

C. No. 632

Dist. of [18] Madras.
PUBLIC WORKS.

Go. 612-13 of 9. 9. 96.

Dated

Recd.

Encl.

G.O. 15 June 1896 No. 62627

Madras Harbour Works.

Ordered that the Progress
Report of the — for the quarter
ending 31 March 1896, be
forwarded for the information
of the Secretary of State
and the Govt. of India

Forwarding for information
the Progress Report
— for the quarter ending
March 1896 with a
return showing progress and
present state of the work

present state of the
work.

of this Govt. giving
a return of the

GOVERNMENT OF MADRAS.

MARINE DEPARTMENT.

READ—the following paper :—

From W. AUSTIN, Esq., I.C.S., Chairman, Harbour Trust Board, Madras, to the Joint Secretary to Government, Marine Department, dated 2nd June 1896, No. 879.

I have the honour to submit herewith, for the information of Government, a report from the Board's Engineer upon the progress made in the reconstruction of the harbour during the quarter ending 31st March 1896.

ENCLOSURES.

EXTRACT of Proceedings of the Trustees of the Harbour of Madras, at a meeting held at the offices of the Board on Friday the 22nd day of May 1896.

4. Read progress report of the Board's Engineer, upon the reconstruction of the harbour, for the quarter ending 31st March 1896.

Read minutes by Trustees.

Resolved that this report be submitted to Government. The Chairman is invited to address Government with reference to paragraph 26 of the report.

(True Extract.)

(Signed) S. HUTCHENCE,
Acting Secretary.

REPORT of progress on the Madras Harbour Works for the quarter ending 31st March 1896.

Accompanying this report are the following plans and statements :—

43. A plan of the harbour to a scale of 200 feet to an inch, showing in red the position and quantity of the work done during the quarter. The contours in half fathoms, shown on this plan in black lines inside the harbour, are those of the latest marine survey made in 1895. The contour lines outside the harbour in blue, are those of the survey of 1893.

2. The position of the high water marks of 31st March 1896, and that of the previous three months both to the north of the revetment and the south of the harbour, are shown for comparison.

44 (c). A statement comparing the expenditure on different sub-heads.

44 (d). A statement showing work done under different sub-heads, and particulars of cement received and issued.

3. *North Pier capping.*—During the quarter the north pier capping was extended towards shore by 374 feet 6 inches, which complete a total length of 3,522½ lineal feet of the north pier, to the sanctioned design, measured from the pier head.

4. This length of capping formed of 15 blocks of concrete built *in situ*, averaging 24 feet in length × 24' wide × 2½' deep at the shore end, which was equal to 782½ cubic yards of concrete, placed in position during the quarter.

5. Hard wood sleepers have been built into the capping throughout its length, for a line of rails to be laid upon it as soon as the capping reaches shore, and a recess has been left in the capping for the transfer of the bulk-oil discharge pipe from its temporary position to the top of the capping.

6. *South Pier capping.*—During the quarter, the south pier capping was extended towards shore by 369½ lineal feet, which completed a total length of 2,452½ lineal feet of the south pier, to the sanctioned design, measured from the pier head.

7. This length of capping was formed of 16 blocks of concrete built *in situ*, averaging 24 feet in length × 24 feet wide × 4½ feet deep, which was equal to 1,412½ cubic yards of concrete placed in position during the quarter.

8. Hard wood sleepers have also been built into the capping throughout its length, for a line of rails to be laid upon it as soon as the capping is completed.

9. *Pallavaram quarries and Concrete-making machinery.*—The total outturn of concrete made for the capping and other works during the quarter was 2,061 cubic yards; and the outturn of blasted chips received from the Pallavaram quarries during the quarter amounted to 3,910 tons.

10. *Summary of Progress.*—The following statement is the summary of progress made on the Harbour works during the quarter under review.

11. *Supply of Portland cement.*—The S.S. *Simla* arrived with 500 casks of Portland cement, containing

S.S. <i>Manora</i>	do.	do.	...	...	...	Tons.	89-5-2-24		
S.S. <i>Bengal</i>	do.	do.	...	...	...	600 casks	107-2-3-12		
Balance in store from former shipments			...	...	...	500 do.	89-5-2-24		
Quantity due on indent			...	...	...	...	213-2-2-8		
			...	...	...	...	314-5-2-24		

12. The balance of cement in store on the 31st March 1896 was Tons 144-19-3-16.

13. The issue of cement during the quarter ending 31st March was 1,981½ casks, containing Tons 353-16-3-24.

14. *Expenditure.*—The expenditure upon the works during the quarter was Rs. 62,640, including establishment, &c., and the quarter closed with a balance upon the revised estimate of Rs. 87,813 including materials, cement and stores, already upon the works on the 31st March 1896.

15. *High Water mark north of Harbour.*—No settlement along the line of revetment could be detected, and the seas striking it during the quarter were exceptionally light.

16. The bay at the end of the revetment continued to fill in during the quarter, and the high water line of 31st December 1895 had advanced 70 feet east by the 31st March 1896, but its position at that date showed a net loss of 100 feet of foreshore in the 12 months ending 31st March 1896.

17. *Sea bottom within the Harbour.*—The high water mark inside the harbour during the quarter remained in about the same position along the northern half of the harbour.

18. At the southern half of the harbour the high water mark advanced seawards by 30 feet at the south pier and about 20 feet on the south side of the iron pier, while between the iron pier and the south pier there was an advance of the water line of 40 feet during the quarter.

19. The depth inside the harbour remained the same, but further soundings across the entrance showed a shallowing of about 2 inches in the centre of the entrance during the quarter, and only a deepening of 6 and 7 inches near the caissons, whereas the entrance should have deepened considerably during the monsoon.

20. The net shallowing at the entrance has therefore been a loss in depth of 3 feet 2 inches in the year 1895-96.

21. *Foreshore south of Harbour.*—The high water mark close to the south pier has advanced by 25 feet during the quarter, but from 500 feet south of the south arm to as far as the Municipal drain at 3,450 feet south, the shore line has remained in the same position.

22. From this point southwards, there has been a considerable accretion or advance of the shore line during the quarter, as follows:—

HIGH WATER MARK OF 31ST MARCH 1896.

At ¼ mile south of harbour, was 25' in advance, or east of the H.W.L. of 31st Dec. 1895.

