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MADRAS RECORD OFFICE

Government of Madras

Public Works

DEPARTMENT

G.O. No.	1802	Press
~~B.P. No.~~		~~Mis.~~
Dated	18-7-	1876
		195

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
18th July 1876. No. 1,802.*

Read the following papers:—

No. 264. From N. S. B. BEARDMORE, Esq., Officiating Superintendent, Madras Harbour Works, to Major-General G. W. WALKER, R.E., Secretary to Government, Public Works Department, dated Madras, 30th June 1876, No. 38 W.

I HAVE the honor to submit the following Report on the Works of the Madras Harbour for the month of June 1876.

2. The surf bank has been projected for a further length of 75 feet, making a total length of 925 feet from the point of origin in line with the telegraph poles North Pier.

along the Beach Road. Laterite stone to an amount of 15,232 tons has been deposited during the month, making a total quantity of stone deposited in this embankment altogether of about 63,342 tons, without taking into account that deposited last year in the bank opposite Royapooram Station. The amount of stone deposited is about the same as last month; but, in consequence of our going into deeper water, we have a higher bank to make up and the stone does not go so far. This explains the fact that the length of bank completed is not so great as last month.

3. During the first week of the month, and on the 26th, 27th, and 28th days, the stone was somewhat spread about by heavy seas; a part of it has been deposited at the foot of the northern slope, so as to widen out the base at that part as shown on a plan and cross sections that accompany this report, similar to those which have accompanied previous ones. This widening of the base on the north side is of no harm, for it is the side from which the heaviest seas are to be expected, namely, those from the north-east. Mr. Parkes prefers this sort of natural protection to the construction of concrete blocks as lately proposed and partly carried out; sixteen of these blocks have been constructed, and I have abstained from building more; for, owing to the base of the bank having been so much widened out, it appears that a further number for protective purposes will not be required. Mr. Parkes remarks, "I should have myself preferred allowing the bank to be washed down so as to form a broad base of rubble stone—a feature for which no amount of concrete blocks above water will provide a substitute," and directs me to let the sea wash down the slopes and fill up again. The slopes, however, have washed down very little, and have stood remarkably well at the angle, about $1\frac{1}{2}$ to 1, at which they were originally pitched; but the same result desired by Mr. Parkes, *viz.*, a broad base of rubble stone, has been attained by the stone being spread out from the end.

4. We have generally deposited during the month 65 wagon loads of stone per day; but the pier is now advancing too quickly, and in consequence of the delay that has been caused in procuring suitable stone for concrete-making, we have no blocks ready for making the abutment of the pier, and I am obliged to give orders that next month the rate of progress and deposition of stone shall be reduced. I dare not stop, or an unfinished end would be exposed to action of the surf, damaged, and perhaps a deep hole scooped out in front by the current; and I dare not go on too quickly before we are ready with preparations to form the abutment.

5. The Ambatoor quarries have been inspected by me more than once during the month; the railway sidings there have been extended four chains. A separate report will follow on this subject.
Ambatoor Quarries.
6. I may mention that at a meeting held with the Madras Railway Company on the 26th day of June last, an agreement was come to with them that they should charge us only 6 Pies per ton per mile for the carriage of all stone brought from Chinnamapett, and not a higher rate as was once settled. This rate is that which is paid for the stone from Ambatoor and which was originally proposed for the stone to be brought from Tritany, 51 miles from Madras, when it was thought we should have to go there for that class of stone. As Chinnamapett is 15 miles nearer Madras, it is hoped there will thus be a distinct saving in the estimates of the Madras Harbour.
Railway Company's rates.

7. With the assistance of Captain J. H. Taylor, Master Attendant, I engaged for each of the Steam Barges lately arrived a crew of one syrang, one tindal, one bundarry, and six lascars from Cocanada. The late Chief Mate of the *Hobart*, Mr. Ferdinand deGrott, still remains in charge of her; but as I implied in my letter No. 23 W of 31st May, the Mate of the *Salisbury* did not prove sufficiently trustworthy, I was obliged to discharge him, and I have placed Captain Robson, a gentleman recommended to me by Captain Taylor, in charge of her instead. As directed in G.O., No. 1,493, dated 15th June, I have since given up the entire control of, and responsibility for, these Steam Barges to the Master Attendant of the Port of Madras. I have been requested to report whether these vessels are insured, and I am now in a position to state that they are not. Mr. Parkes, who is my informant, adds—

“Nor can I see the use of insurance, it will be no remedy; for the greatest evil consequent on the loss of a Barge is delay to the work, and we should have to pay an exorbitant rate for the under-writers' ideas of the risk. Insure by care and not by annual payments.”

