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TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

Public work DEPARTMENT

G.O. No.	1953 W	Press.
B.P. No.		Mis.
Dated	24-7-1879	197

Not to be folded or roughly handled

1953

GOVERNMENT OF MADRAS.
PUBLIC WORKS DEPARTMENT.

24th July 1879, No. 1,953 W.

Buildings and Roads.
Civil Works.

Read the following paper :—

No. 173. From F. N. THOROWGOOD, Esq., M. INST. C.E., Superintendent, Madras Harbour Works, to the Secretary to Government, Public Works Department, Buildings and Roads, dated Madras 3rd July 1879, No. 20 W.

I HAVE the honor to submit the following report of the progress on these works during the past month of June.

2. NORTH PIER SUPERSTRUCTURE.—The weather during June has been very favorable for work, and only on the 27th and 28th diving operations were stopped by a heavy ground swell. Work was carried on on twenty-three days, and in that time 240 blocks were set, advancing the pier by a length of $146\frac{1}{2}$ lineal feet, and making the total length of blockwork from the commencement $1,706\frac{1}{2}$ feet on June 30th. From the 17th to the 26th, that is to say on eight consecutive working days, the advance was 72 lineal feet, the greatest length that has ever been accomplished in the same time, and since the 28th this rate of progress has been kept up.

3. NORTH PIER RUBBLE BASE.—The rubble base has been kept sufficiently in advance of the work by means of cargo boats without the use of the hopper barges. There is now a good foundation for a distance of 400 feet in advance of the blockwork, and a certain amount of stone is deposited over the whole length of the straight portion of the North Pier. During the past month 8,836 tons of stone were deposited, and since January 1st of this year the amount disposed of in the North Pier base alone has been 62,992 tons. Next month the formation of the base round the curve will be commenced which will need constant surveying and great care.

January	...	...	...	9,524
February	...	...	...	15,793
March	...	...	...	14,158
April	...	...	...	9,465
May	...	...	...	5,216
June	...	...	...	8,836
				62,992

4. BLOCKMAKING.—From the 19th to the 29th blockmaking was suspended for want of cement. There was English cement in store, but I did not wish to use it all up for blockmaking, and as General Morgan's April, May and June deliveries of cement were improving so much in quality I relied upon that supply for keeping up the stock of blocks. There have been 282 blocks made during June, of which 43 were made by hand labor at the South Pier blockground. At present 18 blocks per day are being made with Morgan's cement which is now supplied for most excellent quality and in fair quantities. Since January 1st of this year, there have been 1,596 blocks made on the works, equivalent to about 40,000 tons of concrete.

January	...	...	...	221
February	...	...	...	196
March	...	...	...	318
April	...	...	...	179
May	...	...	...	400
June	...	...	...	282
				1,596
				39,900 tons.

5. I am making the blocks now with a rather more vertical slope or inclination than formerly. There has always been hitherto a tendency for the end row of blocks "to run out" at the foot and thereby give too much slope to the face. I am greatly in hopes that the alteration now being made will stop this tendency. Moreover in going round the curved work the difficulty of building will be increased by reason of the batter, and the more nearly vertical this is made within certain limits the simpler the work of construction becomes. It is therefore desirable to get the change carried out before the curve is commenced. This point has been discussed with Mr. Parkes and he is not against the experiment being made. If the blocks run out at the foot with the new arrangement of batter the worst that can happen is for them to reach the angle of inclination originally intended.

6. QUARRIES.—The Umbathoor quarries are in excellent working order, and the supply of laterite in the portion now being worked is practically unlimited. During June 10,736 tons of laterite were sent down to Madras which kept two trains working daily. Next month the outturn will be increased to what it was in March and April.

7. The quarries on the South Indian Railway have been rather a source of anxiety lately. In the Pallavaram district there exist two descriptions of stone in contiguous places. Both kinds are granite, but one is durable and the other is not, owing to an excess of felspar. It now becomes a difficult matter to prevent some of the felspathic granite from being mixed with the good stone, and as I cannot, notwithstanding frequent visits to the quarries, fix a division or boundary between good and bad rock, I have to trust to close inspection and rejection of the inferior kind of stone. I had recently proposed closing the quarry at the 15th mile and doubling the sidings at Pallavaram with a view to getting all stone from that place, and thus doing away with the four additional miles "lead," but I am now reluctant to give up the other quarry so long as good stone can be obtained from it.

January	...	...	20,057
February	...	...	32,784
March	...	...	35,453
April	...	...	25,702
May...	...	...	16,412
June	...	...	24,445

154,858

8. During June the South Indian Railway quarries supplied 13,709 tons of stone of different sizes, and the total amount brought in the past month from all sources was 24,445 tons. Since January 1st 1879 there has been a grand total brought to these works of 154,858 tons of stone of all sorts.

9. SOUTH PIER SUPERSTRUCTURE.—From the 1st to the 7th June the work at the South Pier progressed steadily and 53 blocks were set. In lowering the last block the mitre wheels which form the reversing gear of the crab on the Titan broke all to pieces, but fortunately without doing any bodily harm to the men standing below. I can assign no reason for this mishap except the vibration of the Titan which may possibly have caused a toothed wheel to get jammed.

10. The gearing is complicated and difficult of repair. No duplicates and no patterns were supplied with the Titan so new patterns of all the broken parts have had to be made and the castings are now being turned and fitted in the Public Works Shops. The Titan will probably not be at work again for several days yet. Owing to this accident no work has been done since the 9th June, the advance during the month being only 23½ lineal feet and the total length built being 1,327 feet. The total advance of the South Pier during the past six months has been 327 lineal feet.

