(1) பக்கங்களின் எண்ணிக்கை 104

(2) புதுக்கித் திருப்பிய நாள் 1.7.89

(3) ஆதாரங்குறிப்பவர் சுருக்கொப்பம்

தமிழ்நாடு ஆவணக் காப்பகம்.

தமிழ்நாடு அரசு

P.W.D துறை

அரசாணை எண். 341-W. 2/341 -W

மு. கோப்புத் தாள் எண்.

அச்சகம் பலவகை

நாள் : 3.2.1890 198 .

க்கவோ கண்டபடி கையாளவோ கூடாது

ண. கா-1—18,006—15-6-87.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following paper:—

From G. McWATTERS, Esq., M.A., C.S., Chairman, Harbour Trust Board, to the Chief Secretary to Government, Marine Department, dated Madras, 11th January 1890, No. 138.

I have the honor to submit, for the information of Government, progress report upon the Madras Harbour Works for the quarter ending 30th September 1889, together with statement (in triplicate) showing expenditure to date compared with the sanctioned estimate, and resolution passed thereon by the trustees at their meeting last evening; also copy of a letter No. 1177, dated 9th January 1890, from the Board's Engineer explaining the delay in forwarding the report.

Enclosures.

From A. L. POGSON, Esq., Engineer, Harbour Trust Board, to the Chairman, Harbour Trust Board, dated Madras, 9th January 1890, No. 1176.

I have the honor to forward my report on the progress made on these works during the quarter ending 30th September 1889.

2. With this report is submitted a lithographed plan showing the state of the harbour and beach improvements on the 30th June in black, and all progress and new works during the quarter in red.

3. All progress at the north arm was stopped on the 12th of July on receipt of a telegram from Government insisting on the abutment being built in the north arm, as suggested by Mr. Parkes; and not until the 1st of August were orders received to proceed with the superstructure omitting the abutment.

4. The result of this stoppage was that only 66 blocks were set in July, advancing the pier by 43 lineal feet.

5. The progress during August was rapid as far as block-setting went, which is shown by 328 blocks being set in position by divers which advanced the piers by 199½ lineal feet, but progress to the superstructure had to be stopped to allow the Titan crane to be used in recovering the "set" wavebreaker blocks (ordered in G.O., No. 2277 W., dated 19th August 1889) and again depositing them in the random system according to the sanctioned design; which work, though difficult and requiring the greatest skill, was accomplished without any serious mishap, and just in time for the cranes to be run on shore for safety during the north-east monsoon.

6. *Surveys.*—The marine survey of the harbour and Madras roadstead made in 1886 was carefully repeated on the same lines during the quarter, and the chart of soundings is being plotted and will be submitted as early as possible.

7. In addition to the above, several cross sections and soundings of the new work and rubble bases were taken, and a correct record of levels of every course of blocks was kept, which, on comparison with former year's records, shows no further settlement.

8. *North Pier Works.*—The progress made at extending the north pier superstructure was rapid and satisfactory, notwithstanding the stoppage caused by the abutment question, and, when compared with the statement under para. 22 of this report, shows that more than three times the length of superstructure was built in this quarter than in the same quarter last year.

9. Although 130½ lineal feet was the result of the quarter's progress, a much greater length could have been built had the building of the superstructure not received a second hindrance by the Titan crane being required for removing a portion of the last season's work, viz, taking up and again depositing at random the wavebreaker blocks which were set in "orderly rows;" but the delay thus caused cannot be regretted, as this work is now more substantial and in accordance with the sanctioned design.

10. The total length of the north pier superstructure on the 30th September 1889 was 2,974 lineal feet, and of this length of pier 924 lineal feet is new work under the restoration estimate, commenced in March 1886.

11. *Rubble Base.*—During the quarter 1,031 tons of rubble was added to the north pier base. 649½ tons of this quantity was deposited to widen the foreshore, and the balance 381½ tons (including blocks blasted) was added to the base.

12. *South Pier Works.*—Block-setting was carried on through July and August, when 180 blocks were set, which advanced the south pier superstructure by 112½ lineal feet. This progress may be considered good, and while an advance upon former year's work was not equal to the length of superstructure built at the north arm, the reason being that the sea at this arm, washing over the old ruined wall, so disturbed the water that the divers could generally only work at low water.

13. The total length of the south pier superstructure at the close of the quarter under review was 3,631½ lineal feet from the first block set on shore. Of this length, 1,214½ lineal feet is of the new bonded section under the restoration estimate, commenced in July 1886.

14. *Wavebreaker.*—The length of superstructure built during the quarter was protected with the wavebreaker to an average width of 30 feet (being the range of the Titan crane), when the wavebreaker crane carried on the protection shorewards. These cranes conjointly dropped 108 large wavebreaker blocks according to the random system of the sanctioned design.

15. *Rubble Base.*—At the south pier 1,274½ tons of rubble was deposited in the base as follows: 360¾ tons of rubble was used in the foreshore, 562¾ tons deposited as base, and 351 tons of base was formed by blasting old blocks recovered from the old pier head by the pontoon.

16. *Railways.*—All existing lines of railway were kept in good order and renewals made where necessary, both at the quarries and throughout the works.

17. On the piers 846 feet of railway was removed, and 1,455 running feet of line relaid.

18. On shore 1,485 running feet of railroad was overhauled and partly renewed.

19. One thousand three hundred and eighty running feet of broad-gauge line was also laid in connection with the beach improvements for landing coal, &c.

20. *Pallávaram Quarries.*—Seventy-three trains were run from the Pallávaram quarries during the quarter, conveying 14,431½ tons of stone for the works. Of this quantity, 12,530½ tons was chips for block-making and the remainder 1,901 tons was rough rubble stone for the base.

21. *Concrete Block-making.*—The work of concrete block-making was carried on steadily throughout the quarter, with the exception of a few days necessary stoppages for repairs to machinery, holidays, &c.

22. The number of blocks made was 590, showing an outturn of 9,881¼ cubic yards of concrete in the quarter. This branch of the works, I am happy to state, has now reached the maximum possible outturn with the present appliances.

				Cub. Yards.
In the quarter ending September	1888	the outturn was	... ...	9,085
,, ,, ,,	March	1889 ,,	,, ...	9,149
,, ,, ,,	June	,, ,,	,, ...	9,590½
,, ,, ,,	September	,, ,,	,, ...	9,881¼

23. *Cost and Progress of Works.*—From the foregoing details a summary of the rate and cost of progress, compared with the same quarter last year, comes out as follows:—

Statement of work done and cost.

Items.	Particulars.	In quarter ending 30th September 1888. Quantity, &c.	Cost.	In quarter ending 30th September 1889. Quantity, &c.	Cost.
A	Length of superstructure built	744 ft.	Rs. A. P. 29,791 13 0	2224½ ft.	Rs. A. P. 92,977 11 0
B	Number of wavebreakers placed in position	13†	24,858 7 7	222	82,498 14 9
C	Cubic yards of concrete made	9,085	1,02,789 13 4	9,881¼	1,17,587 1 8
D	Number of concrete blocks made	589		590	
E	Tons of chips received from quarries for block-making	12,530½	18,208 15 11	12,486½	23,939 5 3
F	Tons of rubble received for foundations	85½	86 3 0	12,530½ † 1,901	3,102 8 5

* Two hundred and twenty-two wavebreaker blocks at Rs. 11-13-11 per cubic yard = Rs. 47,831-11-0, includes the value of 156 blocks deposited in September 1888, but adjusted in the accounts for October 1889.

† Total quantity received.

24. In addition to the above figures will be found submitted with this report a complete statement of the expenditure on the works (in triplicate) during the quarter ending September 1889.

25. It will be observed that the expenditure under many of the sub-heads has already exceeded the cost estimated by Mr. Parkes, while the reconstruction of the works is far from completion; this excess is due to the original rates being taken as sufficient for the present design and no allowance being made for the cranes having to be withdrawn for four months in each year when no progress could be shown which naturally increases the cost of establishment and other heads.

26. The trustees have before them my estimate of cost for completing the sanctioned design submitted with my suggestions for a north-east entrance, in which I have shown the probable excess in the sanctioned design as Rs. 3,82,545

27. These figures I have now placed in the statement of expenditure side by side with the sanctioned estimated rates which when compared with the actual expenditure to date will be found to be within my estimate for the eastern entrance.

