

(1) Number of pages 30(2) Date of repair 2-4-1968

(3) Initials of the Referencer _____

MADRAS RECORD OFFICE.

Government of Madras.

P. W.

DEPARTMENT.

G.O. No. 3676.

Press

Mis.

89-90.

Dated 4-12-1968.

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
4th December 1865.*

No. 89. Read the following letter from the Consulting Engineer for Irrigation and Canal Company, to the Secretary to Government, Department Public Works, dated Madras, 13th November 1865, No. 114 :—

ESTIMATES.

- ✓ Supplemental estimate for earth-work.
- Do. do. revetment.
- ✓ Comparative Statement.
- Abstract Estimate.

APPENDICES.

- ✓ A. General details for earth-work.
- B. Do. do. revetments.
- ✓ C. Executive Engineer's report with Tables, Nos. 1 and 2.
- ✓ D. Chief Engineer's description of revised supplemental estimates.
- ✓ Additional letter, dated 6th instant, from Chief Engineer, with a correction of the latter part of letter No. 789D.

PLANS.

Section of embankments, old tank bund, 43rd mile.
Lower bank, 41th mile }
Upper do. 46th do. } In one drawing.
Lower do. 47th do. }
Upper do. 47th do. }
Lower do. 51st, 52nd, and 53rd miles in sheets.
Upper do. 53rd mile in sheets.
Banks from 54th to 60th miles, compiled in the form of a book.
Return bund 52, 53, and 59 miles in sheets.

SECTION OF CUTTINGS.

Cuttings 41, 46, 48, 49, 50, 51, 52, 53, and 56 miles.
Do. in plans 45 and 47 miles in sheets.

CATCH-WATER DRAINS.

Catch-water, drain 44 to 46½, 50 to 50½, 51, and 52 and 58½ to 60 in one tracing.
Do. 47, 50 miles in one do.

3. The amount of the original estimates for the earth-works and revetments of the 4th Section, or Nagatore Division, was Rupees 2,12,269-14-11, or an average of Rupees 11,793 per mile, the length of the section being 18 miles (43 to 60 inclusive).

	RS.	A.	P.
Fourth and Fifth Sections...	4,31,265	10	2
Deduct part belonging to 5th Section ...	2,18,993	11	3
Difference, 4th Section...	2,12,269	14	11

* G. O. dated 19th August 1864, No. 2,382.
Do. " 14th September do. " 2,670.
Do. " 5th October do. " 2,871.
The several additional sanctions given in the Orders as per margin,* raised the amount to Rupees 4,16,844, or Rupees 23,158 a mile, of which Rs. 29,027; or Rupees 1,613 a mile were in connection with the alterations made to prevent the submergence of the Teragopila valley in the 63rd mile.

The present estimate raises the average per mile to Rupees 55,257.

1. I have the honor to forward, for the consideration of Government, a letter, No. 789D of the 2nd instant, from the Provisional Chief Engineer Madras Irrigation and Canal Company, to the address of the Agent and Manager, together with the supplemental estimates and their accompaniments as per margin, for earth-works and revetments in the 4th Section of Main Canal.

2. The amount of supplemental sanction asked for in the estimates is Rupees 6,27,790 being for :—

	RS.	A.	P.
Earth-works ...	3,21,655	12	0
Revetments ...	1,44,461	14	4
Plant ...	1,00,000	0	0
Contingencies ...	61,672	5	8

but of the sum allowed for plant one-half will not be a permanent charge against the works, and may therefore be excluded from an estimate professing to show their ultimate cost, and the amount requiring sanction becomes therefore Rupees 5,77,790.

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4. The papers forming the enclosures of this letter exhibit, in considerable detail, the causes which have led to this very great increase of cost, and of these the most important is the enormous amount of over-payments for earth-work.

† As revised by his communication, dated Bellary, 6th November.

Paragraph 8 of the Chief Engineer's letter† shows that the over-measurements amount to cubic yards 10,26,897, or allowing ten per cent. on measurements of efficient work in cutting for silting, and ten per cent. margin on the whole, the excess in measurement becomes 9,94,604, and its value Rupees 1,24,872 out of Rupees 2,06,517. The over-payments to which Mr. Latham refers are on the work in 11 out of the 18 miles of the section, and table II., column 12, Appendix C., shows that 11,61,638 cubic yards of earth-work out of the total quantity paid for are non-existent, and these valued at the same rate as is given by the Chief Engineer above, make the payments in excess Rs. 1,41,104. This amount, however, includes excesses due to soil washed down from embankments or into cuttings by the rains, and to inefficient work, but, on the other hand, in some cases it gives credit for unsettled bank measurements as though they were taken from pits, and probably therefore, could the amount of allowance practically made in each case be ascertained, there would be little if any decrease in the amount thus shown as over-paid, and it will be observed that the Chief Engineer estimates the payments in excess, if credit be given only for efficient work found standing, at in round numbers one and a half laes. Nevertheless, it will be better, here at any rate, to take the smaller amount only as clearly shown to have been paid away without any work in return.

