(1) Number of pages 34

(2) Date of repair

(3) Initials of the Referencer

TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

P.W DEPARTMENT

G.O. No. / B.P. No. 59 W

Press. / Mis.

Dated 7·1·1886

198

V.S.M

Not to be folded or roughly handled.

7th January 1886, No. 59 W., Public Works.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following despatch from the Right Honorable Lord RANDOLPH S. CHURCHILL, Her Majesty's Secretary of State for India, to His Excellency the Right Honorable the Governor in Council, Fort St. George, dated India Office, London, 3rd December 1885, No. 10, Public Works:—

I forward, herewith, for your Excellency's information, copy of a report* lately received from Mr. Parkes on the progress made in the restoration of the Madras harbour during the quarter ending 30th September 1885.

* Report dated 10th November 1885.

Enclosure.

Madras Harbour.

Report of progress for the quarter ending 30th September 1885.

I have the honor to append to this report a plan showing the state of the works on the 30th September last.

2. No part of the new work as yet shows above water, as such work is dependent upon the cranes sent out from England. These, at the present date, are all at Madras, and one (a Titan) was nearly ready for work at the date of the Superintendent's last advices. He hoped to deposit a few blocks before the rough weather of the present month sets in. It will not be till January, however, that much show will be made.

3. The work actually done at the piers within the quarter is the deposit of 22,975 tons of rubble stone for the foundation of the new line of the north pier, and 3,524 at the south pier. The positions of these deposits are shown in brown on the plan. The great bulk of this is from the granite quarries of Pallávaram, from whence it is brought by the South Indian Railway, but a small quantity, 162 tons at the north pier, and 459 tons at the south pier, consists of the materials of 23 old blocks which were lying in the line of the new work, and were blasted into fragments by dynamite before the rubble was deposited. Had they been allowed to remain as blocks in masses of 27 tons their incompressibility, as compared with that of the surrounding rubble, would have caused unequal settlement in the built superstructure above them, which would have been very damaging to it.

4. Attempts have been made to lift some of these blocks and transport them to within reach of one of the cranes, by which they would be again lifted and placed in the wave-breaker, but so far these attempts have not been successful. I think the attempts were quite justifiable, for the value of a block as a block is about Rs. 140, while its value as tons of rubble is only about Rs. 54. Mr. Thorowgood calculated that if 30 blocks could be recovered the cost of the apparatus for raising them would be reimbursed, and any number in excess of that would show a clear profit.

5. But the difficulties of working the apparatus were greater than was anticipated. Even on calm days, the disturbance of the water in the immediate neighbourhood of the ruined piers was so great that it was impossible to keep the lighters on which the machinery was placed sufficiently still to lower the apparatus for gripping the block with precision, and the latter was too heavy for the divers to adjust under water. I am afraid, therefore, it will be necessary to abandon any further attempts in this direction.

6. 429 concrete blocks were made during the months of July and August, making, with the 1,059 in stock on the 30th June, a total of 1,488, a number amply sufficient to carry on work till those now being made are sufficiently matured for use. Block-making was suspended during September and the first half of October, partly because the cement which had recently arrived from England was unfit for use until it had had a few weeks' exposure to the air, and partly because the only space available for making new blocks was occupied by old ones, which it was impossible

to move in consequence of the delay in the arrival of a new boiler for the Goliath crane, about which there was some correspondence at the India Office in the early part of the present year. But both these obstacles are now removed.

7. The delay due to the temporary unfitness for use of the cement on its arrival is a difficulty which has arisen since the Suez canal route was adopted for this material. All Portland cement requires a few weeks' exposure to air after it leaves the manufactory, and this was furnished by the time occupied in the Cape route, all cement forwarded by that route having uniformly arrived in excellent condition. But the five weeks occupied in the canal route requires to be supplemented by a little further delay after its arrival. I have thought it desirable to mention this, to obviate any misapprehension arising from the fact of a supply of cement temporarily unfit for use being on hand.

8. I may further mention that the locally manufactured cement is used as far as it will go, but hitherto the rate of delivery has not exceeded one-tenth of what will be required in full work, and any attempt to increase the rate of supply is apt to result in a deterioration of quality. The great bulk of the work must continue, therefore, to depend upon the regular supply of English cement.

Changes of coast line.