28. *Stores from England.*—The following vessels arrived from England during the quarter with stores for the works as follows:—

		Tons	Cwt.	Qrs.	Lbs.
	In July.				
	By the S.S. *India* 790 casks of Portland cement containing	150	18	3	20
	Also 33 coils of Manilla rope weighing	2	0	3	15
	Twenty-four Guernseys for divers, 3 gross coach screws and one set of divers' speaking apparatus.				
	By the S.S. *Manora* 1,500 casks of Portland cement containing	286	12	0	16
	From Gopálpur—By the S.S. *Africa* 1,200 salwood slabs for concrete block-making.				
	In August.				
	By the S.S. *Goorkha* 2,400 casks of Portland cement containing	458	11	1	20
	Also four steel 75-lb. rail non-reversible crossings, thirty-two fish-bolts and nuts, twenty-four fang bolts, one case containing 4 cwt. rivets and 1 cwt. iron washers.				
	By the S.S. *Chyebassa* 1,920 casks of Portland cement containing	366	17	0	16
	Also six dozens Railway beaters.				
From Gopálpur	By the S.S. *Canara* 1,695 salwood slabs for block-making.				
	By the S.S. *Malda* 1,800 do.			do.	
	By the S.S. *Lucenda* 1,000 do.			do.	
	By the S.S. *Patna* 800 do.			do.	
	In September.				
	By the S.S. *Navarino* 1,694 casks of Portland cement containing	323	13	2	0
	By the S.S. *Rewa* 2,127 casks of Portland cement containing	406	8	0	20
	Also 57 square iron shovels.				
	By the S.S. *Amphitrite* 188 75-lb. steel Titan rails weighing	50	7	2	5
	One hundred and sixty-two 50-lb. steel rails weighing ...	29	8	1	18
	Two hundred fish-plates for 75-lb. rails.				
From Gopálpur	By the S.S. *Culna* 1,500 salwood slabs, &c.				
	By the S.S. *Ellora* 2,209 do.				

RETURN OF WORK FOR THE QUARTER ENDING 30TH SEPTEMBER 1889.

Surveys.—A marine survey of the roadstead, a survey denoting high water mark and sections of the north and south pier bases were taken. The iron beacon at the south pier was moved two feet to the south.

Railway Lines.—On the north pier 492 running feet temporary broad-gauge and 150 running feet temporary metre-gauge lines were taken up and 46 running feet temporary broad-gauge and 500 running feet temporary metre-gauge lines were laid. On the south pier 204 running feet temporary broad-gauge lines were taken up and 909 running feet temporary broad-gauge lines were laid. The sand line was extended 181 running feet. In the north pier yard 385 running feet metre-gauge lines and 480 running feet single line were laid in connection with the running shed. In the south pier yard 200 running feet broad-gauge lines and 375 running feet single line were taken up and 420 running feet mixed gauge lines laid. One thousand three hundred and eighty running feet broad-gauge line were laid in connection with the beach improvements.

Quarries.—Seventy-three trains were despatched in the quarter with stone from Pallávaram quarries as follows:—

Rubble.

	Tons.
Total quantity received up to 30th September 1889	362,223¾
Do. up to 30th June 1889	360,322¾
Received in the quarter ...	1,901

Chips.

Total quantity received up to 30th September 1889	153,983¼
Do. up to 30th June 1889	141,452¾
Received in the quarter ...	12,530½

Ballast.—None received.

North Pier Surf Bank.—Nothing done since 30th November 1888.

North Pier Rubble Base.—Foreshore.

	Large rubble under wave-breaker.	Widening foreshore.	Base.
Total deposited up to 30th September 1889 ... ... tons	14,286½	54,700¾	119,806¾
Total deposited up to 30th June 1889 ... ... tons	14,286½	54,051¼	119,425¼
In the quarter ...	...	649½	*381½

*Stone from quarries 327½
Two old blocks blasted by dynamite ... 54

Total ... 381½

North Pier Superstructure.

	Nos.	Cub. yards.
Blocks set up to 30th September 1889	1,424	23,045$\frac{9}{12}$
Do to 30th June 1889	1,210	19,522$\frac{8}{12}$
In the quarter ...	214	3,523$\frac{1}{12}$

Running feet new wall built up to 30th September 1889	924
Do. do. up to 30th June 1889	793½
In the quarter ...	130½
Total length of wall completed from B	2,974 feet.
Do. do. F	924 ,,

North Pier Supplementary Works.—Blocks deposited in wavebreaker.

	Number of blocks.	Contents cubic yards.	Distance on pier.	Average breadth from face of pier.
Up to 30th September 1889	2,808$\frac{7}{12}$	41,870$\frac{5}{12}$	...	...
Up to 30th April 1889	2,194	39,807$\frac{1}{12}$	...	...
In the quarter ...	*269	4,852½	2,700 to 2,974	28 feet.

and 2 pieces 2,790
155 blocks
=114 do. = 2,062½
and 2 pieces

*New blocks 221
Old blocks taken from N.P.F. 48

Total .. 269

($\frac{5}{8}\times\frac{1}{8}$) pieces of an old wavebreaker block removed by north pier Titan on 5th February 1889.

North Pier Capping.—Nothing done since 30th June 1889.
North Pier Cramps.—Nothing done since 30th April 1889.
South Pier Surf Bank.—Nothing done since 30th April 1888.

South Pier Rubble Base.—Foreshore.

	Large rubble under wave-breaker.	Widening foreshore.	Base
Total deposited up to 30th September 1889 ...	12,061½	38,750½	123,601
Total deposited up to 30th June 1889	12,061½	38,389¾	122,687¼
In the quarter ...	...	360¾	*913¾

*Stone from quarries 562¾
Thirteen old blocks blasted by dynamite ... 351

Total .. 913¾

South Pier Superstructure.

	No.	
Blocks set up to 30th September 1889	1,907	31,113½
Do. up to 30th June 1889	1,727	28,145½
In the quarter ...	180	2,968

Running feet new wall built up to 30th September 1889	1,244¼
Do. do. up to 30th June 1889	1,132
In the quarter ...	112¼
Total length of wall completed from E	3,631¼ feet.
Do. do. G	1,244¼ ,,

South Pier Supplementary Works.—Blocks deposited in wavebreaker.

	Number of blocks.	Contents cubic yards.	Distance on pier.	Average breadth from face of pier.
Up to 30th September 1889	1,797	31,833$\frac{15}{216}$	...	...
Up to 30th April 1889	1,689	29,389$\frac{7}{216}$	...	...
In the quarter ...	*108	1,944	3,519 to 3,631	30 feet.

*New block 1
Old blocks from north pier foreshore ... 107

Total .. 108

South Pier Capping.—Nothing done since 30th June 1889.
South Pier Cramps.—Nothing done since 30th April 1889.
Protective Works.—Nothing done.

Concrete Blocks.

Description of blocks.	Made up to 30th June 1889.	Made in the quarter.	Made up to 30th September 1889.	Placed in Works.		In hand.
				Up to 30th June 1889.	Up to 30th September 1889.	
Old blocks	806	..	806	806	806	..
Wavebreaker blocks	3,365	433	3,798	3,064	3,286	512
Superstructure.						
North pier bottom blocks	227	..	227	216	223	4
Do. middle do.	750	..	750	728	743	7
South pier bottom do.	248	..	248	239	244	4
Do. middle do.	477	22	499	340	412	87
Do. top do.	1,343	72	1,415	949	1,171	244
Special do.	523	34	557	535	408	149
Counterbalance do.	71	..	71	71	71	..
Special abutment do.	1	..	1	..	..	1
Test weight	21	25	46	..	..	46
	..	4	4	..	..	4

Nine thousand eight hundred and eighty-one and two-ninth cubic yards concrete was made in the quarter ending 30th September. There was no block-making on the 1st and 13th to 28th July, on the 10th and 12th August and from 4th to 7th, 19th to 21st and 23rd to 28th September.

One hundred and five wavebreaker blocks were transferred from north to south block grounds; 1,934½ tons of Portland cement was the balance on the works at the end of the quarter.

Miscellaneous.—An extension of 24 feet was made to the running shed, and the flooring and roof generally repaired.

No. 1 buoy was renewed and moored to the inner or shore mooring chains. One hundred and fifty-five wavebreaker blocks were removed by the north pier Titan from the north pier foreshore, of which 48 were replaced in the foreshore. Sixteen old blocks and two pieces were removed by the pontoon from site of work at the south pier, of which 13 blocks were blasted by dynamite and added as rubble to the south pier base. Three blocks and the two pieces were placed in position to be removed by the south pier Titan. Three old blocks of 27 tons each and three old pier head blocks of 5 tons each were removed by the pontoon from the site of work at the north pier. Two 27-ton blocks were blasted and added as rubble to the north pier rubble base, and the remainder were placed in position to be removed by the north pier Titan.

TOOLS AND PLANT.

Stationary Engine.—The superheater and pipe was cleaned and tarred.

Stone-crushers.—Two moveable and two eccentric jaws (spare) were fitted up, two new shoots and six hooks were made, and two sheets, twenty-five hooks, two bars, and the iron-work of two sheets were repaired.

Stone-crusher No. 1.—A new jaw and two new side wedges were supplied and the set-plates refitted.

Stone-crusher No. 2.—Two new jaws, a key for moveable jaw, two new side wedges and a new spout were fitted, the bands of the moveable jaw were reshrunk, the grooves for set-plates were chipped, and set plates and shoot fixed.