1	"	"	60'	"	"	"	"	"
1½	"	"	30'	"	"	"	"	"
1½	"	"	20'	"	"	"	"	"
1½	"	"	80'	"	"	"	"	"
2	miles	"	80'	"	"	"	"	"
2½	"	"	45'	"	"	"	"	"
2½	"	"	50'	"	"	"	"	"

23. *Moorings.*—Twenty-two mooring screws were put down during the quarter, two of which were outside the harbour; and five new moorings were completed and handed over to the Harbour Masters.

24. Seven old buoys were removed and repaired and five old moorings were raised and brought ashore.

25. There was much delay to the work due to the raft being required for landing boilers and other purposes, &c., and considerable difficulty was experienced in drawing the shackle pins which had become rusted in for years; there were therefore only 17 days in March, when the new moorings could be proceeded with, and in this time three moorings were completed, and 14 screws put down in 14 consecutive days. Such rapid progress was impossible with the old system of screwing moorings, and none could be put down in the open roadstead by any process until the present one was devised.

26. The complete system of screw moorings and the Madras Harbour to the sanctioned design, has this day been completed; and I therefore trust the subject of G.O. No. 350 M., dated 25th November 1895, may now be considered, and Government addressed accordingly.

27. *Miscellaneous.*—The usual repairs and the upkeep of all machinery, cranes, railway lines, &c., and haulage of coal and oil traffic was done by the Harbour Works for the Traffic Department as usual.

MADRAS,
9th May 1896.

(Signed) A. LEE-POGSON,
Engineer, Harbour Trust Board.

MADRAS HARBOUR WORKS.

PROGRESS STATEMENT No. 44 (d).

STATEMENT showing Progress during quarter ending 31st March 1896 as shown on the accompanying Lithographed Plan No. 43.

Item Number.	Particulars and quantity of work done during quarter ending 31st March 1896.	Sub-head works.	North pier concrete capping.	South pier concrete capping.	Pallavaram quarries outturn.	Concrete made at mixing station.	Railway lines.	Total expenditure during quarter.
		Column.	A	B	C	D	E	F
1	Total quantity blasted chips received on works	..	..	..	3,910	..	..	..
2	Concrete blocks made <i>in situ</i>	..	15	16	..	..	..	..
3	Total outturn of concrete	..	782½	1,412½	..	2,061½	..	..
4	Advance or progress of completed work	..	374½	369½	..	..	..	..
5	Broad gauge line taken up	..	374½	369½	..	..	..	..
6	Titan line taken up	..	374½	369½	..	..	..	..
7	Broad gauge line laid on pier	..	3,770½	..	..	..	..	..
8	Approximate expenditure under sub-heads of works	..	720	1,354	5,300	29,176	..	36,550

		Tons.	Cwt.	Qrs.	lb.		Tons.	Cwt.	Qrs.	lb.
1,600	Casks of cement received on works during quarter ending 31st March 1896	285	14	1	4	Quantity due on indents	314	5	2	24
1,981½	Casks of cement issued for works during quarter ending 31st March 1896	353	16	3	24					
	Balance in store at the end of quarter	144	19	3	16					

MADRAS,
9th May 1896.

(Signed) A. LEE-POGSON,
Engineer, Harbour Trust Board.

COMPARISON of expenditure to date with sanctioned estimate for the quarter ending 31st March 1896, Madras Harbour Works.

4

No. 426, MARINE, 15TH JUNE 1896.

Sub-head of work.	As per estimate sanctioned in Secretary of State's Despatch, No. 41, dated 26th September 1895—vide G.O., No. 2817 W., dated 6th November 1895.						As executed.					Arrears not paid.	Value of work done up to date, columns 11 and 12.
	Quantity.	Rate.	Per.	Cost.	Total.	Quantity.	Rate.	Expenditure.					
								Total up to end of last quarter.	During the quarter.	Up to date.			
1	2	3	4	5	6	7	8	9	10	11	12	13	
<i>Expenditure up to 31st Dec. 1884.</i>													
1. Works ..	..	..	..	55,09,324	..	..	..	55,09,324 8 10	..	55,09,324 8 10	..	55,09,324 8 10	
2. Establishment ..	..	..	..	5,29,904	..	..	..	5,29,904 0 0	..	5,29,904 0 0	..	5,29,904 0 0	
3. Tools and plant ..	..	..	..	5,15,262	..	..	..	5,15,262 6 0	..	5,15,262 6 0	..	5,15,262 6 0	
Total ..	..	..	..	..	65,54,490	..	..	65,54,490 14 10	..	65,54,490 14 10	..	65,54,490 14 10	
<i>Revised Estimate.</i>													
4. Alteration and extension of block ground ..	..	..	..	5,892	..	..	..	5,892 0 11	..	5,892 0 11	..	5,892 0 11	
<i>North Pier.</i>													
5. Ordinary rubble deposited from breakwater ..	13,930	1 12 0	Ton	24,378	..	13,930	1 12 0	24,377 9 0	..	24,377 9 0	..	24,377 9 0	
6. Ordinary rubble deposited from boats ..	205,896	2 0 5	"	4,19,218	..	205,477	2 0 8	4,15,132 8 10	3,578 8 1	4,18,711 0 11	718 11 11	4,19,429 12 10	
7. Concrete blocks for building ..	51,320	11 8 0	C. yd.	5,90,110	..	51,320	11 8 0	5,90,110 0 0	..	5,90,110 0 0	..	5,90,110 0 0	
8. Setting blocks at commencement of new work ..	2,615	2 1 1	"	5,415	..	2,615	2 1 1	5,414 11 2	..	5,414 11 2	..	5,414 11 2	
9. Setting blocks from 2,200 to 3,600 feet ..	36,520	2 14 3	"	1,05,569	..	36,520	2 14 3	1,05,569 0 0	..	1,05,569 0 0	..	1,05,569 0 0	
10. Setting blocks at pier head ..	12,185	9 8 11	"	1,16,424	..	12,185	9 8 10	1,16,415 4 0	..	1,16,415 4 0	..	1,16,415 4 0	
11. Concrete in mass for filling ..	263	4 8 3	"	1,188	..	263	4 8 3	1,188 0 7	..	1,188 0 7	..	1,188 0 7	
12. Wave-breaker blocks ..	288	9 5 7	"	2,692	..	288	9 5 7	2,692 0 0	..	2,692 0 0	..	2,692 0 0	
13. Do concrete ..	77,355	10 14 11	"	8,45,591	..	69,863	12 1 8	8,45,459 12 4	..	8,45,459 12 4	..	8,45,459 12 4	
14. Depositing concrete blocks ..	77,932	1 0 0	"	77,928	..	70,457	1 1 8	77,918 8 4	..	77,918 8 4	9 7 8	77,928 0 0	
15. Concrete in protection to rubble base ..	1,986	12 2 8	"	24,158	..	2,029	10 5 0	20,927 6 7	..	20,927 6 7	..	20,927 6 7	
16. Cramps, iron ..	331	9 10 1	Each	3,188	..	313	10 3 0	3,188 0 0	..	3,188 0 0	..	3,188 0 0	
17. Concrete capping ..	16,352	16 4 3	C. yd.	2,65,989	..	19,327 3/4	13 11 5	2,45,791 6 9	19,091 6 0	2,64,882 12 9	145 11 0	2,65,028 7 9	
18. Cost of north pier caisson and setting in position and rilling same as items Nos. 26, 27, 33 and 34 ..	..	..	..	1,03,855	25,85,703	..	..	1,03,854 15 10	..	1,03,854 15 10	..	1,03,854 15 10	
Total ..	..	..	..	..	..	..	..	25,58,039 3 5	22,669 14 1	25,80,709 1 6	873 14 7	25,81,583 0 1	