8. The concrete floor or platforms on which are to be constructed the actual piers of the Madras Harbour are being extended 220 feet, having been laid down during the past month. This portion is shown on the general plan in full red lines tinted pink; the portion constructed last month being tinted in faint Indian ink; the dotted red lines on the plan show the work as it will be eventually laid out, the Goliath roads and part of the railways are already extended some little distance, but it is difficult to show them distinctly on the plan.
Block Ground.

9. The concrete mixing station mentioned in my last report is being proceeded with, but is not yet completed; the foundations for the engine-house have been placed *in situ*, and the foundations of the engine chimney are being put in. I have thought it advisable to sink down wells to support these foundations, fearing that if we draw much water by means of wells from the sub-soil for use in concrete making, that we might, unless such precautions were taken, cause a settlement in such a heavy structure.
Engine-houses.

10. The erection of one of the large cranes received from Kurrachee is finished except the fitting of a few pipes that had to be ordered from Bombay to replace worn ones. The putting together of the Titan crane is commenced, and the erection on the block ground of a light sort of treble travelling crane, which arrived from England in the *Sea Gull* last month, is nearly completed. This Trinity Traveller is as it were three cranes in one, and was designed by Mr. Parkes specially for these works; it is to be employed for lifting the small “skips” of concrete containing about one-third of a yard each after they are brought down the side railway from the concrete-mixing machines carrying them over the tops of the concrete block moulds and depositing the contents of the “skip” inside. In this way three concrete blocks can actually be in course of construction under one of these cranes at the same time and three more of them are expected from England. The carpenters have been at work in making these large block moulds, eight of which have already been completed. They have also during the month been employed in making certain frame work for the engines and the machinery; and in fencing round the block ground, the staves of the used cement casks coming in excellently for this purpose, making a neat close fence, and saving some timber.
Travelling Cranes.

11. As advertised in the *Fort St. George Gazette* of 15th May 1876, tenders were received on 10th and 15th days of June for the supply of 8,000 junglewood sleepers and 200 tons of teakwood timber. Out of forty-one forms of tender for the 8,000 junglewood sleepers which were applied for and issued, only sixteen were filled up and returned. The offers varied from that of Messrs. Massey and Company, of Calicut, at Rupees 4-4-0 to those of two Native Firms at Rupees 2-5-11. Nearly all of them stated that the time allowed for the full delivery, *viz.*, up to the 30th day of September, was too short; so I divided the contract in equal proportions, at Rs. 2-5-11 per sleeper, between the two lowest tenderers who happened to be alike, namely, P. Doorooa Rajoo and Company, and M. Gooroonatha Aucharry and Veeroocootty Chetty. This may be considered a reasonable bargain, for we had hitherto been paying Rupees 2-12-0 for 2,000 sleepers, and I knew that for so much larger a number as 8,000, the price ought to be somewhere below Rupees 2-8-0. Adding the cost of the advertisements to these tenders, the price of each sleeper, as delivered, will be Rupees 2-7-6. They will, then, have to be tarred, or other precautions taken to preserve them from the white-ants and boring insects.
Contracts.

12. Only one advantageous offer was received for the supply of teakwood timber; but that firm, *viz.*, Arthur Aratoon, and P. Annamalay Chetty, who offer to supply 200 tons at Rupees 84-15-0, had not the sized timber we require for all purposes, so I offered to take 150 tons from them, they agreeing to sell at the same price, and have left the other 50 tons to be purchased from one of the other firms who tendered.

13. Our staff has been increased this month by the arrival of Mr. William Allen, Foreman Diver, who landed from the *Hydaspes* on June 6th. His salary is Rupees 220, with free quarters. Mr. George Lowe, junior, will be his Assistant. The *Hydaspes* also brought an air-pump and diving dresses for two men. In the
Staff.

interval that will elapse before we are ready to commence the rubble base, I propose to employ this man in making an examination of the bed of the sea on the line of the piers.

14. During the month the Ships *James C. Stevenson*, *General Caulfield*, and *Athene* have arrived with altogether 2,958 casks, Cement. or about 523 tons of Portland cement.

The two latter ships have not yet been unloaded.