9. On the plan of the harbour I have shown the high-water mark south of the harbour as it was in September 1884, March 1885, and September 1885. It will be seen that the lines at the last two dates nearly coincide, but that the line in March was (except close to the pier) from 150 to 200 feet inshore, that width having been washed away during the north-east monsoon, and been recovered during the succeeding south-west monsoon. In the plan accompanying my report on the quarter ending 31st March, I showed the lines at the corresponding period for several successive years preceding, which exhibit a fairly regular annual increment. The increments exhibited by the September lines are not nearly so regular, and in this last year, as in the case of 1881-82, there has been no advance. But it is probable that the next March line will show the usual advance.

10. Inside the harbour I have shown the lines for March and September in the current year. The line for September almost exactly coincides with that for September 1881, and in each of the three intervening years there has been the same change of line between March and September as is shown in the current year, the alternating alongshore movement of sand being in directions opposite to those which take place outside the harbour. There is no regular advance from year to year, but there are occasional temporary and unimportant advances and retirements, due apparently to the surf washing down or driving up the sand more or less

11. On a separate plan I have shown the high-water marks at Cassimode, a mile north of the harbour, for several successive years, to indicate the progress of the annual erosion. It will be seen that for the last two years it has been at a slower rate than formerly, and it certainly now presents no ground for anticipating any serious difficulty. In the seven years from 1876 to 1883 the average rate of erosion was 60 feet per annum, in the last two years it has been 20 feet per annum, and it is probable that this rate will further diminish in future years, but at present there are not sufficient materials to justify a prediction as to what form future erosion may take.

Revenue from reclaimed and purchased lands.

12. Your letter to me of 9th October informs me that the attention of the Madras Government having been called to this matter, an explanation has been given of the arrangements made, which in the opinion of the Secretary of State sufficiently meets the circumstances of the case. I need only, therefore, express a hope that the officers of the various departments which are charged with the collection of this revenue will be instructed to make the returns in such a manner that the total amount collected may be ascertained.

Block-setting machinery.

13. I beg to submit with this report two photo-lithographs representing the Titan and wave-breaker cranes which are now in process of erection at Madras. The Titans, of which there are two, one for each pier, are similar, so far as the upper platform and machinery are concerned, to those which were formerly employed at Madras, but the design of the lower framework has been modified so as to allow the machines to be worked in a variety of positions as shown in the four small diagrams. The machine is supported on three legs instead of four, and each of these legs is fixed on a pivot immediately above the "bogie" or carriage in which the wheels are fixed. Thus the bogie can be turned in any direction with respect to the platform above, and the whole machine can be turned on any one of the three bogies as a centre.

14. When in the position shown on diagram A, it is capable of setting blocks in advance in precisely the same manner as the former Titans, with which the working staff are therefore familiar, but its operations are limited to a length of 30 feet forwards, and a width of 15 feet transversely.

15. When in the position shown on diagram B, it is capable of carrying a block out transversely to a distance of 22 feet from the face of the breakwater, and is thus available for depositing the wavebreaker blocks to that extent. Its work in this position, however, will be only supplementary to that of the wavebreaker crane, and it is not so convenient as the latter, for a "traverser" will be required to bring the blocks to a position in which they can be lifted by the Titan. There are, however, certain portions of the work for which the wavebreaker crane is not available, and for these the Titans are specially adapted.

16. Diagram C shows how the Titan will be worked to build the wider portions of the piers near the ends. The front bogies will be set upon rails laid in the arc of a circle of which the back bogie is the centre, and it will thus be capable of turning to a sufficient extent to command the greater width.

17. Diagram D shows another position of the Titan in which a more limited distance from the face of the wall is commanded without the necessity of using the traverser. This will be useful in special cases.

18. The wave-breaker crane shown upon the other drawing is specially intended for lifting a block off its truck; carrying it to any distance not exceeding 36 feet from the face of the wall on one side, and 24 feet on the other side, and dropping it at any required spot within those distances. It will be seen that the block is suspended by a different apparatus from that of the Titan. It is gripped by a pair of claws which are suspended by their centre; but each end of the claws is also connected with the machinery above by a chain. When these end chains are slack the grip on the block is tight; but when these are tightened and the central chain is allowed to slacken, the claws open, and the block is released. By these means the blocks will be dropped at random and allowed to take their own position as they may happen to fall until a sufficient mound has been formed. By means of the overhang on the harbour side the crane will be available for landing heavy articles of cargo for the public and placing them on railway trucks.

19. When the Titan is used for wave-breaker work similar claws will be used for suspending the blocks, and the releasing will be accomplished in the same manner but with some necessary modification of detail.