No. 426, MARINE, 15TH JUNE 1896.

5

<i>South Pier.</i>											
19. Ordinary rubble deposited from boats ..	175,078	2 9 0	Ton	4,49,052	..	1,73,659	2 9 4	4,44,126 1 4	..	..	4,49,052 0 0
20. Large rubble deposited from breakwater ..	8,615	1 12 0	"	15,076	..	8,615	1 12 0	15,075 13 0	..	..	15,075 13 0
21. Concrete blocks for building ..	45,066	11 3 1	C. yd.	5,04,510	..	43,341 1/2	11 10 3	5,01,510 0 0	..	..	5,04,510 0 0
22. Setting blocks at commencement ..	2,556	3 1 6	"	7,912	..	2,556	3 1 6	7,911 13 3	..	..	7,911 13 3
23. Setting blocks from 2,550 to 3,700 feet ..	30,160	3 7 11	"	1,05,461	..	30,160	3 7 11	1,05,461 0 0	..	..	1,05,461 0 0
24. Setting blocks at pier head ..	12,350	11 1 3	"	1,36,845	..	12,350	11 0 10	1,36,476 5 8	..	..	1,36,476 5 8
25. Concrete in mass for filling ..	602	7 9 1	"	4,555	..	602	7 9 1	4,554 14 4	..	..	4,554 14 4
26. Concrete in cylindrical pier head ..	2,355	15 0 0	"	35,325	..	..	..	35,323 3 0	..	..	35,323 3 0
27. Concrete in filling in between coarsed block-work and caisson ..	791	15 0 0	"	11,865	..	790 1/2	15 0 4	11,865 0 0	..	..	11,865 0 0
28. Wave-breaker concrete blocks ..	47,231	11 1 6	"	5,24,070	..	42,589 1/2	12 4 7	5,23,203 11 0	..	..	5,23,203 11 0
29. Depositing concrete blocks ..	47,714	1 5 8	"	64,708	..	41,073	1 9 0	64,260 3 9	..	..	64,260 3 9
30. Concrete in protection to rubble base ..	1,700	13 4 11	"	22,620	..	1,328 1/2	13 14 2	18,460 3 6	..	..	18,460 3 6
31. Cramps, iron ..	259	11 7 7	Each	2,972	..	220 1/2	13 8 1	2,972 0 0	..	..	2,972 0 0
32. Concrete capping ..	16,247	15 12 9	C. yd.	2,56,687	..	14,511 1/2	13 4 7	1,90,564 11 8	24,491 10 11	2,257 15 7	1,92,822 11 3
33. Iron caisson ..	1	..	"	18,000	..	..	..	18,000 0 0	..	..	18,000 0 0
34. Preparing base for and setting cylindrical pier head ..	..	..	"	38,896	21,98,554	..	..	38,399 10 11	..	..	38,399 10 11
Total for South Pier ..	..	..	..	..	..	..	..	20,96,673 0 6	24,491 10 11	21,21,164 11 5	21,28,348 9 8
<i>Extending the Rubble Revetment protecting the foreshore North of Harbour.</i>											
35. Rubble stone revetment ..	70,600	2 1 0	Ton	1,45,613	..	91,051	1 8 8	1,40,093 13 2	..	..	1,40,093 13 2
36. Railway lines ..	..	..	..	9,849	1,55,462	..	..	11,665 7 10	..	..	11,665 7 10
37. Tools and plant ..	..	..	..	..	..	..	..	1,51,759 5 0	..	..	1,51,759 5 0
38. Contingencies ..	..	..	..	..	6,11,656	..	..	6,11,541 9 10	..	..	6,11,541 9 10
39. Establishment ..	..	..	..	..	2,47,970	..	..	2,29,475 12 10	132 12 5	..	2,29,608 9 3
40. Materials at site (concrete blocks in yards) ..	..	..	..	..	6,73,445	..	..	6,76,766 5 6	3,571 15 2	..	6,80,338 4 8
41. Advances to work-people ..	..	..	..	..	..	1,341 1/2	14 6 4	15,074 5 10	4,242 13 1	..	19,317 2 11
Total of estimate and value of work done ..	..	..	..	..	..	..	..	34 3 2	..	..	..
Deduct probable recoveries due to sales of tools and plant ..	..	..	..	..	64,78,682	..	..	63,29,735 10 4	62,647 10 6	16,005 5 6	64,08,388 10 4
Total ..	..	..	..	..	..	..	..	— 1,507 7 5	— 7 6 0	— 1,514 13 5	— 1,514 13 5
Total ..	..	..	..	..	61,98,018	..	..	63,28,228 2 11	62,640 4 6	63,90,868 7 5	64,08,873 12 11

Comparison of expenditure to date with sanctioned estimate for the quarter ending 31st March 1896—cont.