15. Reference is made in the report for May to the accumulation of sand on the south side of the pier and to the encroachment of the sea on the line of Alteration of Coast Line.

coast to the northward of the pier, I now beg to submit, for the information of His Grace the Governor in Council, a plan with sections, somewhat incomplete it is true owing to my not having sufficient assistance, showing these alterations from the original state of things. It will be seen that the accumulation of sand extends in a gradually thinning out angle to a point even so far distant as 750 feet to the south of the iron pier, or 2,550 feet to the south of our pier; but, as already mentioned, it is considered, if the southern pier is not projected too quickly, the greater part of this sand will be swept away under the influence of the north-east monsoon. From our having advanced the pier into deeper water, this accumulation of sand has been during the past month added to at a much slower rate than in previous months. It will also be seen from the same plan that the encroachment of the sea extends to a point as far north as 3,600 feet from our pier, which in like manner it is conjectured will be made up by the north-east monsoon. I have taken a few observations of the currents in the neighbourhood of the proposed harbour, and I find that with floats started from the iron pier, the velocities of the currents towards the north have been about half a mile an hour, and that the direction has tended rather away from the shore line; for instance a sunken float started at the iron pier about 200 feet further out to sea than our stone pier drifted first of all a little towards the shore, passed our stone pier, about 200 feet from the end of it, and then gradually went out to sea. It is possible some spin is given to the particles of water by the projection of our pier so as to induce them to run towards the shore on the north side; but I cannot help thinking from observations mentioned in my last report of a similar encroachment at St. Thomé, that had our pier never been projected, some encroachment would have nevertheless taken place in the neighbourhood of Royapooram and Cassemode, for it is difficult to believe that our pier extending out some 700 feet from the shore line could effect a point so far distant to the north as the encroachment of the sea is felt. My observations on the currents, however, have not yet been sufficiently extended to enable one to offer a decided opinion, or to make it worth while to plot them on the above-mentioned plan.

16. Before the issue of G.O., No. 1,492, of the 15th June 1876, directing the Railway Authorities to protect their own property, and the Presidency District Engineer to secure and extend existing groynes, a meeting took place between Mr. Burrows, President of the Municipal Commission, Colonel Farewell, Deputy Chief Engineer, and myself, when it was arranged that with regard to a certain portion of the North Beach Road at Royapooram which was in immediate danger from the encroachment of the sea, that I should undertake the work and leave to future

agreement as to who should bear the expense. I accordingly revetted the sand escarpment with sand bags, supporting them at the toe with laterite stone, and in a portion where the sand was more sloping, I constructed a "mattress" of facine work similar to the manner in which the Hollanders have reclaimed and protected nearly the whole of their country from the sea. The whole length, 290 feet, has been done at a cost of Rupees 590, and I believe that portion done with facine work is the cheaper and perhaps, if taken care of and completed, will prove the more effectual. As directed in the above Government Order, I have now given up charge of these protection works.

17. The amount of money spent during the month, compared to the previous month, and also compared to the red figures to the estimated cost, is shown in the following table:—

Heads of Estimate.	Cost for May 1876.	Cost for June 1876.	Total Cost to end of June 1876.	Estimated Cost by new Estimate.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Detailed survey ...	131 2 0	39 8 0	688 10 7	5,000 0 0
Railways, &c. ...	742 2 5	5,230 8 5	37,873 0 0	100,000 0 0
Opening quarries ...	...	105 0 0	1,875 14 1	10,000 0 0
Preparing block ground ...	483 10 2	6,433 5 7	7,897 9 4	65,000 0 0
Rubble stone deposits to North Pier ...	16,403 11 5	20,156 7 7	84,091 3 0	Per ton 1 8 0
Concrete blocks ...	732 9 10	...	732 9 10	12,07,000 0 0
Rubble under extra estimate ...	...	611 13 9	611 13 9	100,000 0 0
Buildings ...	228 2 0	904 5 4	8,271 0 1	75,000 0 0
Locomotive engines ...	124 5 2	20 2 0	714 9 3	60,000 0 0
Rolling stock ...	373 11 5	294 13 6	2,452 12 11	35,000 0 0
Floating plant ...	1,250 0 0	2,084 9 11	3,334 9 11	1,45,000 0 0
Engines, cranes, &c. ...	1,367 2 2	4,139 9 3	27,283 3 2	1,25,000 0 0
Quarry and general tools.	826 0 6	197 14 9	4,852 2 3	50,000 0 0
Buoys and beacons ...	133 0 0	...	551 5 7	3,000 0 0
Office furniture ...	...	69 13 0	647 13 0	2,000 0 0
Salaries ...	3,421 11 7	5,080 13 3	34,707 1 5	2,12,800 0 0
Office contingencies ...	118 14 7	23 13 11	578 11 6	8,800 0 0
Travelling allowances ...	173 8 1	170 0 0	3,363 13 1	20,000 0 0
Contingencies at 5 per cent.	...	181 9 0	8,759 15 0	2,12,800 0 0
Total ...	30,509 11 4	45,744 3 3	2,29,392 13 9	