In the 44th and 45th, 50th to 53rd and 57th miles the excess, if any, has not been ascertained by measurements of work done as well as to be done.

5. The next item of increased cost included in these estimates is that shown in column 8, table No. 2, Appendix C., as work not originally estimated for. The quantity of earth-work is there shown to be cubic yards 45,071½, and from the detailed estimate it appears that the value is Rupees 6,456, and the works provided for are, raising the bund of the Nagatore tank along a portion omitted from the estimates of both the 3rd and 4th Sections which here meet, and catch-water drains in rear of the double banked portions.

6. Increasing the slopes of the embankments is an alteration which has been deemed necessary, and which column 9 of table 2, Appendix C, shows to require cubic yards 2,14,174, and is a third cause of excess. The provision for this as found from the detailed estimate is Rupees 38,736, but this must be considered to be only a tolerably close approximation. as in many of the miles the rates of the earth-work required for the increased slopes are not separately given.

7. Another item of increased cost is the allowance of one-sixth for making good settlements of high banks. Column 10 of table 2 mentions that one-eighth additional was allowed in the original estimate, but this is not correct, and the item may be considered as an addition to the first cause of increase, viz., over-payments,

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for although the high banks will settle and require much making up, the earth for this purpose is already provided, because the full amount of pit excavation would make a bank which, prior to settlement, would be considerably higher than is necessary. The earth-work allowed on this account in column 10 of the table is cubic yards 36,381, and, allowing the same rates as for increase of slopes, its value will be Rupees 7,451.

8. The only remaining cause of excess which has been detailed in table No. 2 is the difference between column 11 and column 12, the latter having been already referred to in paragraph 4 above, and this difference is cubic yards 6,64,447.* The value of this cannot be ascertained directly from the estimates, but an average rate

* 18,26,085
11,61,638
6,64,447

of three Annas a cubic yard will probably not be far from correct, and this will make it Rupees 1,24,584. This sum may be considered to represent excesses of various sorts which cannot be satisfactorily explained, though loss from rains, useless work, differences in sections, &c., &c., are mentioned at the head of the column. Part may be and, so far as I may judge from the Chief Engineer's opinion, undoubtedly is, over-payments in these miles in which check measurements have not been taken, and were the same proportion of over-payment in the whole 18 miles supposed as has been ascertained in 11 of these miles, very nearly two-thirds of the above sum would be absorbed; it may not perhaps be unfair to take the over-payments, however, in the remaining seven miles at one-half the proportion of that found in the other miles, and if this be done, Rupees 39,732 would be the amount paid in excess.

9. The information regarding causes of excess on earth-works given in the five preceding paragraphs may be thus summarized:—

	RS.
First.—Over-payments on 11 miles	1,24,872
Second.—Work not originally estimated for	6,456
Third.—Increase of slopes	38,736
Fourth.—Settlements of banks	7,451
Fifth.—Sundry causes	1,24,584
	3,02,099

This amount is somewhat less than that given in paragraph 2 above, the difference arising from average rates having to be deduced from the estimate as already stated.

If the supposition made in the latter part of paragraph 8 be correct, it follows that the total sum just given may be thus divided:—

	OVER-PAYMENTS.	RS.
First item		1,24,872
Fourth do.		7,451
Fifth do. (part of)		39,732
		1,72,055
Alteration of work, &c., intended to secure increased stability and efficiency		1,30,044

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Moreover, as the total expenditure for earth-works was, up to the time the investi-

† *Vide* entry at end of detailed estimate.

† Rupees 1,24,872 out of Rupees 3,99,758.

‡ Total expenditure	...	...	RS. 3,99,758
			1,72,153
			<u>2,27,703</u>
			2,27,703
			<u>2,27,703</u>
			3,99,758

$\frac{2,27,703}{3,99,758} = 0.57$ nearly.

gations were made, Rupees 3,99,758,† and as all the over-payments were made out of that expenditure, it is clear that if only what has been ascertained be taken into account, very nearly one-third‡ of this total expenditure is unrepresented by any work, and if it be supposed that the over-payments in the miles not checked were on one-half the scale, the work done would be of the value of only 0.57‡ of the expenditure.

10. In explanation of the discontinuance of check measurements before the work done in every mile had been ascertained, I should add that the Chief Engineer informs me that had a different course been followed the completion of the supplemental estimates would have been greatly delayed, because these latter required only the work to be done to be ascertained, and the measurement of that already done would have nearly doubled the labor. Added to this, the present Executive Engineer's time was required for the superintendence of the works in progress, and his strength had already been over-taxed by the extra work which the investigations he had made in the 11 miles had involved.

