colonel,
Chief Engineer's Office, Fort St. George, Chief Engineer.
5 January 1854.

To the Honourable the Court of Directors of the East India Company.

The respectful Memorial of Lieutenant-colonel *Arthur Thomas Cotton*, of the Corps of Madras Engineers, holding the appointment of Chief Engineer at Fort St. George,

Humbly sheweth,

Para. 1. THAT in March last your memorialist considered it his duty to transmit a memorial to your Honourable Court, stating his views of the effect upon the corps of which he is in charge, of certain late appointments in it; that no answer to that memorial has yet been communicated to your memorialist; that the Right Honourable the Governor in Council has now printed a book, which

has been extensively circulated in Madras (so that the contents of it are in fact published), containing the minutes of the President and the two civil members of the Council on the Report of the Public Works Commissioners; that, besides the above minute, several minutes by the President have been printed in the same book, most severely reflecting on your memorialist, though not one of the Commissioners of Public Works, one of which minutes is that which the President wrote on the above memorial.

2. Your memorialist respectfully submits for the consideration of your Honourable Court the following objections to this proceeding:

1st. The matter of the above memorial is before your Honourable Court, and the virtual publication of one of the minutes written on that occasion (and that without the minute of the other members of Council, and other documents), before the decision of your Honourable Court is known, seems to be an appeal to the public, which the circumstances do not justify, so far as your memorialist is concerned.

2d. That not only has no decision yet been received from your Honourable Court, but it seems to your memorialist that he has a right to presume that your view of the case essentially differs from that shown in the President's minute referred to; for it is not to be supposed that the matter would have remained unnoticed for more than six months (it is now 10 months since it was sent in to Government), if your Honourable Court had concluded that it was so objectionable a document as is implied in the minute; it being usual, I believe, in such cases whenever there is even the least room for doubt as to which is in the right, the superior or subordinate, to give the superior the benefit of that doubt.

3d. In the matter of the Public Works Report, both the civil members of Council have recorded at length their views respecting that document; one of them defending it, while in the case of your memorialist, neither of these gentlemen have recorded their views either upon the subject of the minute, or upon the appeal to the public, by its publication in a book primarily on another subject. It is thus, certainly, to be presumed that neither of the civil members concur with the Right Honourable the President in this proceeding; though they have neither said anything in defence of your memorialist, nor protested against your memorialist being thus publicly accused, without an opportunity being given to your memorialist of defending himself by the publication of such documents as your memorialist may consider necessary for that end.

3. As so much time must elapse before your memorialist can hear from your Honourable Court, and the public here are already in possession of these papers, your memorialist has thought it necessary at once to address the Government here in a letter, a copy of which is here appended.

4. Your memorialist respectfully submits:

1st. That no step such as the present, being a public condemnation of a servant of Government on a point which is still in the hands of your Honourable Court by the local authorities, against whom your memorialist has appealed, is justifiable, whether as respects your memorialist or the authority of your Honourable Court; and

2d. That if an appeal to the public is made by the publication of a document condemnatory of any individual, that document ought to be accompanied by every other that that individual may think necessary for his defence.

And your memorialist, as in duty bound, &c.

(signed) *A. Cotton*, Lieutenant-colonel,
 Chief Engineer's Office, Fort St. George, Chief Engineer.
 3 January 1854.

No. 2.

From Lieutenant-colonel *A. T. Cotton*, Chief Engineer, to the Chief Secretary to Government.

Sir,

It is now a matter of common notoriety that in the book which has been printed, containing the minutes of the Right Honourable the President and Members of Council, on the subject of the Public Works Report, several minutes by the Right Honourable the President are inserted, most severely reflecting on my conduct.

I most respectfully submit, that not having been one of the Public Works Commissioners, I am not connected with that matter, and my case is essentially different from theirs in two respects.