20. It will be observed that there is only one wave-breaker crane, though there are two Titans. The reason of this is that there is much less work to do at the south pier than at the north, and it is expected that the one Titan will be able to do the building and the wave-breaker depositing, so far as the latter is within its reach, in the same time as the two machines can do the larger amount of work at the north pier. When the north pier is finished the wave-breaker crane may be transferred to the south pier for the necessary widening.

Cost of the works.

21. I have not received as yet the statement of expenditure to the 30th September, but previous statements show that the work is so far being executed at rates rather under those of the estimate. The principal expenditure, however, has been on rubble stone from Palláváram, for the transport of which by the South Indian Railway the old price of six pies per ton per mile has been paid. The question of a higher rate is still under consideration. Any statement I might now submit, therefore, would require correction if a higher rate be decided on, and the state of the works at present is such that no fair comparison of estimated and actual cost could be presented. I propose, therefore, to defer presenting these statements in the form I previously adopted till the work is rather further advanced.

10th November 1885.

Order—dated 7th January 1886, No. 59 W., Public Works.

Recorded.

(True Extract.)

Captain, R.E.,
Under Secy. to Govt., P.W.D.

To the Superintendent, Madras Harbour Works.
" Consulting Engineer for Railways.
" Marine Department.
" Revenue do.

Exd. E. Fernandez.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1886} Madras.

PUBLIC WORKS.

Dated January, 7th.

Recd. *Encl.*

G.O., 7th Jan. 1886, No. 59 W.

JANUARY.

Madras Harbour Works

Despatch from the Secretary of State for India forwarding copy of Mr. Parkes' report on the progress made in the restoration of the — during the quarter ending 30th September 1885, recorded.

15th August 1885, No. 1889 W., Public Works.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following despatch from the Right Honorable the Secretary of State for India, to His Excellency the Right Honorable the Governor in Council, Fort St. George, dated India Office, London, 30th June 1885, No. 4, Public Works:—

Dated 23rd May 1885.

Herewith is transmitted, for the information of your Government, copy of a report which has been submitted to me by Mr. W. Parkes, C.E., on the operations in connection with the Madras Harbour Works, which have been carried on since the severe storm of 1881 up to the 31st of March last.

2. The point raised by Mr. Parkes, in the 16th paragraph of his report, as to the best manner of administering and utilising the funds derived from the rent of buildings on the land lying to the immediate north and south of the harbour will call for your consideration, and I shall be glad to be furnished with an expression of the opinion of your Excellency's Government on the subject.

Enclosure.

MADRAS HARBOUR.

Report of Progress up to 31st March 1885.

In resuming the series of quarterly reports of the progress of the Madras Harbour Works, which has been suspended since the severe storm of November 1881, it may be convenient if I commence by a short *résumé* of the works which have been executed in the interval, distinguishing those which were in pursuance of, or contingent on, the original design, and those which are a portion of the supplementary design for restoration and completion now in course of execution.

2. *North Pier Surf Bank.*—Six hundred and fifty-five tons of rubble were deposited immediately after the storm of 1881, and 300 tons in the latter part of 1883, to maintain the sea slope. The cost of this is the only charge which has been entered against this department of the work since 1876, but it is probable that similar small expenditure may from time to time be required as the rubble is wasted by the sea. No similar maintenance is required for the south pier surf bank as it is completely buried in sand.

3. *North Pier Rubble Base.*—In 1882, 4,782 tons of rubble were deposited on the outer foreshore where it had been scoured out by the heavy sea. No similar maintenance was required for the south pier rubble base.

4. *North Pier Superstructure.*—The 2,200 feet of work left uninjured were strengthened by iron clamps connecting the blocks at the top, the top of the breakwater was levelled with a bed of concrete, and a line of broad gauge railway bedded in concrete laid nearly to the end. These works were completed in 1882.

5. *South Pier Superstructure.*—This was treated in the same way as the north pier by clamping the blocks and levelling the top with concrete, but only a portion of the railway (1,780 feet out of 2,500) has been made, and that on the narrow gauge, being in immediate connection with the South Indian Railway, by which the rubble stone is conveyed. The total cost of the foregoing works was Rs. 75,029.

6. *Protective Works for the shore north of the Harbour.*—This is a work which was incomplete at the time of the storm, and was not materially affected by it. Between November 1881 and February 1883, 59,726 tons of rubble stone were deposited to form a revetment in addition to the 44,180 tons previously deposited, and it may now be considered complete. It will probably require some occasional feeding as the sea washes it down, but up to the present time only 65 tons have been so added to it, which was in November 1884.