18. In conclusion, I may mention that the Harbour Works Office has been opened exactly one year; quarrying operations were commenced on 12th July 1875, and the first ton of stone deposited in the sea on the 3rd August following.

No. 264-A. From Colonel W. T. F. FAREWELL, Officiating Deputy Chief Engineer, to Major-General G. W. WALKER, R.E., Secretary to Government, Public Works Department, dated Fort St. George, 5th July 1876.

In submitting the Progress Report of the Madras Harbour Works for the month of June, I have the honor to state that, in company with the Officiating Superintendent, I inspected the works once weekly; and on the 20th of June I also inspected the

Ambatoor laterite quarries and the proposed new level siding extension of railways, &c. I drew the attention of the Officiating Superintendent to the necessity of a more systematic mode of working the quarries being adopted.

2. The damage done to the pier during the past month appears to me to be greater than that heretofore reported, that is, a large quantity of rubble has been swept north of the line of the pier on occasions of heavy surf, which, though the pier has been advanced 700 feet in a straight line from the shore, still breaks in front of it.

3. In the concrete block ground a good deal of machinery has been fitted up, and a considerable amount of brick work has been carried out during the month; the Goliath railways, concrete block platforms, and concrete factory are well advanced; though most of the work is excellent, I pointed out to the Officiating Superintendent that some of the mortar was not as good as it should be.

4. The subject of contracts has been fully dealt with in the Superintendent's report, and the addition to the establishment of the works is also noted.

5. In regard to the Officiating Superintendent's experiments on the coast current, &c., I would remark that, until correct diurnal tide-registers have been obtained, and a coincident series of current observations taken, no really reliable conclusion can be arrived at.

6. The general state of the weather in June has been remarkably fine; the velocity of the wind and current from the south has decreased considerably; consequently but little additional sand has accumulated south of the pier, and, for the same reason, the encroachment of the sea north of the pier has caused no anxiety; now and then, during spring tides with a high surf, the tendency to erosion has shown itself, but the temporary measures taken to arrest anything like dangerous encroachment of the sea, have answered their purpose well, and now the District Engineer of the Presidency has as directed taken the necessary protective work in hand, and is making up the shore ends of the groynes where they had sunk and threatened to be out-flanked, &c.

7. I think it of great importance that the manufacture of concrete blocks should be commenced as soon as possible, in order that the rubble pier may be well faced before the north-east monsoon sets in, and therefore it is very desirable that the quarries at Tritany or Chinnamapett should be made available as early as practicable, as, until they are, no blocks can be made.

No. 265. ORDER THEREON, 18th July 1876, No. 1,802.

CIVIL WORKS, No. 20.

THE extension of the northern surf bank has amounted to 75 feet in length in this month, as against 115 feet in May, with only 500 tons less of rubble stone deposited. The disproportion would appear due more to action of the surf in dispersion of the rubble slopes than to the greater height of bank to be constructed. And, considering that there remain 150 feet in length to be run out, which at present rate of deposit would take at least three months to complete, it is not evident why the Officiating Harbour Superintendent should desire to check the supply of material from Ambatoor quarries. His Grace

the Governor in Council cannot agree with him that the pier is now advancing too quickly; nor does he understand what is meant by a pier abutment, now for the first time mentioned. The Officiating Harbour Superintendent will take care on no account to deviate from Mr. Parkes' design in any particular without his written instructions, and he will report at once the nature of any authorized deviations for the information of Government. No doubt arrangements have to be made for enabling the Hopper Barges to be filled, and it would be well to let the Government know the details of the arrangement sanctioned by Mr. Parkes.