1st. No paper of mine has been published, and therefore in appealing to the public in my case the Government have brought forward only the charges against me without any papers which could enable that public to form their own judgment in the case.

2d. I understand the two civil members who have recorded their views on the Public Works Report have not given any opinion either on the minutes animadverting on my conduct or on their publication.

At present I am therefore brought before a tribunal without any opportunity being given me of making my own defence.

I speak of the minutes being made public, though nominally they have not been so, because they have in part; they are printed; they have been placed in the hands of various individuals, both in the service and out of it, and have been seen and commented on by one at least of the editors of the Madras newspapers.

The Honourable Court of Directors have my papers as well as the minutes before them, and had I been brought before a court-martial I should of course have been allowed to produce any papers I thought necessary; but I am now brought before the public, both without defenders and without being allowed to make my own defence, as matters stand. I have therefore the honour respectfully to request that I may be permitted to print and circulate to those who have seen the charges brought against me such public documents as may appear to me necessary for my defence.

I have, &c.

(signed) *A. Cotton*, Lieutenant-colonel,

Chief Engineer's Office, Fort St. George,

Chief Engineer.

4 January 1854.

MINUTE by the Right Honourable the President.

LETTER from Lieutenant-colonel Cotton, Chief Engineer, No. 9, dated the 5th January 1854, handing up a memorial to the Honourable Court, bringing to notice the proceedings of Government with respect to certain engineer officers who memorialised against being superseded by an officer of the native infantry.

The memorial above referred to will immediately be sent to the Honourable Court.

The Honourable Court having expressed their sentiments in a recent despatch on the alleged supersession of certain officers of engineers by an officer of infantry, of course the prohibition of the promotion of the former who memorialised to a higher grade is at an end.

The despatch from the Honourable Court of the 9th of November 1853 will be disposed of in the usual manner, and when it is replied to in due routine, and the draft comes to me, I shall place a minute on record to accompany the reply.

The Honourable Court's orders will necessarily be strictly obeyed, but as I conceive them to have been grounded on misstatement, and further, as I hold that circumstances have since shown that the view I took of the deficiency of qualified engineer officers was essentially correct, I shall point out the impressions I still retain on that question. I wholly deny the allegations made in the chief engineer's memorial as to its being a common right for officers to communicate with me personally as Governor. Lieutenant Scott had chosen to enter into the combination, and as I looked, and still do so, on such a combination to be equally subversive of proper authority and respect, I marked it by my personal displeasure. No individual at the head of this Government, or any other Government, has, I will venture to assert, ever made himself more accessible to all ranks and classes than I have done; but so far as for admitting it to be "a common right," I distinctly decline to do so. I have exercised, and shall continue to do so, my own pleasure on those points. Lieutenant Scott was told by my orders that I would not communicate with him in person, but that if he had anything to say he might inform my private secretary, or put what he wished to make known on paper. I think I was informed afterwards that he observed that he had come to apply to me to be removed to another station as he had quarrelled with his immediate commanding officer, which I deemed a conclusive proof of the total want of the usual respect which the example of Lieutenant-colonel Cotton has inculcated.

21 January 1854.

(signed) *Henry Pottinger.*

MINUTES by the Honourable Mr. *Elliott.*

The letters of Lieutenant-colonel Cotton, chief engineer, one, No. 7, dated the 4th instant, and two, Nos. 8 and 9, dated the 5th instant, containing memorials to the Honourable Court of Directors, have reached me on circulation this day.

In the first letter Colonel Cotton requests the permission of Government to print and circulate such public documents as may appear to him necessary for his defence against certain reflections contained in minutes of the Right Honourable the President appended to his minute on the First Report of the Commission on Public Works, printed with the proceedings of Government on that Report.

In the second letter, Colonel Cotton submits a memorial addressed to the Honourable Court of Directors, complaining of the publication of those minutes.