7. *In pursuance of the design now under execution*, 43,357 tons of rubble have been deposited at the north pier and 19,538 tons at the south pier to widen the foreshore on the sea-side to receive the wave breaker of concrete blocks, the deposition of which will be commenced at the north pier as soon as the crane specially designed for the operation and now nearly completed by the manufacturers, Messrs. Ransomes and Rapier of Ipswich, has been erected. The positions in which this stone has been deposited at the two piers are shown on the accompanying plan.

8. In addition to this deposit of stone below water, the special protection referred to in paragraph 5 of my report of 21st August 1884, near the commencement of the north pier, has been completed. A bank of rubble was made for a length of about 140 feet to the level to the top of the breakwater, and on this 16 thirty-ton concrete blocks were built. The rubble was partially washed down in a heavy sea in November, and 12 out of the 16 blocks fell over upon the flattened slope as was anticipated. The next heavy sea will probably bring down the remainder, and the whole of the rubble and the superincumbent blocks will ultimately be lost to sight, but will remain an efficient protection to the foundation at that point.

9. As regards concrete block work, 313 blocks which were remaining in stock at the time of the destructive storm will now be utilised and 487 more were made in the course of the year 1882. Since then no blocks have been made, but the manufacture of them is about to be resumed.

10. The plant and machinery throughout the work has been thoroughly repaired and renewed where necessary, and the two titan cranes lost in the storm are being replaced by two new titans of a design somewhat modified to suit the new requirements. Of these, one is now ordered for shipment, and the other is nearly completed. A special crane for depositing blocks in the wave-breaker is also nearly complete. The first of these machines may be expected to be in working order in about three months from the present date and the other two in about four months, after which everything will be in readiness for carrying on the actual work in the sea with rapidity.

11. Mr. Thorowgood informs me that he has made contracts for several of the departments of the work on rather lower terms than previously, but the saving on the estimate thus effected will, I fear, be neutralised if the South Indian Railway Company substantiate their claim to a higher rate for the conveyance of stone from Pallávaram to Madras.

12. I alluded in paragraph 8 to the effect of a heavy sea in November 1884, in washing down the bank of rubble on the outer side of the north pier. This was the only effect produced upon any part of the work, except that three cargo boats belonging to the harbour works, which were moored to the south of the south pier, broke adrift, and two of them were carried into the harbour and wrecked; the third was saved. The sea was not of extreme force, but the circumstances were remarkable from the rapid change in the direction of the sea from north to south, the rubble bank being washed down in the early part of the night, and the boats which were then in comparative shelter being attacked in the early morning from the opposite direction. The latter disturbance was of a very exceptional character, the wind blowing from a very unusual quarter (S.S.W.) with a force greater than any that has been registered since 1872. Its velocity was [illegible]9 miles per hour as compared with 33 miles in the destructive storm of 1881.

13. I would now beg to direct attention to the changes in the coast line both south and north of the harbour. These changes have of course been proceeding quite independently of the suspension of the works, and they become more important as time goes on. On the accompanying lithographed plan I have shown the positions of the high-water mark when the accumulation was at its minimum each year (which is about the end of February) since the commencement of the works. This shows clearly the constantly diminishing rate of advance year by year which was originally anticipated, and it is worthy of remark that the advance effected in eight years is almost exactly that which I calculated upon on very slender data in 1876, and which will result, if it continue in the future as it has done in the past, in the 4-fathom line reaching the bend of the pier and permitting the sand to work towards the entrance, in about 100 years from the commencement of the works in 1876.

14. On another plan also appended I have shown the annual waste to the north of the harbour since 1880, also the position of the high-water line in 1876, before the harbour works could have had any effect upon it, and in 1862. In this case, the most shoreward position is in September each year. There is evidence of the coast line having been still further out at various earlier dates during the present century, and there have been considerable fluctuations, sometimes erosion and sometimes accumulation, so that it is no new thing for property abutting on the sea to be washed away and afterwards recovered, though of course the recovered areas are for some time comparatively valueless.

15. It is, however, clear that at the present time a process of erosion is going on which must be attributed to the harbour works, and, though the loss last year was not large, it cannot be assumed that erosion has reached its limits. It is uncertain whether it will in future years take the form of deepening the indentation of the bay, or whether the coast to the north will continue to retreat by parallel steps of decrement. The area coloured green has been purchased by the Government to anticipate either result, and this having been done, will evidently avoid for many years to come any question arising from the encroachment of the sea on private property.