2. It is observed with dissatisfaction that reports on the working of the Ambatoor quarries, on the line of beach railway, and on the probable date of commencing the northern surf bank, have not yet been furnished. His Excellency the Governor in Council wishes to know how the Harbour Superintendent proposes to lay out his sidings at Ambatoor, and arrange with his Contractors, for supply of laterite rubble at the rate of 1,500 instead of less than 600 tons as at present. And what is the line on which it is proposed to lay down the beach railway. The supply of this information has nothing to do with inquiries of the Railway Company, or of the President of the Municipal Commission; references to whom have been stated to have caused delay. It is requested therefore that the proposals of the Officiating Harbour Superintendent on both points may be forthwith made known to the Government. Also that he will submit, with the least possible delay, the forms of tender for delivery of granite stone from Tritany or Chinnamapett agreed on with the Government Solicitor. Forms of tender for supply of cement manufactured in India should likewise be submitted.

3. The Officiating Harbour Superintendent will be so good as to represent the progress of the pier works consecutively on the same plan and section; which will be returned for the purpose of having the monthly extensions and deposits delineated thereon.

(True Extract.)

Colonel,
Offg. Under Secy. to Govt., P.W.D.

To the Superintendent, Madras Harbour Works, with Plan and Section (1) and (2.)
„ Marine Department.

Exd. E. C. Shunker.

Spare Copies

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List of Plans that accompany
this Report.

- These
Plans
are
1. General Plan showing Progress of Works on Block Ground and North Pier.
 2. Longitudinal and Cross Sections showing advancement made in North Pier Surf Bank.
 3. Plan of Coast Line (Scale 100 feet to an inch) showing encroachment of the sea to the North, and accumulation of sand to the South, of the North Pier.
 4. Section showing encroachment of the sea to the North of the Pier.
 5. Sections showing accumulation of sand to the South of the Pier.

Note. The positions of the Sections on these two sheets are shown on the Plan of the Coast Line. -

R. B. B.

No 1

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From

The Offg. Superintendent,
Madras Harbour Works.

To

The Secretary to Government,
Public Works Department,
Fort St. George.

Madras, 30th June 1876

Sir,

I have the honour to submit the following Report on the works of the Madras Harbour for the month of June 1876. -

2. The Surf Bank has been projected for a further length of 75 Feet making a total length of 925 Feet from the point of origin in line with the telegraph poles along the Beach Road. Laterite stone to an amount of 15,232 Tons has been deposited during the month making a total quantity of stone deposited in this embankment altogether of about 63,342 Tons, without taking into account that deposited last year in the Bank &c.

S. G. 4765/76

For

North Pier

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We have generally deposited during the month 25 waggon-loads of stone per day, but the Pier is now advancing too quickly, and in consequence of the delay that has been caused in procuring

suitable stone for concrete-making, we have no blocks ready for making the abutment of the Pier, and I am obliged to give orders that next month the rate of progress and disposition of stone shall be reduced. - I dare not stop, or an unfinished end would be exposed to action of the surf, damaged, and perhaps a deep hole scooped out in front by the current; and I dare not go on too quickly before we are ready with preparations to form the abutment.

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The Ambatoor Quarries have been inspected by me more than once during the month; the railway sidings there have been extended four chains; a separate report will follow on this subject.

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With the assistance of Captain J. H. Taylor, Master Attendant, I engaged for each of the Steam Barges lately arrived, a crew of one Syrang, one Tindal, one Bindary, and six Lascars from Locanada. The late Chief Mate of the "Robert", Mr. Ferdinand Delgott still remains in charge of her; but as I implied in my Letter No 23 W, of 31st May, the Mate of the "Salisbury" did not prove sufficiently trustworthy, I was obliged to discharge him; and I have placed Captain Robson, a gentleman recommended to me by Captain Taylor in charge of her instead. As directed

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in Government Order, No 1493 dated 15th June, I have since given up the entire control of, and responsibility for these Steam Barges to the Master Attendant of the Port of Madras. I have been requested to report whether these vessels are insured and I am now in a position to state that they are not. - Mr. Parker who is my informant adds:-

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been laid down during the past month. This portion is shown on the general Plan in full red lines tinted pink, the portion constructed last month being tinted in faint Indian ink: the dotted red lines on the Plan show the work as it will be eventually laid out, the Goliath roads and part of the Railways are already extended some little distance, but it is difficult to show them distinctly on the Plan. —

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The erection of one of the large cranes received from Furrachee is finished except the fitting of a few pipes that had to be ordered from Bombay to replace worn ones. The putting together of the Titan crane is commenced, and the erection on the Block ground of a light sort of treble Travelling crane, which arrived from England in the "Sea Gull" last month is nearly completed. This Trinity Traveller is, as it were three cranes in one and was designed by Mr. Parkes specially for these works; it is to be employed for lifting the small "ships" of concrete containing about $\frac{1}{3}$ of a yard each after they are brought down the side railway from the concrete mixing machines carrying them over the tops of the concrete Block moulds and depositing the contents of the

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Contract.