Stone-crusher No. 3.—The bands of the moveable jaw were reshrunk, and two new side wedges, set-plates and two keys were fitted.

Stone-crusher No. 6.—A new eccentric jaw shaft and side wedges were supplied and keys for coupling and fly-wheels refitted.

Elevators.—Nine elevator boxes were repaired, and three box-wheels were cast.

Elevator No. 1.—The brake was repaired.

Elevator No. 2.—A new stay-rod was fitted to the upright, and a bar to the wall timber.

Elevator No. 5.—A new stay-rod was fitted to the upright, and a "bar" to the wall-timber.

Concrete-mixers.—Two spare mixer hammers were made.

Concrete-mixer No. 1.—A new door catch was supplied, all bolts were tightened, and a new trap-door fitted to the hopper. The mixer pump was repaired and fitted with four new valves.

Concrete-mixers Nos. 2 *and* 3.—The door catches were eased and all bolts tightened.

Concrete-mixer No. 4.—The catches were eased and the bolts tightened and a hammer made and supplied.

Concrete-mixer No. 5.—A new box, a large spur-wheel, an intermediate spur-wheel with pin and a new pinion and plumber block bearing were fitted.

Concrete-mixer No. 6.—Two new door catches, a new pinion, an intermediate spur-wheel, and a hammer were supplied.

Concrete-mixer No. 7.—All brass bearings were closed and a new catch was supplied.

Concrete-mixer No. 8.—A new door catch and a hammer was supplied, and the water-cock was fitted with a new plug.

Goliath Crane No. 1.—The cylinder cover joints were remade and brass bearings closed of travelling engine, and the cylinder cover joints of lifting engine were remade. Two new brass brake blocks, two slide blocks, a new gudgeon pin, and a key for fly-wheel were made and fitted.

Goliath Crane No. 2—Was supplied with two new hydraulic piston leathers.

Light Traveller No. 2.—Two new foot-steps and boards were fixed.

Light Traveller No. 4.—Two tail-boards were repaired.

North Pier Titan.—A distance bolt was repaired for the claws and the brass bearings of connecting rods closed.

South Pier Titan.—A stud was made and fitted to the pall handle, a catch for fire-box door and a ¾″ spanner were made, and the clack-box and blow-off cocks were ground.

Miscellaneous.—A new crossing, a hundred chair bolts, fifty ⅝″ trenails, two ⅞″ spanners, two ¾″ spanners and nine distance pieces were made, and a crossing was repaired. Three brass nuts and a new spanner for water-pipe for diver's pump, twenty ⅝″ studs and four 1″ chains were made, and seventeen shackles; four 1″ sling chains, seven 1″ and ⅞″ chains, a ½″ chain and an anchor were repaired for divers. One hundred and fifty cottars, two hundred ⅝″ rivets, twenty-five washers for lewis pins and a hundred washers and iron work for twenty end frames were made, ninety-two 1¼″ bolts, sixty cottars and forty joggle boxes were repaired for block frames. Fifty eye-screws and two eyes for lewis pins were made, fifty-nine pick-axes and twenty-one crowbars were repaired for block grounds. A portable forge was thoroughly renovated. A chimney in the smith's shop was repaired. Seven concrete skips were repaired. A riding trolly was repaired. Twelve shackles and two bands for buoys, one ½″ and one ⅞″ chain and iron tiller for survey boat *Coromandel* were made, and a ½″ chain was repaired for marine survey purposes. The survey boat *Hobart* was repaired. A boat was made for lifting blocks. Six chisels and four screw-drivers were made and a hand hammer was repaired for carpenter's shop. A mould was made for apron blocks at the south pier. Two shoes were made for the sounding rods. The doors and windows of the extended portion of the running shed were painted, No. 1 hand-pump was repaired and No. 2 was fixed and a pump shed erected.

Locomotive engine No. 1.—Was under thorough repair.

Locomotive engine No. 2.—The brass bearings of connecting and coupling rods were closed. The waste-water cocks were repaired, ground and set. The copper stays of the fire-box was caulked. A spectacle plate was straightened. The pressure gauge pipe repaired and the lead plug renewed. The blow-through cock of the water-gauge column was repaired. Two new lead washers were fitted to the front wash-out plugs. The left hand front cylinder cover joints were made, and ferrules fitted to the spring balances to reduce the pressure to 90 lb. per square inch.

Locomotive engine No. 3.—The right hand front and back cylinder cover joints were remade. The brass bearings of connecting and coupling rods were closed and the copper stays of the fire-box were caulked. The boiler-cocks were ground and two new lead washers were fitted to front wash-out plugs. The waste-water cocks were ground and set, and the gearing set and straightened. A new right hand gudgeon pin and a new volute spring for front draw-hook were fitted. The tank and left hand dummy gland joints were remade and ferrules were fitted to the spring balances to reduce the pressure to 90 lb. per square inch.

10-ton Travelling Jib Crane.—A new jib, two new tie-rods, two new brass bearings for rollers, and a feather for double gear pinion were made and fitted.

Block truck No. 9.—The pedestals were tightened.

Block truck No. 10.—A coupling chain was supplied.

Block truck No. 13.—Was rebuilt and painted.

Block truck No. 15—Was rebuilt and painted.

Block truck No. 18.—New keys were fitted to leading wheels, all brass bearings were eased, and the keeps filled with waste and grease, and the truck painted.

Sand wagon No 3—Was fitted with a new tail-board hinge, and two new pins were fitted to draw-hooks.

Sand wagon No. 4—Was supplied with three shackles and pins.

Sand wagon No 5—Was fitted with a tail-board hinge.

Sand wagon No. 7.—Two new pins were fitted to the draw-hooks.

Sand wagon No 9—Was supplied with a pair of new wheels and a shackle and pin.

Sand wagon No. 12—Was fitted with a draw-hook.

Sand wagon No. 16—Was supplied with two shackles and pins.

Iron Pier.—One hundred and twenty running feet for the half width of the pier timber work was renewed. At the T end, the timber work to four bays of 10 feet and a traverser beam was renewed and five pile caps were cast and fixed. Nine feet of the main water-pipe was renewed and a small stand-pipe with a tap was fitted for drinking purposes. A staging for the north Doty lamp was under erection and davits for the pier ladders were in hand.

B. P. Crane No. 5—Was thoroughly repaired.
B-class Cranes.—Twelve thimbles and twenty-four S hooks were fitted and six eye-bolts made.
Sentry-boxes Nos. 5 *and* 6—Were repaired.
Truck No. 22—The wheels were repaired and the truck tarred.
Truck No. 26—Was thoroughly repaired.
Truck No. 50—Was supplied with a new brake handle.
No. 2 *Turn-table in Custom House.*—A new pall and bracket was fitted.
Harbour Trust Office.—The stair-case was repaired.
North Goods Shed (*tiled*).—A partition was made and fitted with two doors and a window.
The market building at Cassimode underwent repairs.
A ramp and bridge over the storm water overflow drain at the south pier was erected, leading to the Madras Stable Company's shed, for landing horses.

From A. L. POGSON, Esq., Engineer, Harbour Trust Board, to the Chairman, Harbour Trust Board, dated Madras, 9th January 1890, No 1177.

In submitting the quarterly report of September 1889, I have the honor to inform you that the remaining reports overdue are written and will follow as soon as they can be fair copied.

2. I shall be glad if you will be good enough to point out to the trustees that the delay in the submission of these reports is not due to negligence on my part, but that I was forced to delay them on account of the extra amount of work I had during the latter half of 1889. My time was fully occupied with the several estimates required in connection with the beach improvements, Biden Home, iron pier, &c., in addition to the abutment question and designing of the special blocks.

3. Then came the setting of the wavebreaker blocks in orderly rows, and their removal (which required my presence continually out of doors), the revetment north of the harbour and the marine survey of the roadstead which kept myself and assistant out of office for two months on end; besides all this, there was the difficulty with the Pallávaram quarries, and, when all is considered, I have no hesitation in saying that this office has turned out more work than was ever before attempted by any one in charge; consequently I feel that para. 3 of the order on the quarterly report for June being allowed to be submitted to the Secretary of State without some explanation for the delay on the report is rather a severe return for the past difficulties I have had to encounter.

Extract of Proceedings of the Trustees of the Harbour of Madras at a meeting held at the offices of the Board on Friday the 10th day of January 1890.

* * * * * *

23. Read letters from the Board's Engineer, No. 1176, dated 9th January 1890, submitting report on the progress made on the Harbour Works during the quarter ending 30th September 1889, with statement of expenditure compared with the sanctioned estimate for the quarter ending 30th September 1889, and No. 1177 explaining the delay in forwarding the report.