11. The amount entered in the revised estimate for revetments is Rupees 2,47,620-10-0, the previous sanction being Rupees 1,03,158-11-8. The original

* Exclusive of contingencies.

provision for this description of work was Rupees 17,282.* The inadequacy of

this last item shows how far short of the actual requirements of a single banked canal was the idea of its wants then entertained. That the second estimate should have been not much more than one-third of the sum needed, is not readily excusable,

especially as an opportunity was given for the revision of the rates as at first entered in the estimate. At that time I

supposed the rates allowed to be in some cases too high, and it appeared certain that one rate for 10 miles was incorrect. In reality the revetment stone has had to be carted 5 miles for some parts of the line, and the last estimate must have been framed without taking the trouble to ascertain whence the stone was to be

obtained, and shortly after the sanction was given the work in 3½ miles was let on contract at about three times the estimate rates.

Vide paragraphs 69 and 73 of letter No. 243, 19th April last, Proceedings Madras Government, 15th May, No. 1,317.

12. The highest rate for revetment allowed in the present revised estimate is Rupees 3 a cubic yard. The cost of that already done is not shown in the comparative Statement, and so it cannot be ascertained in what way the work, which has already been done at much higher rates, has been compensated for. I hope, however, that due provision has been made for the whole cost of completing the work.

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13. The facts noticed in the preceding paragraphs leave little to be said in the way of comment. It is quite clear that over-payments, far in excess of what could be accounted for by mistakes, have been made during a long time. The predecessor of the present Executive Engineer is responsible, as Mr. Latham points out, for all the excess due to this cause except an insignificant sum, because he failed, when specially called upon to do so, to ascertain and report the extent of work actually done. It will now probably be absolutely impossible to make even a fair guess of the actual disbursements in excess made by that Officer and prior to his assuming charge in July 1863, but it is nevertheless abundantly clear that before that date the practice of over-payments had become established, for even then the quantity paid for was much more than that found now, after two years more work. It is evident, therefore, that more than one Executive Engineer of the Section has entirely neglected his duty, and on works all of which were within an hour or an hour and a quarter's ride of his head quarters, has permitted fraudulent transactions to go on unchecked.

14. Instead of Rupees 2,12,270, the first estimate of the cost of constructing the earth-works and revetments of this Section of 18 miles, the probable cost, as now stated, will be Rupees 9,94,634 and, making every allowance for increase of rates, &c., I do not think I am wrong in expressing the opinion that with judicious planning in the first instance, and ordinary care in carrying out the works afterwards, a more efficient canal than that which will now be obtained might have been had for five lacs instead of nearly ten lacs.

15. From the revised cross sections of the embankments it will be seen that, in some cases, revetment already constructed is to be superseded. The Chief Engineer informed me, however, in reply to a question as to whether it would be advisable to incur additional expense on this account, that it is intended to cover up or remove existing revetment, only where the stone used is of the rotten description noticed, as used, in several of the reports submitted by me, and that in all other cases completed work will remain as it is even if it be not exactly in accordance with the arrangements which the Chief Engineer would approve for new work.

16. The revised estimates for the masonry works of this section are with the Chief Engineer, and will shortly be submitted to Government.

17. Subjoined is a statement of the amounts of estimates already sanctioned, of the balances unexpended, of the cost of permanent establishment to the same date, and the probable total expenditure by the time the works already sanctioned are completed. On those works which

Proceedings Madras Government, No. 2,596, dated 6th September 1865.

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are under postponement, the expenditure already incurred is the maximum which will be debitable to guaranteed capital :—

	rs.
Amount of estimates already sanctioned ...	62,01,515
Cash expenditure to 31st July... ..	52,65,603
Cost of permanent Establishment	15,16,710
Stores and other floating heads of charge ...	12,48,310
Home charges not included in Indian Accounts.	2,97,061
Balance of sanctioned estimates	83,27,684
Deduct postponed works	9,35,912
Permanent Establishment at 30 per cent. ...	3,50,000
Home charges	5,85,912
Probable expenditure for completion of sanctioned works ...	1,75,770
Estimate submitted with letter No. 109, dated 7th instant...	25,000
Supplemental sanction required in estimate for 4th Section now submitted	91,14,366
Cost of permanent Establishment at 30 per cent. ...	30,612
Home charges, Stores, &c., at 20 per cent. ...	5,77,790
Add as above	6,08,402
	1,82,526
	1,21,632
	9,12,610
	91,14,366
	100,26,976