Sub-head of work.	As per estimate sanctioned in Secretary of State's Despatch No. 41, dated 26th September 1895—vide G.O., No. 2817 W., dated 6th November 1895.									
	Quant.	Rate.	Per.	Cost.	Total.	Quantity.	Rate.	Total up to end of last quarter.	Expenditure.	Value of work done up to date, columns 11 and 12.
	2	3	4	5	6	7	8	9	10	11
1										
Total of revised estimate sanctioned in Secretary of State's despatch, plus expenditure before 31st December 1884	..	..	..	..	1,27,52,508	..	..	1,26,82,719 1 9	62,640 4 6	1,29,45,359 6 3
Total sanctioned cost for completion of works	..	..	..	..	1,27,52,508	..	..	1,26,82,719 1 9	62,640 4 6	1,29,45,359 6 3
Add recovery on tools and plant	..	..	..	..	2,80,564	..	..	1,26,82,719 1 9	62,640 4 6	1,29,45,359 6 3
Deduct total expenditure as per column 11	..	..	..	..	..	1,30,33,172	..	1,26,82,719 1 9	62,640 4 6	1,29,45,359 6 3
Total amount available for completing works after quarter ending 31st March 1896	..	..	..	..	..	1,29,45,359	..	1,26,82,719 1 9	62,640 4 6	1,29,45,359 6 3
	..	..	..	..	..	87,813	..	1,26,82,719 1 9	62,640 4 6	1,29,45,359 6 3

REMARKS.—Expenditure up to 31st March 1895 from commencement of works
 " during current official year from 1st April 1895 to 31st March 1896
 Total outlay to 31st March 1896

MADRAS,
 14th May 1896.

(Signed) C. R. KRISHNA ROW,
 Accountant, M.H. Works Office.

(Signed) A. LEE-POGSON,
 Engineer, Harbour Trust Board.

No. 426, MARINE, 15TH JUNE 1896.

6

No. 426, MARINE, 15TH JUNE 1896.

7

ORDER—No. 426, Marine, dated 15th June 1896.

Ordered that the report be forwarded for the information of the Secretary of State and the Government of India.

[Here enter No. 427, Marine, dated 15th June 1896.]

(True Extract.)

(Signed) D. McNEIL CAMPBELL, Colonel, R.E.,
 Joint Secretary to Government.

To the Chairman, Harbour Trust Board.
 " Presidency Port Officer.

ENDORSEMENT—No. 427, Marine, dated 15th June 1896.

Copy of the above, with a plan showing progress and present state of the work, forwarded to the Government of India, Public Works Department.

(By order.)

(Signed) D. McNEIL CAMPBELL, Colonel, R.E.,
 Joint Secretary to Government.

Exd. T. K. Narayana Aiyangar,
 Spare Copies

Gobt. of {1896} Madras.
MARINE.

Dated June, 15th.

Recd.

Encl.

G.O. Nos. 426, 427, 15th June
1896.

JUNE.

Madras Harbour Works

Forwarding, for information, the progress report of the — for the quarter ending 31st March 1896, with a plan showing progress and present state of the work.

MARINE DEPARTMENT:

FROM

THE CHAIRMAN,
HARBOUR TRUST BOARD,
MADRAS,

TO

THE JOINT SECRETARY TO GOVERNMENT,
Marine Department.

DATED 2nd June 96

DESPATCHED 4th June 1896.

RECEIVED

ENCLOSURES Two Plans

No. 879

SUBJECT.

MADRAS HARBOUR.

Submitting Report upon Progress made in the reconstruction of the — for the quarter ending 31st March 1896.

LAWRENCE ASYLUM PRESS

MARINE C. No. 632
Enc 1 (Plan)
(in duplicate)

25.11.95. 350. Marine
4.2.96. 524. 1st
7.4.96. 1220. 1st

MARINE DEPARTMENT.

FROM

THE CHAIRMAN,
HARBOUR TRUST BOARD,
MADRAS,

TO

THE JOINT SECRETARY TO GOVERNMENT,
Marine Department.

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in the reconstruction of the ——— for the
quarter ending 31st March 1896.

Harbour Trust Office,

Madras, 2nd June 1896.

No. 879

From

WARE AUSTIN, Esq., I.C.S.,

CHAIRMAN, HARBOUR TRUST BOARD,

Madras,

To

THE HON'BLE Col. D. McNEIL CAMPBELL, B.E.,

JOINT SECRETARY TO GOVERNMENT,

Marine Department.

SIR,

I have the honour to submit herewith, for the information of Government, a report from the Board's Engineer upon the progress made in the reconstruction of the Harbour during the quarter ending 31st March 1896.

I have the honor to be,

Sir,

Your obedient Servant,

W. Austin

Chairman, Harbour Trust Board.

Extract of Proceedings of the Trustees of the Harbour of Madras, at a Meeting held at the Offices of the Board on Friday the 22nd day of May 1896.

4. Read Progress Report of the Board's Engineer, upon the reconstruction of the Harbour, for the quarter ending 31st March 1896.

Read minutes by Trustees.

Resolved that this report be submitted to Government. The Chairman is invited to address Government with reference to para. 26 of the report.

True Extract.

S. HUTCHENCE,

Acting Secretary.

MADRAS HARBOUR WORKS.

Report of Progress on the Madras Harbour Works for the Quarter ending 31st March 1896.

Accompanying this report are the following plans and statements:—

43 (a). A plan of the Harbour to a scale of 200 feet to an inch, showing in red the position and quantity of work done during the quarter. The Contours in half fathoms, shown on this plan in black lines inside the Harbour, are those of the latest Marine Survey made in 1895. The Contour lines outside the Harbour in blue, are those of the Survey of 1893.

2. The position of the High Water Marks of 31st March 1896, and that of the previous three months both to the North of the revetment and the South of the Harbour, are shown for comparison.

44 (c). A statement comparing the expenditure on different Sub-heads,

44 (d). A statement showing work done under different Sub-heads, and particulars of Cement received, and issued.

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4. This length of capping was formed of 15 Blocks of concrete built in situ, averaging 24 feet in length $\times$ 24' wide $\times$ 2½' deep at the shore end, which was equal to 782½ cubic yards of concrete, placed in position during the quarter.

5. Hard wood sleepers have been built into the capping throughout its length, for a line of rails to be laid upon it, as soon as the capping reaches shore, and a recess has been left in the capping for the transfer of the bulk-oil discharge pipe, from its temporary position, to the top of the capping.

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7. This length of capping was formed of 16 Blocks of concrete built in situ, averaging 24 feet in length $\times$ 24 feet wide $\times$ 4½' deep, which was equal to 1,412½ cubic yards of concrete placed in position during the quarter.

8. Hard wood sleepers have also been built into the capping throughout its length for a line of rails to be laid upon it, as soon as the capping is completed.