Recorded, and resolved that this report be submitted to Government with Mr. Pogson's explanation of the delay in forwarding it. The Board considers the report very satisfactory, and is glad to observe that the report for the quarter ending 31st December 1889 will soon be ready for submission.

* * * * * *

(True Extract.)

(Signed) C. PINSENT,
Secretary, Harbour Trust Board.

Transferred to the Public Works Department. The order referred to in para. 3 of Mr. Lee Pogson's letter No. 1177, dated 9th January 1890, does not appear to have been communicated to this department.

Fort St. George,
17th January 1890.

(Signed) J. GROSE,
Acting Chief Secretary.

Order—dated 3rd February 1890, No. 341 W., Public Works.

The report will be forwarded to the Secretary of State for India.

2. The order referred to in para. 3 of Mr. Pogson's letter No. 1177, dated 9th January 1890, is G.O., No. 3660 W., dated 26th December 1889, which was duly communicated to the Marine Department.

(True Extract.)

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

To the Chairman, Madras Harbour Trust Board.
" Marine Department.

Exd. J. Moses.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1890} Madras.

PUBLIC WORKS.

Dated February, 3rd.

Recd. *Encl.*

G.O., 3rd Feb. 1890, No. 341 W.

FEBRUARY.

Madras Harbour Works

Ordered that the progress report of the — for the quarter ending 30th September 1889, be forwarded to the Secretary of State for India.

PUBLIC WORKS DEPARTMENT.

Letter—to

The Right Honorable the SECRETARY of STATE for INDIA.

My Lord,

In continuation of our despatch No. 19/3660 W., dated 26th December 1889, we have the honor to forward a copy of our Proceedings No. 341 W., dated 3rd February 1890, embodying a report of the progress of the Madras Harbour Works for the quarter ending 30th September 1889.

2. A plan showing the state of the works at the end of the quarter, and a statement comparing the expenditure with the sanctioned estimate, are also forwarded for information.

We have the honor to be,
My Lord,
Your Lordship's most obedient, humble servants,

(Signed) CONNEMARA.
(„) H. E. STOKES.
(„) J. H. GARSTIN.

Fort St. George,
3rd February 1890.

Exd. J. Moses.

GOVT. OF MADRAS.

PUBLIC WORKS DEPARTMENT.

(Copy.)

LETTER to the Right Honorable the Secretary of State for India.

No. $\frac{2}{341\ W.}$ dated 3rd Feb. 1890.

Forwarding the progress report of the Madras Harbour Works for quarter ending 30th September 1889.

Read the following papers

C. No. 38

Harbour Trust Board Office,

MADRAS, 11th January 1890.

Rec'd 14-1-90

No. 138

FROM Geo: Mc Watters Esqr Mh.R. CE.

CHAIRMAN, HARBOUR TRUST BOARD,

MADRAS,

TO The Honble J. F. Price CS

CHIEF SECRETARY TO GOVERNMENT,

Marine Department.

Sir

I have the honor to submit for the information of Government progress report upon the Madras Harbour Works for the quarter ending 30th September 1889, together with statement (in triplicate) showing Expenditure to date compared with the Sanctioned Estimate, and resolution passed thereon by the Trustees at their meeting last evening, also copy of a letter No. 1177 dated 9th January 1890, from the Board's Engineer

Engineer explaining the delay
in forwarding the report.

I have the honour to be
Sir
Your most obed.t Servant

Chairman
Harbour Trust Board

C. Lee

L 346-7-12-89

310

D/17 Jany'90
Transferred to the Public Works Dept.
The order referred to in para 3 of Mr. Lee Pogson's letter No. 1177, dated 9th January '90, does not appear to have been communicated to this department.
J Grose
Ag. Chief Secretary.

No. 3660 W 4 26-12-89
" 19/3660 W - 26-12-89
" 4924 C - 29-10-89
" 2277 W - 19-8-89
" 821 W - 19-3-89

22-1-90 & 27-1-90

C. No. 38

MARINE DEPARTMENT.

From

THE CHAIRMAN,

HARBOUR TRUST BOARD,

MADRAS,

To

THE CHIEF SECRETARY TO GOVERNMENT,

Marine Department.

Fort Saint George

Dated 11th January 1890
Dated 14
Received
Reg'd No. 138 (including 2 plans)
Enclosure
No.

SUBJECT.

Submitting for the information of Government progress upon the Madras Harbour Works for the quarter ending 30th September 1889.

Transferred

Enclosures.

No. 1176

From

RECEIVED
9 JAN 90

THE ENGINEER,

HARBOUR TRUST BOARD,

MADRAS.

HARBOUR TRUST BOARD, MADRAS, 9 JAN 90, Regd No. 139

2 Sep 10/341

To

The Chairman
Harbour Trust Board
Madras.

Madras, 9th Jany 1890

Enclosures
1 Lithographed Plan. Triplicate
1 Statement of Expenditure — do

Sir,

I have the honor to forward my report on the Progress made on these Works during the Quarter ending 30th September 1889.

2. With this report is submitted a Lithographed plan showing the state of the Harbour and Beach Improvements on the 30th June in black, and all progress and new works during the Quarter in red.

3. All progress at the North Arm was stopped on the 12th of July on receipt of a telegram from Government insisting on the Abutment being built in the North Arm, as suggested by Mr. Parkes; and not until the 1st of August were orders received to proceed with the Superstructure

omitting

3-88
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341

omitting the abutment

4. The result of this stoppage was that, only 66 blocks were set in July - advancing the pier by 43 lineal feet.

5. The Progress during August, was rapid as far as blocksetting went, which is shown by 328 blocks being set in position by Divers which advanced the piers by 199 2/4 lineal feet, but progress to the Superstructure had to be stopped to allow the Titan Crane to be used in recovering the "set" Wavebreaker blocks (ordered in G.O. No 2277 W dated 19th August 1889) & again depositing them in the random system according to the Sanctioned Design; which work though difficult, and requiring the greatest skill was accomplished without any serious mishap, and just in time for the Cranes to be run on shore for safety during the N.E. monsoon.

Surveys - 6. The Marine Survey of the Harbour and Madras Roadstead made in 1886 was carefully repeated on the same lines, during the Quarter; and

the

4 58

the chart of soundings is being plotted and will be submitted as early as possible.

7. In addition to the above, several Cross Sections and soundings of the New Work and rubble Bases were taken, and a correct record of levels of every course of blocks was kept, which on comparison with former years records, shows no further settlement.

North Pier Works. 8. The progress made at extending the North Pier Superstructure was rapid and satisfactory, notwithstanding the stoppage caused by the Abutment question, and when compared with the statement under para 22 of this report, shows that more than three times the length of Superstructure was built in this Quarter, than in the same Quarter last year.

9 Although 130½ lineal feet was the result of the Quarters progress a much greater length could have been built had the building of the Superstructure not received a second hindrance, by the Titan Crane being required for removing

13
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removing a portion of the last seasons Work, viz taking up and again depositing at random, the Wavebreaker blocks which were set in "orderly rows;" but the delay thus caused, cannot be regretted, as this Work is now, more substantial — and in accordance with the Sanctioned Design.

10 — The total length of the North Pier Superstructure on the 30th September 1889 was 2974 lineal feet; and of this length of Pier, 924 lineal feet is new work, under the Restoration Estimate, commenced in March 1886.

Rubble Base - 11. During the Quarter 1031 Tons of Rubble was added to the North Pier Base. 649½ Tons of this quantity was deposited to widen the Foreshore, and the balance 381½ Tons (including blocks blasted) was added to the Base.

South Pier Works 12 Blocksetting was carried on through July and August, when 180 blocks were set which advanced the South Pier Superstructure by 112½ lineal

14
341

lineal feet. This progress may be considered good, and while an advance upon former years work, was not equal to the length of Superstructure built at the North Arm: the reason being, that the sea at this Arm, washing over the old ruined wall, so disturbed the water that the Divers could generally only work at low water.

13. The total length of the South Pier Superstructure at the close of the Quarter under review, was 3631½ lineal feet from the first block set on shore. Of this length 1344½ lineal feet is of the new bonded Section under the Restoration Estimate, commenced in July 1886.

Wavebreaker. 14 The length of Superstructure built during the Quarter, was protected with the Wavebreaker to an average width of 30 feet (being the range of the Titan Crane), when the Wavebreaker Crane carried on the protection shorewards. These Cranes conjointly dropped

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341

108 large Wavebreaker blocks according to the random system of the Sanctioned Design.

Rubble Base. 15 At the South Pier 12714½ Tons of rubble was deposited in the base as follows:-

360¾ Tons of Rubble was used in the Foreshore
562¾ " deposited as Base and
351 " of Base was formed by blasting old blocks recovered from the old pier Head by the Pontoon

Railways 16. All existing lines of Railway were kept in good order and renewals made where necessary - both at the Quarries and throughout the Works.