18. From the above particulars it will be seen that there is probably no objection, on the score of want of funds, to the sanction of the revised estimates of the 4th Section; but on the other hand, it must be remembered that the estimates already sanctioned for many of the sections of the Main Canal will not suffice to complete those sections; that for this 4th Section supplemental sanction for masonry works will be needed, and that for the 5th, 6th, 7th, and 8th Sections very considerable supplemental sanctions will be required. Moreover, no provision has been made for distribution, and if the channels for only 30,000 acres be immediately undertaken these will involve an outlay of from one and a half to two lacs. Under these circumstances, perhaps, the best course will be to make each successive sanction, so far as the total amount of the estimates is concerned, subject to funds out of the guaranteed capital being available. The sanctions as regards approval of the works, will remain in force after the guaranteed capital is exhausted, and so long as it is clearly understood that the sanction of estimates involves no intention on the part of Government of making any advances in excess of the million, for the purpose of carrying them out, it seems unnecessary that this sanction should be limited to the works for which the guaranteed capital may be expected to suffice, and on the other hand to do so would perhaps prevent the Chief Engineer laying out the balance to the best advantage.

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No. 90. ORDER THEREON, 4th December 1865, No. 3,676.

CIVIL WORKS, No. 19.

1. With this letter the Consulting Engineer submits supplemental estimates for earth-work and revetments in the 4th or Nagatore Section of the Madras Irrigation and Canal Company's Canal, amounting to Rupees 5,77,790.

2. The estimates already sanctioned for this section are as follow :—

	rs.
Original estimate	2,12,270
Revised estimates sanctioned between August and October 1864	4,16,844

3. The supplemental estimates now submitted raise the total cost to Rupees 9,94,634 or 55,257 per mile exclusive of the necessary masonry works.

4. From the explanations which are furnished of the causes of this enormous increase in the cost of this section of the Canal, it appears that in the item of earth-work there has been an excess of Rupees 3,02,099, of which Rupees 1,24,872 represent charges for which no work can be shown to have been done on 11 out of 18 miles, and Rupees 1,30,044, the value of additional work which had been found necessary to secure increased stability and efficiency. Further charges for work which cannot be accounted for are alleged to have been made in the other seven miles of the same section, but these have not been definitively ascertained, as the measurements required to be taken to determine them would have greatly delayed the completion of the supplemental estimates, and would have continued to occupy the time and attention of the present Executive Engineer, whose services were required for the superintendence of the works in progress. Assuming, however, that such charges in the seven miles not checked were on one-half the scale of those found to have been made on the eleven miles which have been examined, Captain Mullins shows that the work actually done would be of the value of only 0.57 of the expenditure; and, after a careful analysis of the various items of the supplemental estimates, that Officer is of opinion that, with judicious planning and ordinary care in execution, a better canal might have been completed for five instead of ten lacs of Rupees.

5. In passing the estimates now submitted, the Government are compelled to withhold their sanction to the sum of Rupees 1,24,872, referred to in the preceding paragraph, being charged against the guaranteed capital. They are of opinion that, independent of the little care that was exercised in the preparation of former estimates, there has been an extraordinary amount of laxity in carrying out the work, giving an opening for enormous fraud, and that the utmost discredit attaches to the Executive Officers to whom its supervision was entrusted.

6. It will be distinctly understood that the sanction now accorded is conditional on funds being available within the guaranteed million.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

To the Consulting Engineer for Irrigation and Canal Company, with thirty-five Enclosures.
 „ Manager for do. do.

Exd. S. T. Augustin.

Consulting Engineer's Office,
Irrigation & Canal Company,
Madras, 13th November 1886.

10114.

P. 114.
 ram.
 Captain, J. M. Miller, R. C.
 Counselor for Mr. H. C. C.
 The Secretary to Government
 Department of Pub. Works

I have the honor to forward for the consideration of Government a letter, N^o 789D of the 2nd instant, from the Provisional Chief Engineer Madras Irrigation and Canal Company.

Estimates. Engineer Madras Irrigation and Canal Company
 Supt. Est. for Barracks.
 do. a revetment.
 Comparative Sheet.
 Abstract Estimates.
 Appendices. together with the Supplemental Estimates and

Appendices. - Gathered with the Supplemental Estimates and
 A. Canals details for earth ^{works} their accompaniments as per margin for earth.
 B. ~~Canals~~ ^{works} ~~and~~ ^{revelments} ~~revelments~~
 C. Engineering Engr's reports ^{with Tables 1922, 1923} works and revelments in the 4th Section of
 D. Chief Engr's description of Revised ^{of Revised} ~~enph~~ ^{revelments} ~~revelments~~ the Main Canal.

Additional letter dated 6th inst. from Ching with a correction of the letter part of letter No. 7892. The amount of supplemental sanction asked for in the estimates is Rupees 6,27,790 being for Plans.