16. The rents of the purchased land are collected and credited to the harbour works. Some parts of the reclaimed land to the south of the harbour are let at high rents by the Marine Department and the proceeds "credited to the harbour dues account in order to assist in meeting the interest on the construction of the harbour," the two revenues (of which I have no particulars, but which must now amount to an annual income worth consideration) being thus in the hands of different departments, while other departments and authorities claim the right to establish themselves on the land at their discretion. I would therefore beg to represent the increasing urgency for the recognition of these inevitable changes of the shore line and the expenditure and revenues connected with them as a ground for the establishment of some special suitable administration under which they should be placed, with a view to the land being utilised for the public service to the greatest possible extent.

17. I propose in future reports to resume my former practice of furnishing an abstract of the expenditure as compared with the estimate up to date, but on the present occasion it would be difficult to present such a statement in a form that it could be compared with the official statements, as the latter are not yet made out according to the new form which I suggested in August 1884, but which will be adopted as from the 1st April last.

23, Abingdon Street, (Signed) W. PARKES.
23rd May 1885.

To the Under Secretary of State for India.

Order—dated 15th August 1885, No. 1889 W., Public Works.

Communicated to the Superintendent, Madras Harbour Works, and to the Marine Department.

2. The Secretary of State for India will be addressed on the subject of paragraph 2 of the foregoing despatch.

(Here enter No. $\frac{10}{1889}$ W., dated 15th August 1885.)

(True Extract.)

Major, R.E.
Under Secy. to Govt., P.W.D.

To the Superintendent, Madras Harbour Works.
„ Marine Department.
„ Revenue „

Exd. J. Henricus,
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of (1885) Madras.

PUBLIC WORKS

Dated August, 15th.

Recd. *Encl.*

G.O., 15th Aug. 1885, No. 1889 W

AUGUST.

Madras Harbour Works

Despatch from the Secretary of State for India forwarding copy of report by Mr. Parkes on the operations in connection with the —, communicated to the Superintendent, Madras Harbour Works, and to the Marine Department.

24TH OCTOBER 1885, No. 2512 W., PUBLIC WORKS.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

READ—the following despatch from Lord RANDOLPH S. CHURCHILL, Secretary of State for India, to His Excellency the Right Honorable the Governor in Council, Fort St. George, dated India Office, London, 10th September 1885, No. 7 (Public Works).

I forward herewith, for the information of your Government, a copy of a report * which has been received from Mr. Parkes on the progress of the operations for the restoration of the Madras Harbour for the quarter ending 30th June last.

Restoration of Madras Harbour. Progress report for quarter ending 30th June 1885.

* Dated 15th August 1885.

2. In the 11th paragraph of the report Mr. Parkes draws attention to the rents derived from the lands contingent to the harbour, and urges that they should be credited to an account which would show the pecuniary result of the "gain and loss of land."

3. I have already addressed your Excellency in connection with this subject in my Public Works despatch, No. 4, of 30th June last, and I await the expression of your opinion therein asked for.

ENCLOSURE.

Madras Harbour.

Report of progress for the quarter ending 30th June 1885.

From W. PARKES, Esq., to the Under Secretary of State for India, dated 23, Abingdon Street, 18th August 1885.

This report is submitted somewhat later than I could have wished, in consequence of the unavoidable delay in sending me the periodical returns upon which it is based.

2. This has been caused by the illness of several members of the staff, the death of Mr. Beardmore, and also within a few days of the clerk who was best acquainted with his papers. There has also been an unexpected delay in placing Mr. Pogson's services at Mr. Thorowgood's disposal. I telegraphed my recommendation of his temporary appointment on the 12th May, having reason to believe that he was then, or was very soon to be, at liberty, but it is only within the last few days that I have been informed by telegraph that he will join the Harbour Works staff on the 20th instant. An assistant sent out specially from England might have been at work two months earlier.

3. Thus for nearly four months (and those in the most trying season, from 27th April till 20th August) Mr. Thorowgood has been without any general assistant. If he had broken down, which would not have been matter for surprise, the consequences would have been serious, as there was no one competent to carry on his duties even temporarily.

4. The sea work during the months of April, May, and June is generally subject to much interruption from rough weather, and the present season has been no exception to the rule. What work has been done has been under water, so as to make no show upon a plan, for which reason I am not submitting one with this report.

5. Nine thousand five hundred and twenty-two tons of rubble stone, however, were deposited during the quarter, in addition to the 43,357 previously reported, on the outside of the north pier for the foundation of the wavebreaker, and a commencement has been made for the rubble base of the new line of pier inside the old one by the deposit of 774 tons of stone dropped from boats, and the blasting of some of the old blocks which lay under the site of the new building. This was equivalent to 686 tons additional.