In both his letter to Government and in his memorial to the Court of Directors, Colonel Cotton assumes that the Government have appealed to the public in his case, and complains that they have brought forward only the charges against him, without any papers, which could enable that public to form their own judgment. He surmises that the Government printed the papers in question purposely as an appeal to the public, and complains of the civil members of Council not having protested against his being thus publicly accused without an opportunity being given to him of defending himself by the publication of such documents as he might consider necessary for that end.

I deny that an appeal to the public was intended by Government in printing the minutes. The Report of the Commission on Public Works was printed in the first instance for the sake of convenience, and for the same reason the minutes reviewing that Report were likewise printed. These minutes were intended for the consideration of the Government of India, and the Honourable the Court of Directors, and the copies of former minutes appended to some of them were annexed simply for more easy reference to documents already recorded in the proceedings of Government, to which the writers desired to call attention. The Government are not in any way bound to make known to officers, on whose conduct they have found it necessary to animadvert, in communications to the Court of Directors, the tenor of their comments, or to give them an opportunity to discuss them; still less to make known to them, or to give them an opportunity of discussing the opinions of the head, or individual members of the Government,

Letter No. 7.

Memorial enclosed
in No. 8.

ment, which have not been adopted by the majority. It is quite contrary to all precedent to do so, pending the judgment of the Court in the representation made to them. It would be detrimental to the public service to admit such discussion. I do not see that there is reason to distinguish between this case and others, merely on the ground that the minutes having been printed, have got into the hands of persons who would not have had an opportunity of seeing them if they had been, as usual, confined to manuscript. This was not authorised nor contemplated by Government, and it has been stated to the Governor-General in Council, that the Government do not feel themselves at liberty to publish the papers that have been printed, while they are under the consideration of that authority and the Court of Directors. Colonel Cotton does not specify what papers he desires to print and circulate; and I have no idea that they are beyond those that have been sent to the Court. I presume that all the papers to which the appended minutes relate will be before the Court, when his memorial to that authority, which is the subject of one of them, is disposed of. His appeal to that only legitimate tribunal will therefore have all the support that the papers in the records of Government can afford, and the opinions that have been expressed regarding his conduct will be weighed by that standard; his proposed appeal to the public I think is inadmissible.

The Honourable Court will judge of the propriety of the memorial which Colonel Cotton has addressed to them on the subject, and I trust that the opportunity will be taken to lay down some rule as to the latitude which is to be allowed to officers in criticising the proceedings of Government in the shape of memorials, as well as upon the right asserted by Colonel Cotton, which of course he does not claim as a peculiar privilege, to vindicate himself from censures, which he understands to have been passed upon him in the course of discussions at the Council table, by appeal to the public, knowing that those censures, and the grounds of them, have been submitted to the judgment of the Honourable Court.

In his third letter, Colonel Cotton has submitted a memorial, addressed by him to the Honourable Court of Directors, not on account of any grievance of his own, but as the champion of certain officers of the corps of engineers under his command, on account of a grievance which he considers them to have suffered. I question the pretension of Colonel Cotton to set himself up as the champion and advocate of these officers; and I cannot but remark that the time was ill chosen for doing so, when a despatch had actually been received from the Honourable Court of Directors, containing their decision, pending which, only the resolution complained of was to have effect. The despatch was received on the 1st January, and Colonel Cotton's memorial is dated the 5th. I do not object to the memorial being transmitted to the Honourable Court, for though it appears to me exceptionable, yet it is for the Court to determine on the correctness of the principle on which it is based. I do not enter into the merits of the case, further than to say that I did not approve of the promotion of the officers in question being suspended because of their having addressed memorials to the Honourable Court.

Minute, dated 15th and 23d August 1853.

While I oppose the claim of Colonel Cotton to be allowed to print and circulate public documents by way of appeal to the public, from censures upon which we may expect a judgment to be pronounced by the Honourable Court of Directors, on a full consideration of his conduct, as manifested in the papers before them, which it would seem must be the papers he desires to publish, I yet would guard myself from being supposed to concur in the censures to which he objects, particularly those expressed in the minute of the Right Honourable the President,* dated 4th May 1853, on the draft of the despatch with which Colonel Cotton's memorial was transmitted to the Honourable Court.