[illegible]

Upper - do - 43 1/2 miles in sheets.
 Banks from 52 1/4 to 60 1/2 miles compiled in the
 form of a book. --- 3
 Return bank 52-53-459 miles in sheets. -
 Section of Cuttings.
 Cuttings 44-46-48-49-50-51-52-53-56 miles.
 --- in plans 46 7/8 miles in sheets.
 Catch water drains.
 Catch water drain 46 to 46 1/4 - 50 1/4 - 51 1/2 - 52 1/2
 48 3/4 to 60 in one tracing --- 3
 --- do --- 47-50 miles in one --- do

be excluded from an estimate professing to show their ultimate cost, and the amount requiring sanction becomes therefore Rupees 577,790.

3. The amount of the original estimates for the earthworks and revetments of the 4th section, viz Nagapore Division, was Rupees 212,269-14-11 or an average of Rupees 11,793 per mile, the length of the section being 18 miles (43 to 60 inclusive). -

The several additional sanctions given in the orders per margin raises the amount to Rupees 4,16,344 or Rupees 23,150 a mile, of which Rupees 29,027, or Rupees 1613 a mile were in connection with the alterations made to prevent the submergence of the Erangipala valley in the 63rd mile.

The present estimate raises the average per mile to Rupees 55,257.

4. The papers forming the enclosures of this letter exhibit in considerable detail the causes which have led to this very great increase of cost, and of these the most important is the enormous amount of overpayments for earthworks.

Para. 3 of the Chief Engineer's letter shows that the over measurements amount to cubic yards of work or allowing 10 per cent on measurements of efficient work in cutting for cutting, and 10 per cent margin on the whole, the excess in measurement becomes 794,604, and its value Rupees 124,072 out of Rupees 206,517. The overpayments to which Mr. Latham refers are on the 11th to 14th out of the 18 miles of the section, and Table D, Column 12, Appendix II, shows that

R.M. 2. 11. 7. 36 of 11 April 62
4 75 Stations - R.M. 12. 6. 54
Deduct 1/2 mile
Leaving 74 1/2 Stations - 218,998. 4. 3
By same Division - 212,269. 14. 11

G.O. Dated 19th Aug 64
do 15 Sept 64
do 5 Oct 64

that 116,163.8 cubic yards of earthwork out of the total quantity provided for are nonexistent and these values at the same rate as is given by the Chief Engineer above, make the payments in excess Rupees 1,11,104. This amount however includes expenses due to soil washed down from embankments or into cuttings by the rains, and to inefficient work, but on the other hand in some cases it gives credit for unsettled bank measurements as though they were taken from pits and probably therefore, could the amount of allowance practically made in each case be ascertained, there would be little if any decrease in the amount thus shown as overpaid, and it will be observed that the Chief Engineer estimates the payments in excess, if credit be given only for inefficient work found standing, at in round numbers 1 1/2 lacs. Nevertheless it will be better, here at any rate, to take the smaller amount only as clearly shown to have been paid away without any work in return.

In the 44th, 45th, 50th to 53rd and 57th miles the excess, if any, has not been ascertained by measurement of work done as well as to be done.

5. The next item of increased cost included in these estimates is that shown in Column 8, Table No. 2, Appendix C, as work not originally estimated for. The quantity of earthwork is there shown to be cubic yards 4,507 1/2, and from the detailed estimate it appears that the value is Rupees 64,567, and the works provided for are, raising the bund of the

the Nagore Sank along a portion omitted from the estimates of both the 3rd and 5th sections which here meet, and Catchwater drains in rear of the double banked portions.

6. Increasing the slopes of the embankments is an alteration which has been deemed necessary and which Column 9 of Table 2 Appendix C claims to require embankment 211,174 and is a third cause of excess. The provision for this as found from the detailed estimate is Rupees 38,736, but this must be considered to be only a tolerably close approximation, as in many of the miles the rates of the earthwork required for the increased slopes are not separately given.

7. Another item of increased cost is the allowance of 1/8th for making good settlements of high banks. Column 10 of Table 2 mentions that 1/8th additional was allowed in the original estimate, but this is not correct, and the item may be considered as an addition to the first cause of increase viz. overpayments, for although the high banks will settle and require much making up, the earth for this purpose is already provided, because the full amount of pit excavation would make a bank which, prior to settlement, would be considerably higher than is necessary. The earthwork allowed on this account in Column 10 of the Table is Rs. 36,381, and allowing the same rates as for increase of slopes, its value will be Rupees 7,151.