9. **Pallavaram Quarries and Concrete-making Machinery.**—The total out-turn of concrete made for the capping and other works during the quarter was 2,061 cubic yards; and the out-turn of blasted chips, received from the Pallavaram Quarries during the quarter amounted to 3,910 tons.

10. **Summary of Progress.**—The following statement is the Summary of progress made on the Harbour Works during the quarter under review.

11. **Supply of Portland Cement.**—The S. S. "Simla" arrived with 500 Casks of Portland Cement, containing, Tons 89-5-2-24
 S.S. "Manora" do. do. 600 Casks " 107-2-3-12
 S.S. "Bengal" do. do. 500 " " 89-5-2-24
 Balance in store from former shipments " " 213-2-2-8
 Quantity due on Indent do. " " 314-5-2-24

12. The balance of Cement in Store on the 31st March 1896 was Tons 144-19-3-16.

13. The issue of Cement during the quarter ending 31st March was 1,981½ casks, containing, Tons 353-16-3-24.

14. **Expenditure.**—The expenditure upon the works during the quarter was Rs. 62,640 including establishment, &c., and the quarter closed with a balance upon the revised estimate of Rs. 87,813 including materials, Cement and Stores, already upon the works on the 31st March 1896.

15. **High Water Mark North of Harbour.**—No settlement along the line of revetment could be detected, and the seas striking it during the quarter were exceptionally light.

16. The bay at the end of the revetment continued to fill in during the quarter, and the High Water Line of 31st December 1895 had advanced 70 feet east by the 31st March 1896, but its position at that date showed a net loss of 100 feet of foreshore in the 12 months ending 31st March 1896.

17. **Sea Bottom within the Harbour.**—The High Water Mark inside the Harbour during the quarter remained in about the same position along the northern half of the Harbour.

18. At the southern half of the Harbour the High Water Mark advanced seawards by 30 feet at the South Pier and about 20 feet on the South side of the Iron Pier, while between the Iron Pier and the South Pier, there was an advance of the water line of 40 feet during the quarter.

19. The depth inside the Harbour remained the same, but further soundings across the Entrance showed a shallowing of about 2 inches in the centre of the Entrance during the quarter, and only a deepening of 6 and 7 inches near the Caissons, whereas the Entrance should have deepened considerably during the monsoon.

20. The net shallowing at the Entrance has therefore, been a loss in depth of 3 feet 2 inches in the year 1895-96.

21. **Fore-shore South of Harbour.**—The High Water Mark close to the South Pier has advanced by 25 feet during the quarter, but from 500 feet South of the South Arm to as far as the Municipal Drain at 3,450 feet South, the shore line has remained in the same position.

22. From this point southwards, there has been a considerable accretion or advance of the shore line during the quarter, as follows:—

HIGH WATER MARK OF 31ST MARCH 1896.

at

$\frac{3}{4}$ mile South of Harbour, was 25' in advance, or East of the H. W. L. of 31st Dec. '95

1	"	"	"	60'	"	"	"	"
1½	"	"	"	30'	"	"	"	"
1½	"	"	"	20'	"	"	"	"
1½	"	"	"	80'	"	"	"	"
2	"	"	"	80'	"	"	"	"
2½	"	"	"	45'	"	"	"	"
2½	"	"	"	50'	"	"	"	"

23. **Moorings.**—Twenty-two Mooring Screws were put down during the quarter, two of which were outside the Harbour; and 5 new Moorings were completed and handed over to the Harbour Masters.

24. 7 old Buoys were removed and repaired and 5 old Moorings were raised and brought ashore.

25. There was much delay to the work due to the raft being required for landing boilers and other purposes, &c., and considerable difficulty was experienced in drawing the shackle pins which had become rusted in for years; there were therefore only 17 days in March when the new Moorings could be proceeded with, and in this time 3 Moorings were completed, and 14 screws put down in 14 consecutive days. Such rapid progress was impossible with the old system of screwing Moorings, and none could be put down in the open Roadstead by any process, until the present one was devised.

26. The complete system of Screw Moorings, and the Madras Harbour to the Sanctioned Design, has this day been completed; and I therefore, trust the subject of G.O. No. 350 M, dated 25th November 1895, may now be considered, and Government addressed accordingly.

27. **Miscellaneous.**—The usual repairs and the up-keep of all machinery, cranes, railway lines, &c., and haulage of coal and oil traffic was done by the Harbour Works for the Traffic Department as usual

MADRAS HARBOUR WORKS OFFICE,

9th May 1896.

A. LEE. POGSON,

Engineer, Harbour Trust Board.

Statement showing Progress during Quarter ending 31st March 1896, as shown on the accompanying Lithographed Plan, No. 43

Item number.	Particulars and quantity of work done during quarter ending 31st March 1896.	Sub-Head of Works.	A.	B.	C.	D.	E.	F.
			North Pier Concrete Capping.	South Pier Concrete Capping.	Pallavaram Quarries Out-turn.	Concrete made at mixing Station.	Railway lines.	Total Expenditure during quarter.
1	Total quantity blasted chips received on works.	Tons...	...	...	3,910	...	...	...
2	Concrete Blocks made in situ	No...	15	16	...	...	...	...
3	Total out-turn of concrete	c. yds...	782½	1,412½	...	2,061½	...	...
4	Advance or Progress of completed work	Ry. ft...	374½	369½	...	...	...	...
5	Broad Gauge line, taken up	"	374½	369½	...	...	...	...
6	Titan Line taken up	"	374½	369½	...	...	...	...
7	Broad Gauge line laid on Pier	"	3,770½	...	...	...	...	...
8	Approximate expenditure under sub-heads of works	Rs.	720	1,354	5,300	29,176	...	36,550

Tons. Cwt. Qrs. lbs.

Tons. Cwt. Qrs. lbs.

1,600 Casks of cement received on works during Quarter ending 31st March 1896 ... 285 14 1 4 Quantity due on Indents 314 5 2 24
 1,981½ Do. do. issued for do. ... 353 16 3 24 ...
 do. do. issued for do. ... 144 19 3 16 ...
 Balance in store at the end of quarter ...

A. LEE. POGSON,
Engineer, Harbour Trust Board.

MADRAS HARBOUR WORKS,
9th May 1896.

MADRAS HARBOUR WORKS.

COMPARISON OF EXPENDITURE TO DATE WITH SANCTIONED ESTIMATE FOR THE QUARTER ENDING 31st MARCH 1896.