17. On the Piers 846 feet of Railway was removed, and 11456 Running feet of line relaid

18. On shore 1185 Running feet of Railroad was overhauled and partly renewed.

19 1380 Running feet of Broad Gauge line was also laid in connexion with the Beach Improvements for landing coal &c

Pallaveram Quarries 20 Seventy three trains were run from the Pallaveram Quarries during the Quarter, conveying 11141½ Tons

of

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of stone for the Works. Of this quantity 12530½ Tons was chips for Blockmaking and the remainder 1901 tons was pough Rubble stone for the Bases.

Concrete Blockmaking

21 The Work of Concrete Block-making was carried on steadily throughout the Quarter, with the exception of a few days necessary stoppages for repairs to machinery, holidays &c

22 The number of blocks made was 590, showing an outturn of 9881¼ Cubic Yards of Concrete in the Quarter. This branch of the Works, I am happy to state has now reached the maximum possible outturn with the present appliances.

In the Quarter ending	Sept'88	the outturn was	9085	cubic yards
"	"	"	March'89	"	"	9149
"	"	"	June'89	"	"	9590½
"	"	"	Sept'89	"	"	9881¼

Cost and Progress of Works

23. From the foregoing details a summary of the rate and cost of Progress, compared with the same Quarter last year comes out as follows:-

Statement

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Statement of work done and cost

Memo	Particulars	In Quarter ending 30th September 1888				In Quarter ending 30th September 1889			
		Quantity Rs.	Cost			Quantity Rs.	Cost		
A	Length of Superstructure built	744⅔ feet	29,701	13	"	242 3/4 feet	92,977	11	3
B	Number of Wavebreakers placed in position	131	34,858	7	7	×222	52,498	14	9
C	Cubic Yards of Concrete made	9085				9881 2/3			
D	Number of Concrete blocks made	530	1,02,789	13	14	590	1,17,957	1	5
E	Tons of chips received from Quaries for block-making	10550½	18,206	15	11	12486½ ×12550½	20,639	5	3
F	Do. Rubble do for foundations	55½	89	3	-	1901	3102	8	5

× 222 Wavebreaker blocks @ Rs 11-13-11 per cubic yard Rs. 47,431-11-0 × Total quantity received
includes the value of 155 blocks deposited in September 1889, but adjusted in the Accounts for October 1889.

24 In addition to the above figures will be found submitted with this report a complete statement of the expenditure on the Works× during the Quarter ending September 1889.

× in triplicate

25. It will be observed that the expenditure under many of the Sub Heads has already exceeded the cost estimated by Mr. Parkes, while the reconstruction of the Works is far from completion, this excess is due to the original rates being taken as

sufficient

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18/341

sufficient for the present Design and no allowance being made for the cranes having to be withdrawn for 4 months in each year when no progress could be shown which naturally increases the cost of Establishment and other Heads

26. The Trustees have before them my Estimate of cost for completing the Sanctioned Design submitted with my suggestions for a N.E. Entrance, in which I have shown the probable excess in the Sanctioned Design as Rs 3,82,545.

27. These figures I have now placed in the Statement of Expenditure side by side with the Sanctioned Estimate rates which when compared with the actual Expenditure to date will be found to be within my Estimate for the Eastern Entrance

Stores from England

28. The following vessels arrived from England during the Quarter with stores for the Works as follows:

In

11 SO 22 5 541

In July-

By the S.S "India". 790 Casks of Portland Cement containing - 150-18-3-20 Tons cwts qrs lbs
Also 33 Coils of Manilla rope weighing - 2-0-3-15
24 Guernseys for Divers. 3 Gross Coach Screws and 1 set of Divers Speaking apparatus.

By the S.S. "Manora" - 1500 Casks of Portland Cement containing - 286-12-0-16 Tons cwt qr lb

From Gopaulpore — By the S.S. "Africa" - 1200 Salwood slabs for Concrete Blockmaking

In August

By the S.S. "Goorkha" - 2400 Casks of Portland Cement Containing - 458-11-1-20 Tons cwt qr lb
also 4 Steel 75 lb rail non-reversible Crossings. Thirty two fish bolts and nuts. Twenty four Fang bolts. One Case containing 4 Cwt Rivets and 1 Cwt. Iron Washers

By the S.S. "Chyebassa"
1920 Casks of Portland Cement containing - 366-17-0-16 Tons cwt qr lb
also 6 dozens Railway Beaters

From Gopaulpore

By the S.S. "Canara" - 1695 Salwood Slabs for Blockmaking
" " "Malda" 1800 " "
" " "Lawada" 1000 " "
" " "Patna" 800 " "

In

12 Sep

30/341

In September

	Tons
By the S.S. "Navarino" - 1694 Casks of Portland Cement containing -	323-13-2.0
By the S.S. "Reira" - 2127 Casks of Portland Cement containing -	406-8-0.20
Also 57 Square Iron Shovels	
By the S.S. "Amphitrite"	
188-75 lb Steel Titan Rails weighing	50-7-2-5
162-50 lb " Rails "	29-8-1-18
200 Fish plates for 75 lb Rails	

From Gopaulpore

By the S.S. "Culna" 1500 Salwood Slabs &c
" " "Ellora" - 2209 " "

Return of work for the Quarter ending 30 Sept 1889

Surveys. A marine survey of the Roadstead, a survey denoting High Water Mark and sections of the North and South Pier bases were taken. The Iron beacon at the South Pier was moved two feet to the South.

Railway Lines. On the North Pier - 492 Running feet temporary Broad Guage and 150 Running feet temporary Metre Guage lines were taken up and 46 Running feet temporary Broad Guage and 500 Running feet temporary Metre Guage

Guage lines were laid. On the South Pier 204 Running feet temporary Broad Guage lines were taken up and 909 Running feet temporary Broad Guage lines were laid. The Sand line was extended 181 Running feet. In the North Pier yard 385 Running feet Metre Guage lines and 480 Running feet single line were laid in connection with the Running shed. In the South Pier Yard 200 Running feet Broad Guage lines and 375 Running feet single line were taken up and 420 Running feet Mixed Guage lines laid 1380 Rg^ft. Broad Guage line were laid in connection with the Beach Improvements.

Quarries- Seventy three (73) trains were despatched in the Quarter with stone from Pallaneram Quarries as follows:-

Rubble

	Tons
Total quantity received up to 30th Sept^r 89 -	362223 3/4
——— do ——— 30th June ——	360322 3/4
Received in the Quarter	1901

Chips

	Tons
Total quantity received up to 30th Sept^r 89 -	153983 1/4
——— do ——— 30th June ——	141452 3/4
Received in the Quarter	12530 1/2

Ball -

14 Sept
32
341

Ballast. None received

North Pier Surf bank - Nothing done since 30th Nov. 88

North Pier Rubble Base

Foreshore

	Large Rubble under Wave breaker	Widening Foreshore	Base
Total deposited up to 30th Sept. 1889 Tons	14286½	54700¾	119806¾
do - 30th June '89 "	14286½	54051¼	119425¼
In the Quarter	"	649½	* 381½

16 327½ Stone from Quarries
* 54 Two old blocks blasted by dynamite
381½

North Pier Superstructure

	Nos	Cubic Yards
Blocks set up to 30th Sept '89 -	1424 -	2304520/27
do 30th June '89 -	1210 -	1952219/27
In the Quarter -	214 -	352301/27

Running feet of new wall built up to 30 Sept '89 - 924
do 30th June " - 793½
In the Quarter 130½

Total length of wall completed from B. 2974 ft.
do T 924 "

North Pier Supplementary Works

Blocks deposited in Manchester

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Blocks deposited in Wavebreaker

	No of Blocks	Contents in cubic yards	distance on pier	average breadth from face of pier
Up to 30th Sept. 1889	2308 7/12	41870 5/12	"	"
do 30th April "	2194 -	39807 11/12	"	"
In the Quarter	* 269	4852½	2700 to 2794 - 28 ft.	
	+ 2 pieces	2790		
	155 blocks			
	= 114 blocks =	2062 7/12		
	+ 2 pieces			

221 New blocks
48 Old Blocks taken from 1st P.

*269

(¼ x ⅓) pieces of an old Wavebreaker block removed by Nth Pier Titan on 5th July '89

North Pier Capping - Nothing done since 30 June 1889
North Pier Cramps - ——— do — 30th April 1889
South Pier Surf Bank ——— do — 30th April 1888
South Pier Rubble Base

	Foreshore Large Rubble - understone breaker	Widening Foreshore	Base
Total deposited up to 30th Sept. 1889 -	120 61/2 -	38750½ -	123601
- do - 30th June " -	120 61/2 -	38389 3/4 -	122687 1/4
In the Quarter -	— " — .	360 3/4	* 913 3/4

562 3/4 Stone from Quarries
351 Thirteen old blocks blasted by dynamite

*913 3/4

South

16 Sep
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541

South Pier Superstructure c/o

Blocks set up to 30th Sept '89 - 1907 - 31113 1/9
do 30 June '89 - 1727 - 28146 1/9

In the Quarter 180 - 2968

Running feet new wall built up to 30th Sept. 89 - 1244 1/4
do 30th June '89 - 1132

In the Quarter 112 1/4

Total length of wall completed from Ts - 3631 1/4 ft.
do c 1244 1/4

South Pier Supplementary Works.