* I subscribe to the despatch, but not to the minute.

21 January 1854.

(signed) D. Elliott.

MINUTE by the Honourable Mr. Thomas.

LETTER from Lieutenant-colonel Cotton, 4 January 1854, requesting papers with a view to publication.

213.

S 2

Letters

Letters dated 5 January, with two memorials from the same officer, with minutes by the Right Honourable the President and by the Honourable Mr. Elliott, dated 21st instant.

These papers have reached me this day (24th), and I have little to add to the remarks recorded in the Honourable Mr. Elliott's minute, in which I fully concur.

It should, I think, be pointed out to Lieutenant-colonel Cotton that he is in error in designating the minute, or views of one of the members, as the proceedings of the Government. This error is the more marked in this case, as in the instance to which he especially refers, the minute of the President of the 4th May last, there was but one of the civil members of Government then present. I was not even aware of the existence of his memorial, and of the minute upon it, till long after both had been despatched to England, being then absent on the Neilgherries. So little ground is there for his remarks in the alleged omission to protest against the view taken of his conduct by the President.

As he has now brought this memorial again under notice, I deem it right to state my opinion that I consider that document unjustifiable, as wholly wanting in the respect due to the head of the Government, and subversive of all authority.

Colonel Cotton had no personal grievance of which to complain; and his assumption of a right to comment upon, and pass in review the acts of the head of the Government under the guise of a memorial to the Honourable Court I must entirely condemn, whether in his case or in the more recent one of the Rev. Mr. Taylor, unless the Honourable Court see cause expressly to sanction such appeals to them.

I look upon the memorial now sent in by Lieutenant-colonel Cotton, in which that officer represents the cases of certain junior engineer officers, as open to similar exceptions, particularly as noticed by the Honourable Mr. Elliott, at this date, when the Court's late despatch has removed the ground of complaint.

With reference to Lieutenant-colonel Cotton's application for papers "for the purpose of publication," though I should deprecate the concession in this and similar cases where personal feelings and interests come under discussion, I should be glad to see a discretion given to this Government to publish its proceedings and papers, upon great general questions in which the whole community are interested. Such, for example, as the Minutes and Proceedings of Government and of the Revenue Board on the recent apprehended famine, on the Mohiturfas, the salt and other general questions; I cannot myself doubt but that this course would be found highly beneficial, and far better calculated than the existing system to uphold the character of the Government, and to lead to a sound, healthful, and useful public opinion. It is upon this ground that I now advocate the publication of the minutes and the orders of Government on the Report of the Public Works Commissioners.

24 January 1854.

(signed) *J. F. Thomas.*

No. 62.

RESOLVED, that Lieutenant-colonel Cotton's memorials, enclosed in his letters of the 5th January 1854, Nos. 3 & 4, be forwarded to the Honourable Court of Directors, together with his letter of the 4th January, No. 2, and the Minutes of the Members recorded above, as well as the Papers recorded in the Consultation, noted in the margin, having reference to the application of the Board of Revenue in the Department of Public Works for the promotion of certain engineer officers who had previously memorialized the Honourable Court.

R. D. to Cons.
8 August 1853.
Nos. 21, 22.
Cons. 23 August
1853, No. 31 to 39.

2. Resolved also, that Lieutenant-colonel Cotton be informed with reference to his letter of the 4th January, that pending the orders of the Government of India and the Honourable Court of Directors on the Reports of the Public Works Commissioners,

Commissioners, the Government do not consider that it is open to them to accord to him for the purpose stated the permission he solicits to print certain public documents.

(signed) *H. C. Montgomery,*
 Fort St. George, 10 February 1854. Chief Secretary.