8. The only remaining cause of excess which has been detailed in Table No. 2 is the difference between Column 11

1826085
1161638
664447

Column 11 and Column 12, the latter having been already referred to in para. 4 above, and this difference is entire yards 664,447. The value of this cannot be ascertained directly from the estimates, but an average rate of 3 Annas a cubic yard will probably not be far from correct, and this will make Rs. 124,584. This sum may be considered to represent expenses of various sorts which cannot be satisfactorily explained, though loss from rains, needless work, differences in sections &c. &c. are mentioned at the head of the Column. Part may be, and so far as I may judge from the Chief Engineer's opinion, undoubtedly is, overpayments in these miles in which check measurements have not been taken, and were the same proportion of overpayment in the whole 18 miles supposed as has been ascertained in 11 of these miles, very nearly 2/3rd of the above sum would be absorbed; it may not perhaps be unfair to take the overpayments however in the remaining 7 miles at one half the proportion of that found in the other miles, and if this be done Rupees 39,732 would be the amount paid in excess.

9. The information regarding causes of excess on earthworks given in the 5 preceding paragraphs may be thus summarized.

1 st overpayments on 11 miles	Rs. 124,584
2 nd work not originally estimated for	6456
3 rd increase of slopes	38,736
4 th settlements of banks	7,151
5 th sundry causes	124,584
	<u>Rs. 302,099</u>

This amount is somewhat less than that given in

in para. 2 above, the difference arising from average rates having to be deduced from the estimate as already stated.

If the supposition made ^{the latter part of} in para. 8 be correct, it follows that the total sum just given may be thus divided.

Overpayments
1st item ————— Rupees 124,872
5th — do ————— 7,581
5th — do — (part of) — 39,732
Rs. 1,72,055

alteration of work & intended
to secure increased stability
and efficiency ————— 130,944

Moreover as the total expenditure for earthworks was up to the time the investigations were made, Rupees 399,758 and as all the overpayments were made out of that expenditure, it is clear that if only what has been ascertained be taken into account very nearly $\frac{1}{3}$ of this total expenditure is unrepresented by any work, and if it be supposed that the overpayments in the miles not checked were on one half the scale, the work done would be of the value of only 0.57 of the expenditure.

* 124,872 out of 399,758.

* Total expenditure — 399,758
1,72,055

$\frac{227,703}{399,758} = 0.57$ nearly

10. In explanation of the discontinuance of these measurements before the work done in every mile had been ascertained, I should add that the Chief Engineer informs me that had a different course been followed the completion of the supplemental estimates would have been greatly delayed, because these latter requires only the work to be done to be ascertained, and the measurement of that already done would

would have nearly doubled the labor. Added to this, the present Executive Engineer's time was required for the superintendence of the works in progress, and his strength had already been overtaxed by the extra work, which the investigations he had made in the 11 miles had involved.

11. The amount entered in the Revised Estimate for Revetments is Rupees 247,620-10-0; the previous sanction being Rupees 103,158-11-0. The original provision of contingencies for this description of work was Rupees 17,282. The inadequacy of this last item shows how far short of the actual requirements of a single banded canal was the idea of its wants then entertained. That the second estimate should have been not much more than $\frac{1}{3}$ of the sum needed is not readily excusable, especially as an opportunity was given for the revision of the rates as at first entered in the estimate. At that time I supposed the rates allowed to be in some cases too high, and it appears certain that one rate for 10 miles was incorrect. In reality the revetment stone has had to be carted 5 miles for some parts of the line, and the last estimate must have been framed without taking the trouble to ascertain whence the stone was to be obtained, and shortly after the sanction was given the work in $3\frac{1}{2}$ miles was let on contract at about 3 times the estimate rates.

was 69,732 of
Rs. 243-19 April
11th 18 May 1882

12. The highest rate for revetment allowed in the present revised estimate is Rupees 3, a cubic yard. The cost of that already done is not shown in the Comparative

Comparative Statement, and so it cannot be ascer-
tained in what way the work, which has already
been done at much higher rates, has been compen-
sated for. I hope however that one provision has
been made for the whole cost of completing the
work.

13. The facts noticed in the preceding paragraphs
leave little to be said in the way of comment. It is
quite clear that overpayments have in excess of
what could be accounted for by mistakes have
been made during a long time. The predecessor of
the present Executive Engineer is responsible, as
Mr Latham points out, for all the excess due to
this cause except an insignificant sum because
he failed, when specially called upon to do so, to as-
certain and report the extent of work actually done.
It will now probably be absolutely impossible
to make even a fair guess of the actual disburse-
ments in excess made by that officer and prior to
his assuming charge in July 1863, but it is never-
theless abundantly clear that before that date the
practice of overpayments had become established
for even then the quantity paid for was much more
than that found now, after 2 years more work. It
is evident therefore that more than one Executive
Engineer of the Section has entirely neglected his duty
and on works all of which were within an hour or
an hour and a quarter's ride of his Head quarters,
has permitted fraudulent transactions to go un-
checked.