AS PER ESTIMATE SANCTIONED IN SECRETARY OF STATE'S DESPATCH, No. 41, DATED 26th SEPTEMBER 1895—VIDE G.O., No. 2817 W., DATED 6th NOVEMBER 1895.															
Sub-head of Work.		AS EXECUTED.													
		Quantity.		Rate.		Per.		Cost.		Total.		Quantity.		Rate.	

MADRAS,

C. R. KRISHNA ROW,

Accountant,

M. H. Works Office.

A. LEE POGSON,
Engineer, Harbour Trust Board

14th May 1896.

Duplicate Marine Co
632

MARINE DEPARTMENT:

FROM

THE CHAIRMAN,
HARBOUR TRUST BOARD,
MADRAS,

TO

THE JOINT SECRETARY TO GOVERNMENT,
Marine Department.

DATED 2nd June 96

DESPATCHED th June 1896.

RECEIVED

ENCLOSURE 5 *Two plans*

426
227
426 } 3

No. 879

SUBJECT.

MADRAS HARBOUR.

Submitting Report upon Progress made
in the reconstruction of the ——— for the
quarter ending 31st March 1896.

MARINE DEPARTMENT.

FROM

THE CHAIRMAN,
HARBOUR TRUST BOARD,
MADRAS,

TO

THE JOINT SECRETARY TO GOVERNMENT,
Marine Department.

DATED *2nd June*

DESPATCHED *11* June 1896.

RECEIVED

ENCLOSURE *Two plans*

No. *879*

SUBJECT.

MADRAS HARBOUR.

Submitting Report upon Progress made
in the reconstruction of the ——— for the
quarter ending 31st March 1896.

Harbour Trust Office,
Madras, 2nd June 1896.

No. 879

From

WARE AUSTIN, Esq., I.C.S.,
CHAIRMAN, HARBOUR TRUST BOARD,
Madras,

To

THE HON'BLE Col. D. McNEIL CAMPBELL, R.E.,
JOINT SECRETARY TO GOVERNMENT,
Marine Department.

SIR,

I have the honour to submit herewith, for the information of Government, a report from the Board's Engineer upon the progress made in the reconstruction of the Harbour during the quarter ending 31st March 1896.

I have the honor to be,

Sir,

Your obedient Servant,

W Austin

Chairman, Harbour Trust Board.

Extract of Proceedings of the Trustees of the Harbour of Madras, at a Meeting held at the Offices of the Board on Friday the 22nd day of May 1896.

* *
4. Read Progress Report of the Board's Engineer, upon the reconstruction of the Harbour, for the quarter ending 31st March 1896.

Read minutes by Trustees.

Resolved that this report be submitted to Government. The Chairman is invited to address Government with reference to para. 26 of the report.

* *
True Extract.

S. HUTCHENCE,
Acting Secretary.

In continuation of

MADRAS HARBOUR WORKS.

Report of Progress on the Madras Harbour Works for the Quarter ending 31st March 1896.

Accompanying this report are the following plans and statements:—

43 (a). A plan of the Harbour to a scale of 200 feet to an inch, showing in red the position and quantity of work done during the quarter. The Contours in half fathoms, shown on this plan in black lines inside the Harbour, are those of the latest Marine Survey made in 1895. The Contour lines outside the Harbour in blue, are those of the Survey of 1893.

2. The position of the High Water Marks of 31st March 1896, and that of the previous three months both to the North of the revetment and the South of the Harbour, are shown for comparison.

44 (c). A statement comparing the expenditure on different Sub-heads.

44 (d). A statement showing work done under different Sub-heads, and particulars of Cement received, and issued.

3. **North Pier Capping.**—During the quarter the North Pier Capping was extended towards shore by 374 feet 6 inches which completed a total length of 3,522½ lineal feet of the North Pier, to the Sanctioned Design, measured from the Pier Head.

4. This length of capping was formed of 15 Blocks of concrete built in situ, averaging 24 feet in length × 24' wide × 2½' deep at the shore end, which was equal to 782½ cubic yards of concrete, placed in position during the quarter.

5. Hard wood sleepers have been built into the capping throughout its length, for a line of rails to be laid upon it, as soon as the capping reaches shore, and a recess has been left in the capping for the transfer of the bulk-oil discharge pipe, from its temporary position, to the top of the capping.

6. **South Pier Capping.**—During the quarter, the South Pier Capping was extended towards shore by 369½ lineal feet, which completed a total length of 2,452½ lineal feet of the South Pier, to the Sanctioned Design; measured from the Pier Head.

7. This length of capping was formed of 16 Blocks of concrete built in situ, averaging 24 feet in length × 24 feet wide × 4½' deep, which was equal to 1,412½ cubic yards of concrete placed in position during the quarter.

8. Hard wood sleepers have also been built into the capping throughout its length for a line of rails to be laid upon it, as soon as the capping is completed.

9. **Pallavaram Quarries and Concrete-making Machinery.**—The total out-turn of concrete made for the capping and other works during the quarter was 2,061 cubic yards; and the out-turn of blasted chips, received from the Pallavaram Quarries during the quarter amounted to 3,910 tons.

10. **Summary of Progress.**—The following statement is the Summary of progress made on the Harbour Works during the quarter under review.

11. **Supply of Portland Cement.**—The S. S. "Simla" arrived with 500 Casks of Portland Cement, containing, Tons 89-5-2-24
 S.S. "Manora" do. do. 600 Casks " 107-2-3-12
 S.S. "Bengal" do. do. 500 " " 89-5-2-24
 Balance in store from former shipments " " 213-2-2-8
 Quantity due on Indent do. " " 314-5-2-24

12. The balance of Cement in Store on the 31st March 1896 was Tons 144-19-3-16.

13. The issue of Cement during the quarter ending 31st March was 1,981½ casks, containing, Tons 353-16-3-24.

14. **Expenditure.**—The expenditure upon the works during the quarter was Rs. 62,640 including establishment, &c., and the quarter closed with a balance upon the revised estimate of Rs. 87,813 including materials, Cement and Stores, already upon the works on the 31st March 1896.

15. **High Water Mark North of Harbour.**—No settlement along the line of revetment could be detected, and the seas striking it during the quarter were exceptionally light.

16. The bay at the end of the revetment continued to fill in during the quarter, and the High Water Line of 31st December 1895 had advanced 70 feet east by the 31st March 1896, but its position at that date showed a net loss of 100 feet of foreshore in the 12 months ending 31st March 1896.