MEMORIAL from the Commissioners of Public Works at *Madras.*

EXTRACT Fort St George Public Works Consultation of 22 November 1853.

Read the following Papers :

From the Commissioners for inquiring into and reporting upon the system of Public Works, to Sir *H. C. Montgomery, Bart.*, Chief Secretary to Government, Fort St. George.

Sir,

We have the honour to forward a memorial in triplicate, addressed to the Honourable the Court of Directors of the East India Company. We beg to request that you will be good enough to lay it before the Right Honourable the Governor in Council, with a view to its being transmitted to the Honourable Court.

(signed) *J. D. Bourdillon,*
G. Balfour, Major,
 Public Works Commissioners.

Public Works Commissioners' Office,
 Fort St. George, 8 November 1853.

Respectful Memorial from *J. D. Bourdillon, Esq.*, of the Madras Civil Service, and Major *George Balfour*, Commissioners for inquiring into and reporting on the system of superintending and executing Public Works in the Madras Presidency, to the Honourable the Court of Directors of the East India Company.

Your memorialists beg to submit the following circumstances for the consideration of your Honourable Court, and for such orders as you may deem fitting.

In pursuance of your Honourable Court's despatch of the 30th of January 1850, para. 65, your memorialists were on the 18th February 1851 appointed Commissioners, jointly with Major F. Cotton, of the Madras Engineers, for the purposes of inquiring into and reporting on the superintendence and execution of Public Works under this Presidency, and on the 23d December 1852, the Commissioners submitted the first Report on the very complicated and extensive subject committed to them. Your memorialists then proceeded with their inquiries, being deprived of the co-operation of Major Cotton, who was withdrawn for other important duty in the provinces, and on the 1st instant they reported to Government that their second and final Report was completed, with the exception of a small part of the Appendix. On the 8th instant (this day) your memorialists waited on his Excellency the Governor at the public breakfast officially notified, for the purpose of presenting that Report to him in person, and of officially paying their respects to him as the head of the Government on the breaking up of the Commission. Your memorialists put down their names in the proper book in the usual way, for an interview for this purpose; but after breakfast, and before the reception began, the senior aide-de-camp, Captain Hay, delivered to them a message from the Governor to the effect that his Excellency could not grant them an interview, and that it was owing to his (Captain Hay's) mistake that their names had been put down at all, as he had previously received his Excellency's orders that their names should not be on the Government House list.

Your memorialists beg to represent that according to social usages in this country, removal from the lists of those admitted to Government House carries with it various social and public inconveniences and disabilities; and that as applied to gentlemen holding important and responsible offices under Government, such a measure is altogether unprecedented. They feel compelled to ascribe this sentence of exclusion now notified to them, to displeasure felt and recorded by his Excellency at some passages, or at the general tenor of their first Report. They have thus incurred this exclusion solely, as they believe, by their discharge of an important and arduous duty committed to them in pursuance of the orders of your Honourable Court, and which duty they zealously and laboriously endeavoured to perform in an honest and complete manner, in accordance with their duty to your Honourable Court, and to advance the well-being of this country. Your memorialists therefore address your Honourable Court in the confident hope that you will be pleased to grant them redress, and replace them in that position socially and officially, which as men of honour and integrity, and zeal in your service, they have a right to claim.

And your memorialists respectfully subscribe themselves,

(signed) *J. D. Bourdillon,*
G. Balfour, Major,
Public Works Commissioners.

Fort St. George, 8 November 1853.

MINUTE by the Right Honourable the President.

I BEG to propose that the memorial which accompanies this letter be transmitted to the Honourable Court by the first opportunity. The statement therein contained is quite correct, with the addition that I desired my aide-de-camp to say that I declined to have any personal intercourse with any of the members of the Commission. As the head of this Government I feel that I was quite justified in the step I took, equally to protect myself from being intruded upon by persons who had so totally forgotten what was due to me in that position, and also in my private capacity to mark the sense I entertained of their conduct.