14. Instead of Rupees 2,12,270, the first estimate

of the cost of constructing the earthworks and re-
ments of this Section of 18 miles, the probable cost
as now stated will be Rupees 991,634, and making every
allowance for increase of rates &c, I do not think I
am wrong in expressing the opinion that with judicious
planning in the first instance, and ordinary care
in carrying out the works afterwards, a more ef-
ficient canal than that which will now be ob-
tained might have been had for 5 lacs instead of
nearly 10 lacs.

15. From the revised cross sections of the embank-
ments it will be seen that in some cases re-
ment already constructed is to be superseded.
The Chief Engineer informed me however, in re-
ply to a question as to whether it would be advis-
able to incur additional expense on this account,
that it is intended to cover up or remove existing
remains, only where the stone used is of the
rotten description noticed as used in several of
the reports submitted by me, and that in all other
cases completed work will remain as it is even if
it be not exactly in accordance with the arrange-
ments which the Chief Engineer would approve for
new work.

16. The revised estimates for the masonry work
of this Section are with the Chief Engineer, and will
shortly be submitted to Government.

17. Subjoined is a Statement of the amounts of
estimates already sanctioned, of the balances unex-
pended, of the cost of Permanent Establishment.

to the same date and the probable total expenditure by the time the works already sanctioned are completed. On those works which are under postponement the expenditure ^{already incurred} is the maximum which will be debitable to Guaranteed Capital.

Amount of estimates already sanctioned — 620,516
 Cash expenditure to 31 July — 526,603
 Cash of Permanent Establishment — 151,6710
 Stores and other floating heads of charge — 12,483.10
 Home charges not included in Indian Account — 297,061
 Balance of sanctioned estimates — 935,912
 Deduct postponed works — 352,000
 Permanent Establishment @ 30 per cent — 175,770
 Home charges — 25,000
 Probable expenditure for completion of sanctioned works — 911,436
 Estimate submitted with letter No 109877 inst — 306,120
 Supplemental sanction required in estimate for 4th Section now submitted — 577,790
 Cash of Permanent Establishment @ 30 per cent — 182,526
 Home charges, stores, &c. @ 20 per cent — 121,682
 as above 911,436
 Rupees 1,002,697

10. From the above particulars it will be seen that there is probably no objection, on the score of want of funds, to the sanction of the revised estimates of the 4th Section; but on the other hand it must be remembered that the estimates already sanctioned for many of the sections of the Main Canal will not suffice to complete those sections; that for this 4th Section supplemental sanction for masonry

masonry works will be needed, and that for the 5th 6th 7th & 8th sections very considerable supplemental sanctions will be required. Moreover no provision has been made for distribution and if the channels for only 30,000 acres be immediately undertaken these will involve an outlay of from 1½ to 2 lacs. Under these circumstances perhaps the best course will be to make each successive sanction, so far as the total amount of the estimates is concerned, subject to funds out of the Guaranteed Capital being available. The sanctions as regards approval of the works will remain in force after the Guaranteed Capital is exhausted, and so long as it is clearly understood that the sanction of estimates involves no intention on the part of Government of making any advances in excess of the million, for the purpose of carrying them out, it seems unnecessary that this sanction should be limited to the works for which the Guaranteed Capital may be expected to suffice, and on the other hand to do so would perhaps prevent the Chief Engineer laying out the balance to the best advantage.

I have the honour,
 Sir,
 Your most obedient servant,
 Volundunim Captain, R.E.
 Chief Engineer for Mr. H. Simpson

Public Works Department
 21
 26th Decr
 Proceedings of the Madras Government
 Under date the 17th Novr 1865
 Read the following

From the Consulting Engineer
 18th Decr

Forwarded for the consideration of Government a letter No. 739 D of the 2^d Instant from the Pres. Eng. 1865 together with Supplemental Estimates and their accompanying memoranda with reference to earthworks and accretions in the reclamation of the main Canal. (Here enter 13th Novr 7/65 No 114)

With this letter the Consulting Engineer submits supplemental estimates for earthwork & accretions in the 4th or Nagavara Section of the Madras Irrigation & Canal Company's Canal, amounting to Rs 577,790.

The estimates already sanctioned for this Section are as follows:-

Original estimate - Rs 212,270
 Revised estimates sanctioned between Aug^r & Oct^r 1865 - 416,864
 The Supplemental estimates

Copy in a Minute Book
 of 25th January 2^d of 1866

27th 11/1865
 J. H. P. Esq.
 Secy to Govt
 170 405 374

The Consulting Engineer
 18th Decr

To the Secretary to Govt.
 P.W.D.

(Dated 13th November 1865)
 1865/6

Enc. 55

Forwarded for the consideration of Government a letter No. 739 D of the 2^d Instant from the Pres. Eng. 1865 together with Supplemental Estimates and their accompanying memoranda with reference to earthworks and accretions in the reclamation of the main Canal.