6. In the length of about 200 feet, where the new building adjoins the present standing part of the pier, and which will be built by the titan while partly standing on the latter, the rubble base has also been levelled by divers ready to receive the blocks.

7. For the new building of the south pier, 13,046 tons of rubble base have been deposited from boats.

8. The making of new concrete blocks was started in the middle of May, and 259 were made up to the end of June. These, with the 800 already reported as on hand, make 1,059, which is more than can be set during the current year, though not more than a month's supply when the work is progressing at full speed. The new blocks have principally been made with the locally manufactured cement, and this will continue to be used as supplied, but the supply is not likely to be sufficient for more than a small portion of the whole quantity required, and the bulk of the material must be obtained from England. There is a good supply of English cement for immediate use either on the ground or in course of delivery, but further demands will shortly have to be made.

9. At the present time one of the titans manufactured in this country must now be in course of erection at Madras, the second is on the voyage out, and the wavebreaker crane is just ready for inspection.

10. I have received a statement of expenditure for the quarter showing a total outlay of Rs. 1,26,674, but Mr. Thorowgood has not yet received authority to prepare these accounts in the form I suggested in my report of the 21st August 1884, and the old form is so inappropriate to the present items of expenditure that it is impossible to present any useful abstract. I have compared the actual cost of the rubble stone deposited, which is the largest item, and find that the rate at which the work has been so far done is within the estimate.

11. I would beg to call attention to some information which is now on record with regard to the revenue derived from the lands purchased to the north of the harbour and those reclaimed by the action of the works south of the harbour. It appears from the accounts furnished by Mr. Thorowgood for the year 1884-85 that the sum of Rs. 5,908-9-6 was credited to the item "contingencies" in those accounts, and which I am given to understand is mainly derived from rents of the purchased lands. It is also stated in a letter from Captain Taylor, the Master Attendant, to the Chief Secretary to Government, dated 7th May 1885, and printed in G.O., 6th June 1885, No. 233 (Marine), that there is godown and ground-rent realised (within the year), which amounted to Rs. 10,691-12-6. The aggregate of these two sums, Rs. 16,600, or at any rate a large portion of it, which would be easily determinable if the accounts were furnished in detail, is the revenue in question, and is the proceeds for the year of the expenditure of Rs. 5,00,000, the capital sum expended in the operation of gain and loss of land described in my report of 21st August 1884, paragraphs 43 to 59, and Appendix B. The year's revenue of Rs. 16,600 represents 3·33 per cent. on this capital expenditure, and it is a revenue which will go on increasing. This information, incomplete and uncertain as it is in its present form, supports the recommendation I have more than once submitted, that the revenue in question should be credited to an account which will show the pecuniary result of the "gain and loss of land."

Order—dated 24th October 1885, No. 2512 W., Public Works.

Recorded with advertence to G.O., No. 1889 W., dated 15th August 1885.

(True Extract).

(Signed) J. SHAW-STEWART, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintendent, Madras Harbour Works.
" Marine Department.

Exd. J. Henricus.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of (1885) Madras.

PUBLIC WORKS.

No. 52 W

Dated October, 24th.

Recd. *Encl.*

G.O., 24th Oct. 1885, No. 2512 W.

OCTOBER.

Madras Harbour

Despatch from the Secretary of State for India forwarding copy of Mr. Parkes' report on the progress of the operations for the restoration of the — for the quarter ending 30th June, recorded.

India Office,
London, 3rd December 1885.

Public Works,
No. 10.

To His Excellency The Right Honourable The Governor in Council, Fort St. George.

Sir,

I forward herewith for your Excellency's information, copy of a Report* lately received from Mr. Parkes, on the progress made in the restoration of the Madras Harbour during the quarter ending 30th September 1885.

I have the honour to be,
Sir,
Your most obedient humble Servant,
(Signed) Randolph S. Churchill.

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* Report, dated 10th November 1885.

ENCLOSURE.

Madras Harbour.

Report of Progress for the quarter ending 30th September 1885.

23, Abingdon Street,
10th November 1885.

Sir,

I have the honour to append to this report a plan showing the state of the works on the 30th September last.

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4. Attempts have been made to lift some of these blocks and transport them to within reach of one of the cranes, by which they would be again lifted and placed in the wavebreaker, but so far these attempts have not been successful. I think the attempts were quite justifiable, for the value of a block as a block is about 140 rupees, while its value as tons of rubble is only about 54 rupees. Mr. Thorowgood calculated that if 30 blocks could be recovered the cost of the apparatus for raising them would be reimbursed, and any number in excess of that would show a clear profit.