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and I knew that for so much larger
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(10).

Dondu

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Staff

Our Staff has been increased this month by the arrival of Mr. William Allen, Foreman Diver, who landed from the "Hydaspes" on June 6th. His salary is Rs. 220, with free quarters. Mr. George Lowe, Junior, will be his Assistant. The "Hydaspes" also brought an air-pump

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and Diving Dresses for two men. In the interval that will elapse before we are ready to commence the rubble base, I propose to employ this man in making an Examination of the bed of the sea, on the line of the Pier. -

During the month, the ships "James C. Stevenson", "General Fairfield", "this" and "Athene" have arrived with altogether 2958 keels or about 523 tons of Portland cement. The two latter ships have not yet been unloaded.

Reference is made in the Report for May to the accumulation of sand on the South side of the Pier and to the encroachment of the sea on the line of coast to the northward of the Pier. I now beg to submit for the information of His Grace the Governor in Council, a Plan with Sections, somewhat incomplete it is true, owing to my not having sufficient assistance, shewing these alterations from the original state.

(12)

7

bequests

Alteration of Coast Line

of things. It will be seen that the accumulation of sand extends in a gradually thinning out angle to a point even so far distant as 750 Feet to the South of the Iron Pier or 2550 Feet to the South of our Pier, but as already mentioned it is considered, if the Southern Pier is not projected too quickly, the greater part of this sand will be swept away under the influence of the North East Monsoon. From our having advanced the Pier into deeper water, this accumulation of sand, has been during the past month added to, at a much slower rate than in previous months. It will also be seen from the same Plan that the encroachment of the sea extends to a point as far North as 3600 Feet from our Pier, which in like manner, it is conjectured will be made up by the North East Monsoon. I have taken a few observations

of the currents in the neighbourhood of the the
proposed Harbour, and I find that with tide
floats started from the Iron Pier, the pier
velocities of the currents towards the North
have been about half a mile an hour to
and that the direction has tended
rather away from the shore line; for
instance a sunken float started at the
Iron Pier about 200 feet further out
out to sea than our stone Pier drifted
first of all a little towards the shore
passed our stone Pier, about 200 feet
from the end of it, and then gradually
went out to sea. It is possible some
spin is given to the particles of water
by the projection of our Pier so as to
induce them to run towards the shore
on the North side, but I cannot help
thinking from observations mentioned
in my last Report of a similar encroach-
ment at St. Thome, that had our Pier
never been projected, some encroachment
(14) would

would have nevertheless taken place in the neighbourhood of Royapuram and Sassemore, for it is difficult to believe that our Pier extending out some 700 Feet from the shore line could effect a point so far distant to the North as the encroachment of the sea is felt. My observations on the currents however, have not yet been sufficiently extended to enable one to offer a decided opinion or to make it worthwhile to plot them on the above mentioned Plan.

Before the issue of G.O. No. 1492 of the 15th June 1876, directing the Railway Authorities to protect their own property, and the Presidency District Engineer to secure and extend existing groynes, a Meeting took place between Mr. Burrows, President of the Municipal Commission, Colonel Farewell, Deputy Chief Engineer, and myself, when it was arranged that with regard

to a certain portion of the North Beach Road at Royapuram which was in immediate danger from the encroachment of the sea, that I should undertake the work and leave to future agreement as to who should bear the expense. I accordingly revetted the sand escarpment with sand bags, supporting them at the toe with Laterite stone and in a portion where the sand was more sloping, I constructed a "mattress" of fascine work, similar to the manner in which the Hollanders have reclaimed and protected nearly the whole of their country from the sea.

The whole length 290 Feet has been done at a cost of \$590, and I believe that portion done with facings work is the cheaper and perhaps if taken care of and completed will prove ^{to} more effectual.