17. **Sea Bottom within the Harbour.**—The High Water Mark inside the Harbour during the quarter remained in about the same position along the northern half of the Harbour.

18. At the southern half of the Harbour the High Water Mark advanced seawards by 30 feet at the South Pier and about 20 feet on the South side of the Iron Pier, while between the Iron Pier and the South Pier, there was an advance of the water line of 40 feet during the quarter.

19. The depth inside the Harbour remained the same, but further soundings across the Entrance showed a shallowing of about 2 inches in the centre of the Entrance during the quarter, and only a deepening of 6 and 7 inches near the Caissons, whereas the Entrance should have deepened considerably during the monsoon.

20. The net shallowing at the Entrance has therefore, been a loss in depth of 3 feet 2 inches in the year 1895-96.

21. **Fore-shore South of Harbour.**—The High Water Mark close to the South Pier has advanced by 25 feet during the quarter, but from 500 feet South of the South Arm to as far as the Municipal Drain at 3,450 feet South, the shore line has remained in the same position.

22. From this point southwards, there has been a considerable accretion or advance of the shore line during the quarter, as follows:—

HIGH WATER MARK OF 31ST MARCH 1896.

at

$\frac{3}{4}$ mile South of Harbour, was 25' in advance, or East of the H. W. L. of 31st Dec.'95

1	"	"	60'	"	"	"	"
1 $\frac{1}{4}$	"	"	30'	"	"	"	"
1 $\frac{1}{2}$	"	"	20'	"	"	"	"
1 $\frac{3}{4}$	"	"	80'	"	"	"	"
2	"	"	80'	"	"	"	"
2 $\frac{1}{4}$	"	"	45'	"	"	"	"
2 $\frac{1}{2}$	"	"	50'	"	"	"	"

23. **Moorings.**—Twenty-two Mooring Screws were put down during the quarter, two of which were outside the Harbour; and 5 new Moorings were completed and handed over to the Harbour Masters.

24. 7 old Buoys were removed and repaired and 5 old Moorings were raised and brought ashore.

25. There was much delay to the work due to the raft being required for landing boilers and other purposes, &c., and considerable difficulty was experienced in drawing the shackle pins which had become rusted in for years; there were therefore only 17 days in March when the new Moorings could be proceeded with, and in this time 3 Moorings were completed, and 14 screws put down in 14 consecutive days. Such rapid progress was impossible with the old system of screwing Moorings, and none could be put down in the open Roadstead by any process, until the present one was devised.

26. The complete system of Screw Moorings, and the Madras Harbour to the Sanctioned Design, has this day been completed; and I therefore, trust the subject of G.O. No. 350 M, dated 25th November 1895, may now be considered, and Government addressed accordingly.

27. **Miscellaneous.**—The usual repairs and the up-keep of all machinery, cranes, railway lines, &c., and haulage of coal and oil traffic was done by the Harbour Works for the Traffic Department as usual.

MADRAS HARBOUR WORKS OFFICE,

9th May 1896.

A. LEE. POGSON,

Engineer, Harbour Trust Board.

MADRAS HARBOUR WORKS.

COMPARISON OF EXPENDITURE TO DATE WITH SANCTIONED ESTIMATE FOR THE QUARTER ENDING 31st MARCH 1896.

AS PER ESTIMATE SANCTIONED IN SECRETARY OF STATE'S DESPATCH, No. 41, DATED 26TH SEPTEMBER 1895—VIDE G.O., No. 2817 W., DATED 6TH NOVEMBER 1895.																	
Sub-head of Work.		AS EXECUTED.					AS EXECUTED.					Arrears not paid.		Value of work done up to date, columns 11 and 12.		REMARKS.	
Quantity.	Rate.	Per.	Cost.	Total.	Quantity.	Rate.	Expenditure.				Rs.	A. P.	Rs.	A. P.			
							Total up to end of last Quarter.	During the Quarter.	Up to date.								
2	3	4	5	6	7	8	9	10	11	12	13	14					
EXPENDITURE UP TO 31st DECEMBER 1894.																	
1	Works ...				55,09,324	810									55,09,324	810	
2	Establishment ...				5,29,904	0									5,29,904	0	
3	Tools and Plant ...				5,15,262	6									5,15,262	6	
	Total...							65,54,490	14	10					65,54,490	14	10
REVISED ESTIMATE.																	
4	Alteration and extension of block ground ... Preliminary...				5,892	0	11								5,892	0	11
NORTH PIER.																	
5	Ordinary rubble deposited from breakwater. Tons	13,980			24,377	9	0								24,377	9	0
6	Do. from boats ... C. yds.	2,06,896			4,13,218										4,13,218		
7	Concrete blocks for building ... C. yds.	51,320			5,90,110										5,90,110		
8	Setting blocks at commencement of new work ... C. yds.	2,615			5,414	11	2								5,414	11	2
9	Do. from 2,500 to 3,600 feet ... C. yds.	36,520			1,05,569	0									1,05,569	0	
10	Do. at Pierhead ... C. yds.	12,185			1,16,415	4	0								1,16,415	4	0
11	Concrete in mass for filling ... C. yds.	263			1,188	0	7								1,188	0	7
12	Wavebreaker blocks ... C. yds.	283			2,692	0	0								2,692	0	0
13	Do. concrete blocks ... C. yds.	69,863			8,45,459	12	4								8,45,459	12	4
14	Do. do. ... C. yds.	77,335			8,45,459	12	4								8,45,459	12	4
15	Concrete in protection to Rubble Base ... C. yds.	77,932			77,918	8	4								77,918	8	4
16	Gramps Iron ... C. yds.	1,986			77,928										77,928		
17	Concrete capping ... C. yds.	331			3,188	0	0								3,188	0	0
18	Cost of North Pier Caisson and setting in position and filling same as items 26, 27, 33 and 34 ... C. yds.	16,352			2,45,791	5	9								2,45,791	5	9
	Total for North Pier...				1,03,854	15	10								1,03,854	15	10
SOUTH PIER.																	
19	Ordinary rubble deposited from boats ... Tons	1,75,078			4,49,052										4,49,052		
20	Large do. deposited from breakwater... C. yds.	8,615			15,075	13	0								15,075	13	0
21	Concrete blocks for building ... C. yds.	45,096			5,04,510	0	0								5,04,510	0	0
22	Setting blocks at commencement ... C. yds.	2,556			7,911	13	3								7,911	13	3
23	Do. from 2,550 to 3,700 feet ... C. yds.	30,160			1,05,461	0	0								1,05,461	0	0
24	Do. at Pierhead ... C. yds.	12,350			1,36,476	5	8								1,36,476	5	8
25	Concrete in mass for filling ... C. yds.	602			4,554	14	4								4,554	14	4
26	Do. in Cylindrical Pierhead ... C. yds.	2,355			35,323	3	0								35,323	3	0
27	Do. in filling in between Coursed Block-work and Caisson ... C. yds.	791			11,865	0	0								11,865	0	0
28	Wavebreaker concrete blocks ... C. yds.	47,231			5,24,070	11	0								5,24,070	11	0
29	Depositing do. ... C. yds.	47,714			64,260	3	9								64,260	3	9
30	Concrete in protection to Rubble Base ... C. yds.	1,709			22,690	3	6								22,690	3	6
31	Gramps Iron ... C. yds.	269			2,972	0	0								2,972	0	0
32	Concrete capping ... C. yds.	16,247			2,56,687	9	9								2,56,687	9	9
33	Iron Caisson for and setting Cylindrical Pierhead... C. yds.	1			18,000	0	0								18,000	0	0
34	Preparing Base for and setting Cylindrical Pierhead... C. yds.				38,399	10	11								38,399	10	11
	Total for South Pier...				21,98,554										21,98,554		
EXTENDING THE RUBBLE REVENEMENT PROTECTING THE FORESHORE NORTH OF HARBOUR.																	
35	Rubble Stone Revetment ... Tons	70,600			1,45,613										1,45,613		
36	Railway Lines ...				3,849										3,849		
37	Tools and Plant ...				6,11,656										6,11,656		
38	Contingencies ...				2,47,970										2,47,970		
39	Establishment ...				6,73,445										6,73,445		
40	Materials at site (Concrete blocks in yards)... C. yds.																
41	Advances to Work-people ...																
	Total of Estimate and value of work done...				64,73,662										64,73,662		
	Deduct Probable recoveries due to sales of Tools and Plant ...				2,80,664										2,80,664		
	Total sanctioned Cost for completion of works ...				61,93,018										61,93,018		
	Add recovery on Tools and Plant ...				1,27,52,508										1,27,52,508		
	Deduct Total Expenditure as per column 11 ...				2,80,664										2,80,664		
	Total amount available for completing Works after quarter ending 31st March 1896 ...				87,813										87,813		