5. But the difficulties of working the apparatus were greater than was anticipated. Even on calm days, the disturbance of the water in the immediate neighbourhood of the ruined piers was so great that it was impossible to keep the lighters on which the machinery was placed sufficiently still to lower the apparatus for gripping the block with precision, and the latter was too heavy for the divers to adjust under water. I am afraid, therefore, it will be necessary to abandon any further attempts in this direction.

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the only space available for making new blocks was occupied by old ones, which it was impossible to move in consequence of the delay in the arrival of a new boiler for the Goliath crane, about which there was some correspondence at the India Office in the early part of the present year. But both these obstacles are now removed.

7. The delay due to the temporary unfitness for use of the cement on its arrival is a difficulty which has arisen since the Suez Canal route was adopted for this material. All Portland cement requires a few weeks' exposure to air after it leaves the manufactory, and this was furnished by the time occupied in the Cape route, all cement forwarded by that route having uniformly arrived in excellent condition. But the five weeks occupied in the Canal route requires to be supplemented by a little further delay after its arrival. I have thought it desirable to mention this, to obviate any misapprehension arising from the fact of supply of cement temporarily unfit for use being on hand.

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Changes of Coast Line.

9. On the plan of the harbour I have shown the high-water mark south of the harbour as it was in September 1884, March 1885, and September 1885. It will be seen that the lines at the last two dates nearly coincide, but that the line in March was (except close to the pier) from 150 to [illegible] feet inshore, that width having been washed away during the north-east monsoon, and been recovered during the succeeding south-west monsoon. In the plan accompanying my report on the quarter ending 31st March, I showed the lines at the corresponding period for several successive years preceding, which exhibit a fairly regular annual increment. The increments exhibited by the September lines are not nearly so regular, and in this last year, as in the case of 1881–82, there has been no advance. But it is probable that the next March line will show the usual advance.

10. Inside the harbour I have shown the lines for March and September in the current year. The line for September almost exactly coincides with that for September 1884, and in each of the three intervening years there has been the same change of line between March and September as is shown in the current year, the alternating alongshore movement of sand being in directions opposite to those which take place outside the harbour. There is no regular advance from year to year, but there are occasional temporary and unimportant advances and retirements, due apparently to the surf washing down or driving up the sand more or less.

11. On a separate plan I have shown the high-water marks at Cassimode, a mile north of the harbour, for several successive years, to indicate the progress of the annual erosion. It will be seen that for the last two years it has been at a slower rate than formerly, and it certainly now presents no ground for anticipating any serious difficulty. In the seven years from 1876 to 1883 the average rate of erosion was 60 feet per annum, in the last two years it has been 20 feet per annum, and it is probable that this rate will further diminish in future years, but at present there are not sufficient materials to justify a prediction as to what form future erosion may take.

Revenue from reclaimed and purchased Lands.

12. Your letter to me of 9th October informs me that the attention of the Madras Government having been called to this matter, an explanation has been given of the arrangements made, which in the opinion of the Secretary of State sufficiently meets the circumstances of the case. I need only, therefore, express a hope that the officers of the various departments which are charged with the collection of this revenue will be instructed to make the returns in such a manner that the total amount collected may be ascertained.

Block-setting Machinery.

13. I beg to submit with this report two photo-lithographs representing the Titan and wavebreaker cranes which are now in process of erection at Madras. The Titans, of which there are two, one for each pier, are similar, so far as the upper platform and machinery are concerned, to those which were formerly employed at Madras, but the design of the lower framework has been modified so as to allow the machines to be worked in a variety of positions as shown in the four small diagrams. The machine is supported on three legs instead of four, and each of these legs is fixed on a pivot immediately above the "bogie" or carriage in which the wheels are fixed. Thus the bogie can be turned in any direction with respect to the platform above, and the whole machine can be turned on any one of the three bogies as a centre.

14. When in the position shown on Diagram A, it is capable of setting blocks in advance in precisely the same manner as the former Titans, with which the working staff are therefore familiar; but its operations are limited to a length of 30 feet forwards, and a width of 15 feet transversely.

15. When in the position shown on Diagram B it is capable of carrying a block out transversely to a distance of 22 feet from the face of the breakwater, and is thus available for depositing the wavebreaker blocks to that extent. Its work in this position, however, will be only supplementary to that of the wavebreaker crane, and it is not so convenient as the latter, for a "traverser" will be required to bring the blocks to a position in which they can be lifted by the Titan. There are, however, certain portions of the work for which the wavebreaker crane is not available, and for these the Titans are specially adapted.