As directed in the above G. O. I have
now given up charge of these protection
works. -

Expenditure

The amount of money spent during the month, compared to the previous month, and also compared to the red figures to the Estimated cost is shown in the following Table:-

Head of Estimate	Cost for May 1876	Cost for June 1876	Total cost to June 1876	Estimated
Detailed Survey	131 2	395	526 107	5000
Railways &c	4712 25	5230 85	9943	12000
Opening Quarries	"	105	105 141	12000
Preparing Block Ground	483 10	2643 57	3126 67	6200
Mobile Stone deposits to North Pier	16403 11	52056 77	68459 88	13000
Concrete Blocks	732 9	"	732 9	10000
Mobile under Extra Estimate	"	611 13	611 13	"
Buildings	228 2	501 54	729 76	7500
Locomotive Engines	124 52	20 2	144 54	1500
Rolling Stock	373 11	5194 13	5567 24	35000
Floating Plant	1250	2084 9	3334 9	15000
Engines Cranes &c	1367 22	4439 93	5806 15	1500
Quarry and General Tools	826 06	197 14	1023 20	3000
Buoys and Beacons	153	"	153	3000
Office Furniture	"	69 13	69 13	"
Salaries	3421 11	7508 13	10929 24	8000
Office Contingencies	115 14	7 23	122 37	1000
Travelling Allowances	173 81	170	343 81	1000
Contingencies at 5 per cent	"	181 9	181 9	"

30507 11 445714 33 22972 13 9

[Faint, mostly illegible handwritten text, possibly bleed-through from the reverse side of the page.]

In conclusion I may mention
 that the Harbour Works Office has
 been opened exactly one year; quarrying
 operations were commenced on 12th July
 1875, and the first ton of stone deposited
 in the sea on the 3rd August following.

I have the honour to be,
 Sir
 Your most obedient servant
 Nathl. B. Beardmore
 Offg Superintendent
 Madras Harbour Works

1876 Department

1876

From
The Off^r Superintendent
of Madras Harbour
Works

Dated 30th June
Received 5th July } 1876

Encls. to 18-88 W.

Submitting Report
on the Madras Harbour Works
for the month of June 1876.

N^o 264

gi-11.7.36 Ptd 18-7-76
Dep't to 18-5-76

W. L.
From

Colonel R. Fairbairn

Off^r: Dy Chief Engineer.

To The Secretary to Govt
Public Works Deptt

Sir,
In compliance with the pro-
gress Report of the Madras
Harbour Works for the month
of June, I have the honor to
state that, in company with the
Officiating Superintendent, I
inspected the works once weekly
and, on the 20th of June I
also inspected the Ambatour
Waterworks, and the pro-
posed new level sidings, extension
of Railway &c &c. I
draw the attention of the
Superintendent to the necessity
of a more systematic mode of

working the quarries being
adopted.

2. The damage done to the
Pier during the past month
appears to me to be greater than that
heretofore reported - that is, a
large quantity of rubble has
been swept north of the line
of the Pier on occasions of
heavy surf, which, though the
Pier has been advanced 700
feet in a straight line from
the shore, still breaks in front
of it.

3. In the concrete block
ground a good deal of machinery
has been fitted up, and a
considerable amount of brick
work has been carried out
during the month, the

Goliath Railways, concrete
block platforms, and concrete
factory are well advanced; -
though most of the work is
excellent, I pointed out to the
Officiating Superintendent that
some of the mortar was not
as good as it should be.

4. The subject of Contracts
has been fully dealt with in
the Superintendent's Report, and
the addition to the Establishment
of the works is also noted.

5. In regards to the
Superintendent's experiments
on the coast current year
I would remark that, until
correct diurnal tide-registers
have been obtained, and a
coincident series of current
observations

observations taken, no really reliable conclusion can be arrived at -

6 The general state of the weather in June has been remarkably fine; the velocity of the wind and current from the South has decreased considerably; consequently but little additional sand has accumulated South of the Pier, and, for the same reason, the encroachment of the sea north of the Pier has caused no anxiety, - now and then, during spring tides with a high surf, the tendency to erosion has shown itself, but the time for any measures taken to correct

536 22
arrest any thing like dangerous encroachment of the ^{at} sea, have answered their purpose well, and now, the District Engineer of the Presidency has, as directed, taken the necessary protective work in hand, and is making up the shore-ends of the ^{at} groynes where they had sunk, and threatened to be outflanked. ^{yes yes} I think it of great importance that the manufacture of concrete blocks should be commenced as soon as possible, in order that the rubble pier may be well faced before the North East monsoon sets in, and therefore it is very

re desirable that the quarries at
 Tritany or Chinnamapett
 should be made available as
 early as practicable, as, until
 as they are, no blocks can be
 h. m. b. e.