1865/6

1865/6

1865/6

1865/6

A.C. 24th Aug 1865
 2175
 2175

now submitted raises the total cost to Rs 9,91,634 or 55,257 per mile exclusive of the necessary masonry works.

From the explanations which are furnished of the causes of this enormous increase in the cost of this section of the Canal, it appears that in the item of earthwork there has been an excess of Rs 302,099, of which Rs ^{124,872} represent charges for which no work can be shown to have been done on 11 out of 18 miles, & Rs 1,30,000, the value of additional work which had been found necessary to secure increased stability & efficiency. Further charges for work which cannot be accounted for are alleged to have been made in the other seven miles of the same section, but these have not been definitively ascertained as the measurements

required to be taken to determine them would have greatly delayed the completion of the supplemental estimates, & would have continued to occupy the time & attention of the present Executive Engineer, whose services ~~would~~ are required for the superintendence of the works in progress. Assuming, however, that such charges in the seven miles not checked were on one half the scale of those found to have been made on the eleven miles which have been examined, Capt. Mullins shows that the work actually done would be of the value of only 0.57 of the expenditure; and, after a careful analysis of the various items of the supplemental estimates, that Officer is of opinion that, with judicious planning & ordinary care in execution, a better

In passing the estimate
now submitted, the Government
are compelled to withhold their
sanction to the sum of Rs.
124,842.

1. The first part of the paper is a
 2. description of the general situation
 3. and the results of the survey.
 4. The second part is a description of the
 5. methods used in the survey.
 6. The third part is a description of the
 7. results of the survey.
 8. The fourth part is a description of the
 9. conclusions of the survey.
 10. The fifth part is a description of the
 11. recommendations of the survey.
 12. The sixth part is a description of the
 13. conclusions of the survey.
 14. The seventh part is a description of the
 15. recommendations of the survey.

To
The Comd Engineer & Co. with
a Manager D. - D.
18

Remise de Copie de l'8^{me} Recensement

Therapy time: 1 hr. 15 min.

—

x 18 miles

X more than $\frac{1}{2}$ the
cost of a railway -
further stimulus for
business to come

& more than $\frac{1}{2}$ the cost of a railway further $\frac{1}{2}$ for the stone to come from the quarries. From the explanation furnished it appears that in the item of earthwork there have been overpayments, much in excess of what could be accounted for by mistake, aggregating Rs. 172,055 out of a total of Rs. 302,099. After the Engineer has been in excess under this head of Rs. 302,099. After the Engineer has been in excess under this head of Rs. 302,099. After the Engineer has been in excess under this head of Rs. 302,099.

The Consulting Engineer
Submits supplemental estimates for
cartworks & reinforcements in the 4th at
Mysore Section of the Madras S. & C.
Company's Canal, amounting to Rs. 27,720

The estimates already sanctioned
 for this section are as follows:-
 Original Estimate - Rs 21,2,270 or Rs 11,79,37 Pina
 Revised Estimates sanctioned } " 4,16,844 or " 23,68 2-
 between Aug^r & Oct/54 - }
 The supplemental estimates now submitted
 raise the total cost to Rs 9,94,634 or Rs 267
 Tributes. ^{can} it

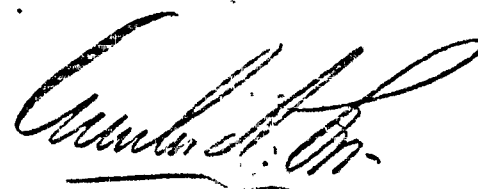
From the explanation furnished it appears that in the item of earthwork there have been overpayments, much in excess of what could be accounted for by mistake aggregating Rs. 1,72,055 out of a total excess under this head of Rs. 3,02,099. Captain Drelling is of opinion that with judicious measurement, the excess leaving Rs. 1,29,044 is not excessive. See p. 100 Ch. Supp. letter.

planning & ordinary care in carrying
out the works, a better Canal might have
been excavated for 5 instead of nearly
10 Lacs of Rs.

The supplemental estimates
now submitted do not represent the total
exp. Revised estimates are stated to be
under preparation for the masonry works,
& these may shortly be expected.

With a new ^{present} ~~the~~ guaranteed
Capital being exceeded, Capt. Brindley ^{This seems}
advises that each future sanction should ^{desirable} ~~be~~ ^{granted}
be granted conditionally on funds being
available within the guaranteed million.

Fort St George
15th November
1865


Col. &c.
Secretary to Govt. Mad.

Copy in a letter to England
8/25th January, 1866.

45, 1865 & 1866
to the
Hon. Secy. of the
Interior

1865-66.
To the Hon. Secy.
of the Interior

1865-66.
To the Hon. Secy.
of the Interior
for the
Hon. Secy. of the
Interior
for the
Hon. Secy. of the
Interior

1865-66