Blocks deposited in Wavebreaker

	c/f of Blocks	Contents Cubic yards	Distance on Pier	Average Breadth from face of Pier
Up to 30th Sept 89	1797	31333 25/216		
do 30 April '89	1689	29387 25/216	"	"
In the Quarter	108	1946	3579 to 3631	30 ft.

1 New block
107 old blocks from N.P. Jetties
108

South Pier Capping - Nothing done since 30th June '89
South Pier Cramps - do — 30th April '89

Protective Works - Nothing done

Concrete Blocks

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341

Concrete Blocks

Description of blocks	Made up to 30 June 89	Made in the Quarter	Total up to 30 Sept 89	Placed in Walls up to 30th June 1889	Placed in Walls up to 30 Sept 1889	In Yard	Remarks
Old blocks	806	"	806	806	806	"	
Wavebreaker blocks	3365	433	3798	3264	3286	512	
Superstructure							
North Pier bottom blocks	227	"	227	216	223	4	
" Middle "	750	"	750	728	743	7	
" Top "	248	"	248	239	244	4	
South Pier bottom "	477	22	499	340	412	87	
" Middle "	1343	72	1415	949	1171	244	
" Top "	523	34	557	335	448	109	
Special "	71	"	71	71	71	"	
Counterbalance "	1	"	1	"	"	1	
Special Abutment "	21	25	46	"	"	46	
Test Weight "	"	4	4	"	"	4	

988149 Cubic yards Concrete was made in the Quarter ending 30th September. There was no block making on the 1st, 13th to 28th July, on the 10th and 12th August and from 4th to 7th, 19 to 21st and 23rd to 28th September.

105 Wavebreaker blocks were

18 C.P. 26/541

were transferred from North to South block grounds 1034½ tons of Portland Cement was the balance on the Works at the end of the Quarter.

Miscellaneous. An extension of 24 feet was made to the running shed and the flooring and roof generally repaired

No 1 buoy was renewed, and moored to the inner or shore mooring chains. 155 Wavebreaker blocks were removed by the North Pier Titan from the North Pier foreshore of which 48 were replaced in the foreshore. 16 old blocks and two pieces were removed by the pontoon from site of work at the South Pier, of which 13 blocks were blasted by dynamite and added as rubble to the South Pier base. Three blocks and the two pieces were placed in position to be removed by the South Pier Titan. 3 old blocks of 27 tons each and 3 old pier head blocks of 5 tons each were removed by the pontoon from the site of work at the North Pier. Two 27 ton blocks were blasted and added as Rubble to the North Pier Rubble base and the remainder were placed

27/341

placed in position to be removed by the North Pier Titan.

Jobbs and Plant

Stationary Engine - The Superheater and pipe was cleaned & tarred

Stone Crushers - Two moveable and two eccentric jaws (spare) were fitted up, two new shoots and six hooks were made, and two shoots, twenty five hooks, two bars, and the iron work of two shoots were repaired

Stone Crusher No 1 - A new jaw and two new side wedges were supplied and the set plates refitted

— do — No 2. Two new jaws, a key for moveable jaw, two new side wedges and a new spout were fitted, the bands of the moveable jaw were restrunk, the grooves for set plates were chipped, and set plates and shoot fixed

— do — No 3. The bands of the moveable jaw were restrunk, and two new side wedges, set plates and two keys were fitted.

20 C.Y.
28
341

Stone Crusher No 5. A new eccentric jaw shaft and side wedges were supplied and keys for coupling and fly wheels refitted.

Elevators. Nine elevator boxes were repaired, and three box wheels were cast.

—do— No 1. The brake was repaired

—do— No 2. A new stay rod was fitted to the upright, and a bar to the wall timber.

—do— No 5. A new stay rod was fitted to the upright, and a "bar" to the wall timber

Concrete Mixers. Two spare mixer hammers were made

—do— No 1 A new door catch was supplied, all bolts were tightened, and a new trap door fitted to the hopper. The mixer pump was repaired and fitted with four new valves.

—do— Nos 2 & 3. The door catches were eased and all bolts tightened.

—do— No 4. The catches were eased and the bolts tightened and a hammer

29/341

hammer made and supplied.

— do No 5. A new box, a large spur wheel, an intermediate spur wheel with pin and a new pinion and plumber block bearing were fitted.

— do- No 6 Two new door catches, a new pinion; an intermediate spur wheel, and a hammer were supplied

— do No 7- All brass bearings were closed and a new catch was supplied

— do No 8. A new door catch and a hammer was supplied, and the water cock was fitted with a new plug.

Goliath Crane No 1- The cylinder cover joints were remade and brass bearings closed of travelling engine, and the cylinder cover joints of lifting engine were remade. Two new brass brake blocks, two slide blocks, a new gudgeon pin, and a key for fly wheel were made and fitted.

— do - No 2 - Was supplied with two new hydraulic piston leathers.

No 2

22 SP
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3/91

Light Traveller No 2 - Two new foot steps and boards were fixed

do - No 4 - Two tail boards were repaired

North Pier Titan - A distance bolt was repaired for the claws and the brace bearings of connecting rods closed

South Pier Titan - A stud was made and fitted to the pall handle, a catch for fire box door and a 7/8" spanner were made and the clack box and blow off cocks were ground

Miscellaneous - A new crossing, a hundred chair bolts, fifty 3/4" trenails, two 7/8" spanners, two 3/4" spanners and nine distance pieces were made and a crossing was repaired - Three brace nuts and a 5/8" spanner for water pipe for Divers pump, twenty 3/8" studs and four 1" chains were made, and seventeen shackles; four 1" sling chains, seven 1" + 3/4" chains, a 1/2" chain and an anchor were repaired for Divers. One hundred and fifty cottars two hundred 3/8" rivets, twenty fine washers for lewis pins and a hundred washers

and

23 52
31
341

and iron work for twenty end frames were made, ninety two 1¼" bolts, sixty cottars and forty joggle boxes were repaired for block frames. Fifty eye screws and two eyes for lewis pins were made, fifty nine pickaxes and twenty one crowbars were repaired for block grounds. A portable forge was thoroughly renovated. A chimney in the Smiths' shop was repaired. Seven concrete skips were repaired. A riding trolly was repaired. Twelve shackles, and two bands for buoys, one ½" and one ⅜" chain and iron tiller for survey boat "Coromandel" were made, and a ½" chain was repaired for marine survey purposes The survey boat "Hobart" was repaired. A boat was made for lifting blocks. Six chisels and four screw drivers were made and a hand hammer was repaired for carpenters shop. A mould was made for Apron blocks at the South Pier. Two shots

were

24 Sept 32/341

were made for the sounding rods. The doors and windows of the extended portion of the running shed were painted. No 1 hand pump was repaired and No 2 was fixed and a pump shed erected

Loco Engineer No 1. Was under thorough repair.

Do No 2. The brass bearings of connecting and coupling rods were closed. The waste water cocks were repaired ground and set. The copper stays of the fire box was caulked. A spectacle plate was straightened. The pressure gauge pipe repaired and the lead plug renewed. The blow through cock of the water gauge column was repaired. Two new lead washers were fitted to the front wash out plugs. The Left Hand front cylinder cover joints were made, and ferrules fitted to the spring balances to reduce the pressure to 90 lbs per square inch.

do No 3. The Right Hand front and back cylinder cover joints were remade.

The

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3491

The brass bearings of connecting and coupling rods were closed and the copper stays of the fire box were caulked. The boiler cocks were ground and two new lead washers were fitted to front wash out plugs. The waste water cocks were ground and set, and the gearing set and straightened. A new R.H. Gudgeon pin and a new volute spring for front draw hook were fitted. The tank and L.H. dummy gland joints were remade and ferrules were fitted to the spring balances to reduce the pressure to 90 lbs per square inch.

10 Ton travelling Jib Crane — A new jib, two new tie rods, two new brass bearings for rollers, and a feather for double gear pinion were made & fitted.

Block Trucks No. 9 — The pedestals were tightened.

do No. 10 — A coupling chain was supplied.

do No. 13 — Was rebuilt and painted.

do No. 15 — Was rebuilt and painted.

do No. 18 — New keys were fitted to leading wheels, all brass bearings were eased, and the keeps filled with waste

waste and grease, and the truck painted.

Sand Wagons — №3 was fitted with a new tail board hinge, and two new pins were fitted to draw hooks

—do— №4. Was supplied with three shackles and pins

—do— №5 Was fitted with a tail board hinge

—do— №7 Two new pins were fitted to the draw hooks

—do— №9. Was supplied with a pair of new wheels and a shackle and pin.