MADRAS,

C. R. KRISHNA ROW,

Accountant,
M. H. Works Office.A. LEE POGSON,
Engineer, Harbour Trust Board

14th May 1896.

MADRAS HARBOUR WORKS.

Statement showing Progress during Quarter ending 31st March 1896, as shown on the accompanying Lithographed Plan, No. 43

Item number.	Particulars and quantity of work done during quarter ending 31st March 1896.	Sub-Head of Works.	Column.	North Pier Capping.	South Pier Concrete Capping.	Pallavaram Quarries Out-turn.	Concrete made at Station.	Railway lines.	Total Expenditure during Quarter.	F.
1	Total quantity blasted chips received on works.	Tons...	...	...	...	3,910	...	...	...	...
2	Concrete Blocks made in situ	... No...	...	15	16	...	...	...	...	...
3	Total out-turn of concrete	... c. yds...	...	782½	1,412½	...	2,061½	...	...	...
4	Advance or Progress of completed work	... Ry. ft...	...	374½	369½	...	...	...	...	...
5	Broad Gauge line, taken up	... „	...	874½	369½	...	...	...	...	...
6	Titan Line taken up	...	...	374½	369½	...	...	...	...	...
7	Broad Gauge line laid on Pier	...	...	3,770½	...	...	...	...	...	...
8	Approximate expenditure under sub-heads of works Rs.	...	...	720	1,354	5,300	29,176	...	36,550	...

		Tons. Cwt. Qrs. lbs.				Tons. Cwt. Qrs. lbs.					
1,600	Casks of cement received on works during Quarter ending 31st March 1896	...	285	14	1	4	Quantity due on Indents	314	5	2	24
1,981½	Do. do. issued for do.	do.	...	353	16	3	24	...	...	...	...
	Balance in store at the end of quarter ...	...	...	144	19	3	16	...	...	...	...

MADRAS HARBOUR WORKS, }
9th May 1896.

A. LEE. POGSON,
Engineer, Harbour Trust Board.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

10
Read the following

From the Chairman, Harbour Trust Board, Madras, No. 879, dated 2nd June 1896.

No 426 Marnie 8/5-June 18/96

Ordered that the report be forwarded for the information of the Secretary of State and the Government of India.

The Chairman, H.T. Board,
" Presidency Port Office.

(H.E. No 427 Marnie 15 June 1896)

Copy of the above, with a plan showing progress and present state of the work, forwarded to the Government of India, P. W. Department.

(H.E. No 428 Marnie 15 June 1896)
To

The Right Honourable
the Secretary of State
for India.

12
My Lord,

& continuation of

our Despatch No. ¹²/_{1220 W}, dated
7th April 1896, we have the
honour to forward, for your
Lordship's information, the
accompanying copy of our
Proceedings No. 426 Marine
dated 15th June 1896 giving
cover to the Progress Report
of the Madras Harbour
Works for the quarter ending
31st March 1896.

2. The report is accom-
panied by a plan showing
progress and present state
of the work.

8/6/96

Recd. etc
M 476 received
8/7/96

Progress Report
Madras Harbour Works

No. 8, MARINE, 15TH JUNE 1896.

MARINE DEPARTMENT.

LETTER—to

THE RIGHT HONOURABLE THE SECRETARY OF STATE FOR INDIA.

MY LORD,

In continuation of our despatch No. ¹²/_{1220 W}, dated 7th April 1896, we have the
honour to forward, for your Lordship's information, the accompanying copy of our
Proceedings, No. 426, Marine, dated 15th June 1896, giving cover to the progress
report of the Madras Harbour Works for the quarter ending 31st March 1896.

The report is accompanied by a plan showing progress and present state of
the work.

We have the honour to be,

My Lord,

Your Lordship's most obedient, humble servants,

(Signed) A. E. HAVELOCK.

(") H. W. BLISS.

(") J. GROSE.

OOTACAMUND,
15th June 1896.

Exd. T. K. Narayana Aiyangar.