(signed) *Henry Pottinger.*

Guindy Park, 10 November 1853.

No. 418.

ORDERED, that the memorial received with the above letter be forwarded to the Honourable the Court of Directors, together with the minute recorded by the Right Honourable the President.

(signed) *H. C. Montgomery,*
Chief Secretary.

Fort St. George, 22 November 1853.

Public Department, 22 March (No. 13) 1854.

Our Governor in Council at Fort St. George.

LETTER (Public Works Department), dated 23 November (No. 10) 1853.

Para. 1. In this letter you have transmitted to us a memorial from Mr. J. D. Bourdillon and Major G. Balfour, members of the Commission on Public Works, complaining of the manner in which they had been treated by the Governor of your Presidency.

2. These gentlemen state that having waited upon Sir Henry Pottinger at the public breakfast, and having put down their names for an interview in order to present

present their second Report, and officially to pay their respects to him as the head of the Government on the breaking up of the Commission, they were informed by the senior aide-de-camp that the Governor could not grant them an interview, and that he had given orders "that their names should not be on the Government House lists."

3. The memorialists state that they feel compelled to ascribe the treatment of which they complain to displeasure felt at some passages, or at the general tenor of their first Report; and this impression is verified by Sir Henry Pottinger in a minute which accompanies the memorial, and in which he states, "As the head of the Government I feel that I was quite justified in the step I took, equally to protect myself from being intruded upon by persons who had so totally forgotten what was due to me in that position, and also in my private capacity, to mark the sense I entertained of their conduct."

4. The blame imputed to the Commissioners in the above minute is stated at greater length and in far stronger terms in the minute recorded by Sir Henry Pottinger, on the first Report of the Commissioners; and on the same occasion the other members of your Government took exception to the tone of the Commissioners' remarks on the Government of your Presidency, with reference to Public Works in past years. Several instances are pointed out by Mr. Elliott, in which their statements, impugning the conduct of your Government, are contradicted by facts; and both he and Mr. Thomas impute to those gentlemen misstatements in cases where they could scarcely be ignorant of circumstances which ought to have modified their conclusions.

5. We shall not be in a position till we have received the second Report of the Commissioners, and been put in possession of the views of the Government of India on the subject, to go into a full consideration of the substance of the Report already received, and of the minutes recorded by your Government in connexion with it; but we have, nevertheless, thought it right to enter on such an examination of it as would enable us to decide how far the Commissioners may have laid themselves open to these observations on the tone and spirit of their Report, as far as it regards the conduct of your Government.

6. The result is, that whilst we are entirely of opinion that it was the bounden duty of the Commissioners to bring fully before the Government of India all the facts connected with the subject of their inquiry, and the deficiencies which, in their opinion, existed in any part of the service of the Department of Public Works, we think they are liable to animadversion for the tone of several parts of their Report, with reference to the conduct which on different occasions your Government thought it right to pursue. Such a course could not be necessary for a perfect elucidation of the truth, and could not but tend to produce feelings little calculated to promote the important object of a good and harmonious understanding amongst gentlemen employed in the same public service.

7. On the other hand, we cannot but regret the mode which Sir Henry Pottinger thought proper to adopt for expressing his disapprobation of the conduct of the Commissioners when they came, according to the accustomed practice, to seek an interview for the purpose of presenting their second Report, and also the communication made to them by his orders, which we think casts unmerited discredit on public officers of high character and reputation.

8. With regard to the charge of wilful misstatement and misrepresentation, which seems to be implied by Mr. Thomas, we shall reserve our opinion until the Commissioners have had the opportunity of offering an explanation.

(True extracts.)

East India House,
2 May 1854.

T. L. Peacock,
Examiner of India Correspondence.

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(*Mr. Hume.*)

Ordered, by The House of Commons, to be Printed,
4 May 1854.

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