—do— №12 Was fitted with a draw hook.

—do— №16 Was supplied with two shackles and pins

Iron Pier — One hundred and twenty running feet for the half-width of the pier timber work, was renewed. At the T end, the timber work to four bays of 10 feet and a traverser beam was renewed & five pile caps were cast and fixed. Nine feet of the main water pipe was renewed and a small stand pipe with a tap was fitted for drinking purposes

27 SP 35/34

purposes. A staging for the North Doty lamp was under erection and Davits for the Pier ladders were in han

No 5 B. P. Crane. Was thoroughly repaired.

B. Class Cranes. Twelve thimbles and twenty four S. hooks were fitted and six eye bolts made.

No 5 + 6 Sentry boxes. Were repaired.

No 22 Truck. The wheels were repaired and the truck tarred.

No 26 Truck. Was thoroughly repaired.

No 50 Truck. Was supplied with a new brake handle.

No 2 Turntable in Custom House. A new pall and bracket was fitted.

Harbour Trust Office. The staircase was repaired.

North Goods shed (tiled). A partition was made and fitted with two doors and a window.

The market building at Cacoimode underwent repairs.

A ramp, and bridge over the Storm Water overflow drain at the South Pier was erected, leading to the Madras Stable Compound

28 Co

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341

Company's shed for landing horses.

I have the honour to be,
Sir
Your most obedient Servant,
A. Lee Popham
Engineer, Harbour Trust Board.

No 1177 29

37/41

From

The Engineer

Harbour Trust Board

Madras.

To

The Chairman

Harbour Trust Board.

Madras 9th January 1890

Sir

In submitting the Quarterly Report of September 89, I have the honor to inform you that the remaining reports overdue are written and will follow as soon as they can be fair copied.

2. I shall be glad if you will be good enough to point out to the Trustees that the delay in the submission of these reports is not due to negligence on my part, but that I was forced to delay them on account of the extra amount of work I had during the latter half of 1889. My time was fully occupied with the several Estimates required in connection with the Beach Improvement Bridew Home, Iron Pier &c in addition to the Abutment question and designing of the Special blocks.

3. Next came the setting of the Mavelon blocks

...rks in orderly rows and their removal
...which required my presence continually
...t of doors) the revetment north of the
...rbour and the Marine Survey of the Road,
...ad which kept myself and Assistant
... of office for two months on end; Besides
... this, there was the difficulty with the
...Mayaram Quarries; and when all is
...sidered, I have no hesitation in saying
...t this office has turned out more work
...an was ever before attempted by any
... in Charge; Consequently I feel that
...ra 3 of the order on the Quarterly report
...ence being allowed to be Submitted to
Secretary of State without some explanation
the delay on the Report, is rather a severe
...ure for the past difficulties I have had
...encountered.

I have &c.

(Signed) A. Lee Pogson.
Engineer, Harbour Trust Board

(True copy)

C. Pinhorn

Secretary
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 10th day of January 1890.

× × ×

23. Read letters from the Board's Engineer No 1176 dated 9th January 1890, Submitting report on the Progress made on the Harbour works during the Quarter ending 30th September 1889, with Statement of expenditure Compared with the Sanctioned Estimate for the Quarter ending 30th September 1889; and No 1174 explaining the delay in forwarding the report.

Recorded, and resolved that the report be Submitted to Government with Mr. Pogson's explanation of the delay in forwarding it. The Board Considers the report very Satisfactory and is glad to observe that the report for the Quarter ending 31st December 1889 will soon be ready for Submission.

× × ×

True Extract

C. Pinhorn

Secretary
Harbour Trust Board

38 A

P.W. Sec 2
541/90

Mar 38/90
3

PROCEEDINGS OF THE MADRAS GOVERNMENT.

From the Chairman, Harbour
& Inust. Board. Madras
Ex. Govt. Engineer to the Marine Dep.

3268

To
The Chairman,
M.H.T. Board
Marine Department

Dec W 61/90

Secs
24/Jan

READ the following

No. 138 of 11th January 1890
of 17th January 1890

The report will be forwarded to the Secretary of State for India.

The order referred to in 3rd of the Papers below
177 of 9th January 1890 is
No. 3660 M. of 26th December 1889,
and was duly communicated
to the Marine Department

2
Ad No. 241/2 of 3-2-90

To
The Right Honble
the Secy of State for India

My Lord,

In continuation of
our despatch No. 3660 M. of 26th
December 1889, without date
we have to forward a copy of
the Proceedings of the
Board of Harbour Engineers
of Madras upon the
report from Major

Madras Sanitary Works

for the quarter ending 3

September 1889.

2. A plan shewing th

state of the works at the e

of the quarter, and a st

ment comparing the

penditure with the sa

tioned estimate, are s

forwarded for inform

tion.

We have &c

Lucas
22-1-90

Price
22.1.90

Accd
5/2/90

G.O. No 341 dt 3.2.90

Cu

Govt. of India

PUBLIC WORKS

Dated Wrsuk

Read.

G.O., [illegible] 187, No.

Madras Harbour.

W. K. O.

Ordered that the [illegible]
& part of the
Quarter Cuds: &c.
be forwd to
Secretary of
for India.

Forwg the Plans
of the Madras Ha.
works for gran
Sept. 78

MADRAS HARBOUR WORKS.

Comparison of Expenditure to date with Sanctioned Estimate for the ~~month~~ Quarter ending 30th September 1889.