I have the honor to be,
 Sir

your most Obedt Servt

Wm. M. Coll

Frederick Dy. Chief
 Engineer F. M. D.

Fort St. George
 5th July 1876

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8015-6-76 No 1492
Progress report

L. H. 1876 Department
No. 14775

From
Colonel H. Harwell
Off. Chief Eng. D.P.G.

Dated 5th July
Received 5th July } 1876.

Submitting Progress
Report of the Madras Harbour
Works for the month of June
1876.

No 261a.

Recd 11.7.76 Pte 18.7.76
Despatched 5-7-76

574 21
No. 1802.
Public Works Department.
PROCEEDINGS of the MADRAS GOVERNMENT.

Under date the 18th July/76.
Read the following:—

From
The Offg. Supt. Madras
Harbour Works. } Vol. No. 38 W. 29 30th June 1876
" Deputy Chief Eng. P.W.D. () 4th 5th July—

The extension of the
Northern Surf Bank has
amounted to 75 feet in
length in this month, as
against 115 feet in May,
with only 500 Tons less of
Rubble Stone deposited.
The disproportion would
appear due more to action
of the surf in dispersion
of the rubble slopes, than
to the greater height of
bank to be constructed. And

considering that there remain
150 feet in length to be run
out, which at present rate
of deposit would take at
least 3 months to complete,
it is not evident why the
Officiating Harbour Superin-
tendent should desire to
check the supply of material
from Ambator Quarries.
His Grace the Governor in
Council cannot agree with
him that the Pier is now
advancing too quickly; nor
does he understand what is
meant by a Pier Abutment,
now for the first time
mentioned. The Officiating
Harbour Superintendent
will take care on no account
to deviate from Mr. Parker's
design in any particular,

2000 ft. of
material
will be
required
for the
pier

without his or Mr. May's
written instructions; and he still
will report at once the nature &
of any authorized deviations
for the information of Govt.
No doubt arrangements will
have to be made for enabling the
Hopper Barges to be
filled from the end of the
Northern Surf Bank; and
it would be well to let
the Govt. know the details
of the arrangement sanc-
tioned by Mr. Parker.
2. It is observed with
dissatisfaction that reports
on the working of the Amba-
tor Quarries on the line
of Beach Railway, and
on the probable date of
commencing the Northern
Surf Bank, have not yet

been furnished. His Excellency the Governor in Council wishes to know how the Harbour Superintendent proposes to lay out his sidings at Ambatour, and arrange with his Contractors for supply of Laterite Rubble at the rate of 1500 instead of less than 600 tons as at present, when the Beach Railway shall have been completed. And what is the line on which it is proposed to lay down that Railway. The supply of this information has nothing to do with inquiries of the Railway Company, or of the President of the Municipal Commission, references to whom

The above
to be sent to
the Board of
Public Works -

submit with the
and papers delay

It is also stated that
the works at Ambatour
will be completed
by the end of the year
and the pier works
will be completed
by the end of the year

have been stated to have caused delay. It is requested therefore that the proposals of the Officiating Harbour Superintendent on both points may be made known to the Govt. (at once). Also that he will expedite the submission of the forms of Tender for delivery of Granite Stone at Chinna-mappett agreed on with the Govt. Solicitor. Forms of Tender for supply of Cement manufactured in India, will likewise be submitted.

3. The Officiating Harbour Superintendent will be so good as to represent the progress of the Pier works consecutively on the same

Plan and Section; which
will be returned for the
purpose of having the monthly
extensions and deposits
delineated thereon.

1877

N^o 264/5

Sept. to H. W. W. with plan
and section (11+12) ✓
Maine Sept. ✓ Oct. 29/7/76

ms dep. to H. W. W. with
enclos. (2 enclos. 18/7)

Encl.

4775 of 4760

Gobt. of 1876 Madras.
PUBLIC WORKS.

To

The Capt Madras Harbour
Works

Dated

Issued

Recd

Encl.

W. J. S. / 20-7-76

G. O. 18th July 1876, No. 1802

Nos. 264-265

Madras Harbour
Works - Passing
orders on the Report
of progress of the —
for the month of
June 1876 -

6th in Def. 31-7-76

5 plans for scheme for dry