16. Diagram C shows how the Titan will be worked to build the wider portions of the piers near the ends. The front bogies will be set upon rails laid in the arc of a circle of which the back bogie is the centre, and it will thus be capable of turning to a sufficient extent to command the greater width.

17. Diagram D shows another position of the Titan in which a more limited distance from the face of the wall is commanded without the necessity of using the traverser. This will be useful in special cases.

18. The wavebreaker crane shown upon the other drawing is specially intended for lifting a block off its truck; carrying it to any distance not exceeding 36 feet from the face of the wall on one side, and 24 feet on the other side, and dropping it at any required spot within those distances. It will be seen that the block is suspended by a [illegible] apparatus from that of the Titan. It is gripped by a pair of claws which are suspended by their centre; but each end of the claws is also connected with the machinery above by a chain. When these end chains are slack the grip on the block is tight; but when these are tightened and the central chain is allowed to slacken, the claws open, and the block is released. By these means the blocks will be dropped at random

and allowed to take their own position as they may happen to fall until a sufficient mound has been formed. By means of the overhang on the harbour side the crane will be available for landing heavy articles of cargo for the public and placing them on railway trucks.

19. When the Titan is used for wavebreaker work similar claws will be used for suspending the blocks, and the releasing will be accomplished in the same manner but with some necessary modification of detail.

20. It will be observed that there is only one wavebreaker crane, though there are two Titans. The reason of this is that there is much less work to do at the south pier than at the north, and it is expected that the one Titan will be able to do the building and the wavebreaker depositing, so far as the latter is within its reach, in the same time as the two machines can do the larger amount of work at the north pier. When the north pier is finished the wavebreaker crane may be transferred to the south pier for the necessary widening.

Cost of the Works.

21. I have not received as yet the statement of expenditure to the 30th September, but previous statements show that the work is so far being executed at rates rather under those of the estimate. The principal expenditure, however, has been on rubble stone from Pallaveram, for the transport of which by the South Indian Railway the old price of six pies per ton per mile has been paid. The question of a higher rate is still under consideration. Any statement I might now submit, therefore, would require correction if a higher rate be decided on, and the state of the works at present is such that no fair comparison of estimated and actual cost could be presented. I propose, therefore, to defer presenting these statements in the form I previously adopted till the work is rather further advanced.

I have, &c.,
(Signed) W. Parkes.

The Under Secretary of State
for India.

Public Works
3rd December 1885.

Copy
~~Letter~~ to Fort St. George
No. 10 1 enclosure

14/45/86

Received 31st Decemb

India Office,
London, 3rd December 1885.

Public Works,
No. 10.

To His Excellency The Right Honourable The Governor in Council, Fort St. George.

Sir,

I forward herewith for your Excellency's information, copy of a Report* lately received from Mr. Parkes, on the progress made in the restoration of the Madras Harbour during the quarter ending 30th September 1885.

I have the honour to be,
Sir,
Your most obedient humble Servant,

Randolph S Churchill

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* Report, dated 10th November 1885.

Enclosure

ENCLOSURE.

Madras Harbour.

Report of Progress for the quarter ending 30th September 1885.

Sir,

23, Abingdon Street,
10th November 1885.

I have the honour to append to this report a plan showing the state of the works on the 30th September last.

2. No part of the new work as yet shows above water, as such work is dependent upon the cranes sent out from England. These, at the present date, are all at Madras, and one (a Titan) was nearly ready for work at the date of the Superintendent's last advices. He hoped to deposit a few blocks before the rough weather of the present month sets in. It will not be till January, however, that much show will be made.

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(Signed) W. PARKES.

The Under Secretary of State
for India.

151 Civil Works

No. 59 W. January 7th 1886

No. 5

Public Works

3rd December 1885

A

Recorded

Recorded

The

Letter to Hon. St. George

No. 10 enclosure

5/1/86

7/1/86

7.1.86

Suptt M. H. W.

Supt M. H. Works

C. E. for Rep. ...

Marine dept.

Rev. dept.

20/1/86

With order

With order

Received 25 Dec/85

16

115

Govt. of 1886 Madras.

PUBLIC WORKS.

Dated

Recd. Ent.

G.O. 7 Jan 1886. No. 59

[illegible]

Despatch from the Secy of State for India forwarding copy of Mr Parkes' report on the progress ~~of the~~ made in the restoration of the — during the quarter ending 30th Sep/85 transmitted

85/6