Sub-head of Work.	As per Estimate. Quantity.	Rate.	Per.	Cost.	As per Revised Estimate No 1 for Completing Eastern Entrance (Transmitted accompanied Engineer's Letter No 949 dt 1st Oct 1889) Quantity.	Rate.	As Executed. Cost. Total up to 31st December 1884.	During the ~~month~~ Quarter.	Up to date.	Arrears not paid.	Grand Total as compared with Estimate.	Remarks.
1	2	3	4	5	5A.	6	7	8	9	10	11	12	13
As per Old Estimate.		Rs. A. P.		Rs.				Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	
orks	.....	... ...	...	49,15,752		...	.....	5509324 8 10	- - -	5509324 8 10	- - -	5509324 8 10	
tablishment	.....	... ...	...	3,57,612		...	.....	529904 - -	- - -	529904 - -	- - -	529904 - -	
ols and Plant	.....	... ...	...	4,71,801		...	.....	515282 6 -	- - -	515282 6 -	- - -	515282 6 -	
Total...	.....	... ...	...	57,45,165		...	.....	6554490 14 10	- - -	6554490 14 10	- - -	6554490 14 10	
New Estimate.													
eration and extension of block ground ...Prely...	.....	... ...	...	8,000	5892	...	.....	- - -	- - -	5882 3 6	9 13 6	5892 - 11	
North Pier.													
Rubble Stone in Foreshore and Base.													
linary deposited from break-water ... ... Tons	5,532	1 8 0	Ton	8,297	4865	2730	1 12 -	- - -	- - -	4865 - -	- - -	4865 - -	
Do. from boats ... ... ,,	1,82,260	2 0 0	,,	3,64,520	417169	179564½	1 15 11	- - -	4233 1 4	376380 4 7	9853 - 2	386013 4 9	
rge ordinary deposited under wave breaker from reak-water ... ... ,,	14,750	1 12 0	,,	25,812	19513	11149⅝	1 12 -	- - -	- - -	19512 9 -	- - -	19512 9 -	
ncrete blocks for buildings ... ... C. yds.	58,116	9 0 0	C. yd.	5,23,044	480003	224214⅔	10 11 6	- - -	41830 10 8	247013 10 -	- - -	247013 10 -	
ting blocks at commencement of new work ... ,,	2,062	2 0 0	,,	4,124	5418	2616½	2 1 1	- - -	- - -	5411 1 2	- - -	5411 1 2	
Do. from 2,200 to 3,600 feet ... ,,	35,245	2 8 0	,,	88,112	131573	24461⅔	2 6 5	- - -	11182 6 2	42127 3 1	- - -	49127 3 1	
Do. at Pier head ... ... ,,	20,809	3 0 0	,,	62,427	58837	-	- - -	- - -	- - -	- - -	- - -	- - -	
ncrete in mass for filling ... ... ,,	500	10 0 0	,,	5,000	4188	363	4 6 3	- - -	- - -	1188 - 7	- - -	1188 - 7	
Wave Breaker.													
lt blocks ... ... C. yds.	288	10 0 0	C. yd.	2,880	2692	288	9 5 7	- - -	- - -	2692 - -	- - -	2692 - -	
inary concrete blocks ... ... ,,	70,849	9 0 0	,,	6,37,641	776268	379778⅓	10 4 10	- - -	8759 - 6	391190 4 2	- - -	391190 4 2	
ositing do. ... ... ,,	70,849	1 0 0	,,	70,849	91471	45527⅓	- 16 6	- - -	1411 1 6	36113 2 7	1147 5 6	37260 8 1	
on blocks ... ... ,,	1,667	9 0 0	,,	15,003	14980	-	- - -	- - -	- - -	- - -	- - -	- - -	
ing do. ... ... ,,	1,667	4 0 0	,,	6,668	4488	-	- - -	- - -	- - -	- - -	- - -	- - -	
crete in bags ... ... ,,	742	12 0 0	,,	8,904	17287	-	- - -	- - -	- - -	- - -	- - -	- - -	
mps ... ... No.	330	10 0 0	Each	3,300	1818	136	2 13 9	- - -	- - -	388 12 11	- - -	388 12 11	
crete capping ... ... C. yds.	22,400	10 0 0	C. yd.	2,24,000	148962	24855	16 4 2	- - -	132 2 10	6273 9 9	- - -	6373 9 9	
Total for North Pier ...	.....	... ...	...	20,50,581	2113625			- - -	50029 7 11	1140639 3 10	10800 5 8	1161439 9 6	
South Pier.													
Rubble Stone in Foreshore and Base.													
inary deposited from break-water ... ... Tons	675	1 8 0	Ton	1,013	-	-	- - -	- - -	- - -	- - -	- - -	- - -	
Do. from boats ... ... ,,	1,69,517	2 0 0	,,	3,39,034	439063	115316	2 9 6	- - -	5726 14 8	418697 4 2	9923 2 2	428821 - 4	
ge. deposited from break-water													
crete blocks for building ... ... C. yds.	52,183	9 0 0	C. yd.	2,26,317	18076	6446⅔	12 - -	- - -	- - -	- - -	- - -	- - -	
ncrete blocks ... ... ,,	57,066	9 0 0	,,	5,13,594	415812	31198½	5 14 8	- - -	2307 4 4	340586 11 9	- - -	340586 11 9	
positing blocks ... ... ,,	57,066	1 0 0	,,	57,066	53477	4123⅓	1 3 3	- - -	1452 10 9	36488 12 4	1199 7 4	37688 3 8	
ron. do. ... ... ,,	1,667	9 0 0	,,	15,003	10080	-	- - -	- - -	- - -	- - -	- - -	- - -	
ncrete in bags ... ... ,,	1,667	4 0 0	,,	6,668	4488	-	- - -	- - -	- - -	- - -	- - -	- - -	
amps ... ... No.	742	12 0 0	,,	8,904	14346	624	5 8 -	- - -	2169 - 1	2167 - 1	61 - -	2210 - 1	
ncrete capping ... ... C. yds.	19,200	10 0 0	Each	2,750	1344	43	3 7 3	- - -	- - -	493 14 4	- - -	493 14 4	
Total for South Pier ...	.....	... ...	...	17,76,482	176026	176026	21 13 2	- - -	577 6 1	10722 10 1	- - -	10722 10 1	
								- - -	77558 - 8	1262233 8 10	11174 7 6	1273407 14 4	
s and Plant	.....	... ...	...	3,19,529	453446	-	- - -	- - -	4870 11 1	393381 10 10	199 5 7	393581 - 5	
				3,19,529								393581 - 5	
ingencies at 2½ per cent.	.....	... ...	...	1,03,865	24988	-	- - -	- - -	2912 4 9	62806 8 6	7153 12 -	© 69959 4 5	
				1,03,865								69959 4 5	
ting entrance	.....	... ...	...	20,000	20000	-	- - -	- - -	- - -	- - -	- - -	- - -	
blishment	.....	... ...	...	3,11,594	465830	-	- - -	- - -	14458 10 3	333999 14 8	112 6 -	334112 4 8	
				3,11,594								334112 4 8	
rials at site (concrete blocks in yards) ... C. yds.	.....	... ...	...	-	19422⅔		12 - 1	- - -	33879 14 3	212320 7 1	23276 - 8	235596 7 9	
nces to work-people	.....	... ...	...	-	-		- - -	- - -	24 - -	4994 14 5	- - -	4994 14 5	
r stores	.....	... ...	...	-	-		- - -	- - -	- - -	29706 5 3	8042 2 -	117748 5 3	
Total of Estimate and value of work done ...	.....	... ...	...	45,90,051	5060138			- - -	183733 - 11	3445963 10 9	140768 5 11	3586732 - 8	
ct Probable recoveries due to sales of Tools and Plant					96537			- - -	-3705 - 3	-41245 11 10		-41245 11 10	
Total	.....	... ...	...	45,90,051	4972596			- - -	180028 - 8	3404718 14 11	140768 5 11	3545486 4 10	
ct Arrears due	.....	... ...	...					.....	.....	.....	.....	140768 5 11	
Outlay to date by books	.....	... ...	...					.....	.....	.....	.....	3404476 4 11	
ct Total Outlay to end of last year	.....	... ...	...					.....	.....	.....	.....	*3033478 5 7	
Total								.....	.....	.....	.....	371238 9 4	
ct Value of Stock								.....	.....	.....	.....	29706 5 3	
Total								.....	.....	.....	.....	* 3403232 4 1	
Net Debits to Suspense Heads during the year ...	.....	... ...	...					.....	.....	.....	.....	-38360 - 7	
Debits of the year	.....	... ...	...					.....	.....	.....	.....	303172 3 6	
ut for 188[illegible]-90, Rupees	.....	... ...	...					.....	.....	.....	.....		

* Outlay on Works up to 31st March 1889
— 33 — during the Current year (from 1st April to 30th September 1889)
Total Net outlay up to 30th September 1889.

33,75,010-9-8.
30,33,478-5-7.
3,41,532-4-1.

Madras,
9th January 1890.

Accountant
M. Harbour Office.

A. Lee Pogson
Engineer, Harbour Trust Board.

Triplicate

Orders No. 2709-S-6 M. H. Contributions towards M. I. Ins. President Funds.

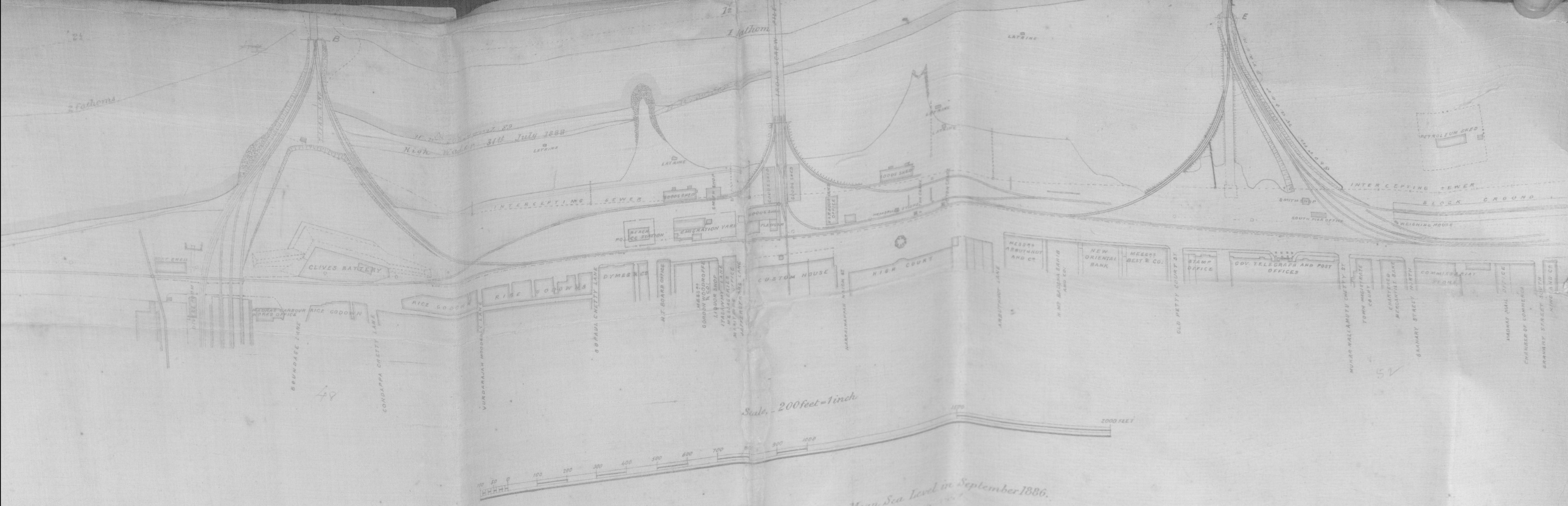
H.H.W.

Plan accompanying Progress Report for quarter ending September 89.



K.H.W.

Plan accompanying Progress Report for quarter ending September 89.



A. Lee Pogson
Engineer
Harbour Trust Board

LITHOGRAPHED BY THE LAWRENCE ASYLUM PRESS, MADRAS, 1889.