11. SOUTH PIER RUBBLE BASE.—The rubble base for the South Pier has been tipped during June from cargo boats entirely, and the amount deposited has been 7,238 tons. There is now a good foundation for 350 feet in advance of the block work and stone is deposited in large quantities for 300 feet further. There has hitherto been no appearance of sand on the surface of the rubble base and we may therefore conclude that this obstruction has been left behind altogether.

12. PROTECTIVE WORKS AND ALTERATION IN COAST LINE.—There has not been any great alteration in the coast line to the north of the harbour during June. Encroachment has gone on in the fishing village north of Cassemode, and in the

neighbourhood of Mr. Coleman's house protective measures have still had to be carried on. The accompanying plan on a scale of 500 feet to an inch has been extended as far northward as any great alteration has occurred. The contour line of June 30th is shown in blue dots. To the south of the harbour the advance of the shore line has not been so rapid as in former years, and it may safely be assumed that each successive season's advance will be less than the previous one, as predicted by Mr. Parkes before the commencement of these works.

13. For the protective works north of the Harbour 1,900 tons of large laterite boulders were used in June, and this quantity was distributed over extension of groynes to the north and keeping up the revetment to the road by Mr. Coleman's compound. The total quantity of laterite used on these protective works since 1878 is now 15,342 tons.

14. The groyne to the south of the pumping station near the Fort has been extended about 20 feet seaward, and it hitherto has answered the purpose for which it was intended perfectly well. The advance of the sandy foreshore in front of the Fort is not yet serious.

15. INTERCEPTING SEWER ALONG BEACH.—The intercepting sewer has now been built from the pumping station to the inside of the south surf bank, a length of 3,120 feet, and here I have stopped work until receipt of further orders. The subject of the design and dimensions of the remaining portion is now under discussion, but it will not be out of place for me to remark here that I have this day learnt that Mr. Parkes sees no objection to the use of a supplementary open channel for the overflow during heavy rains.

16. STEAM BARGES "HOBART" AND "SALISBURY."—The two steamers were at Coringa and Cocanada on June 30th, but the *Hobart* is daily expected at Madras. She would have been here before but for delay in receipt of her crew's wages. It seems that there is some difficulty in arranging for the payment of the wages by the Public Works Department owing to the Public Works Officer living some distance from Cocanada and Coringa. The *Salisbury* has had her bottom doors renewed at Coringa and is not yet ready for sea. She will come to work however during July.

17. STORES RECEIVED ON WORKS.—During June the following vessels brought stores and materials to the works. The S.S. *Hindustan* with cement and sundry stores. The S.S. *Penguin* with 1,130 casks of cement. The S.S. *Merkura*, *Mirzapore* and *Sirahuna* with cement, canvas, diving dresses and sundries. The S.S. *Chunda* and *Ethiopia* with 445 sal wood sleepers from Gopalpur supplied by the Forest Department.

18. With regard to these sleepers I am placed in rather a difficult position. Having calculated carefully the estimated cost per sleeper from the Forest Department, and being convinced that sal wood was the most durable timber for the price that could be obtained, I ordered 6,000 sleepers from the Forest Department Officer at Gunsur. The price of the sleepers delivered at Gopalpur is Rupees 2-12-0 per sleeper, and I estimated that this price would be increased to about 4-13-0 delivered at Madras. (See G.O., No. 1,440 W., dated 23rd May 1879, paragraph 16 of letter.)

19. The first consignment of 113 brought by the *Chunda* cost, with all charges paid, about Rupees 4-12-8 per sleeper, as the freight was charged by measurements as is usual I believe with timber cargo. The second consignment of 332 by the *Ethiopia* has the freight charged by weight, at the Government contract rate with the British India Steam Navigation Company of Rupees 25 per ton. This brings the cost per sleeper to nearly Rupees 6, or more than I have paid formerly for teak.

20. If the British India Steam Navigation Company insist on payment by weight instead of by measurement, I shall be obliged to stop the supply from Gopalpur and shall have to get sleepers from some other place. I shall in the meantime obtain the advice of the Harbour Committee on the subject, as each step of the arrangement has been hitherto referred to them. I have applied to the Agents

of the British India Steam Navigation Company at Madras and they are unable to interfere in any way.

21. PLANS, SECTIONS, &c.—Three tracings accompany this report, one is a plan showing the east and the works to a scale of 500 feet to an inch, referred to in paragraph 11. The two sections show the state of the rubble base in advance of each pier.

22. On the plans submitted monthly to Government there is necessarily a great amount of repetition in tracing the streets, buildings, &c. The principal elements to be shown on the plans, however, are the advance of the two piers and the alterations on the coast. As a matter of fact nearly the whole time of the Draughtsmen is taken up in preparing these monthly tracings, and I find it difficult to get any working drawings (such as are constantly needed for carrying on the work) taken in hand. I would therefore respectfully suggest that as the work has now got into a tolerably forward state, and as much Draughtsmen's work will be needed in the coming six months preparatory to building the curves, it may be considered sufficient to submit a plan to Government once every three months in future. The written progress report will give the rate of advance every month.

23. EXPENDITURE.—The expenditure on the works up to the end of June 1879 has been Rupees 28,33,417, subject to corrections in detail on account of issues and receipt of stores.

No. 174. ORDER THEREON, 24th July 1879, No. 1,953 W.

RECORDED, in continuation of G.O., No. 1,850 W., dated 14th July 1879.

2. With reference to paragraph 1 of G.O., No. 1,619 W., dated 17th June 1879, the attention of the Harbour Works Committee will be drawn to paragraph 4 of the Superintendent's report in regard to the improvement in quality of Morgan's cement.

3. Separate orders will be issued on paragraph 16 of the report in respect of the superintendence and payments connected with the steam hopper barges while at Cocanada.

4. His Grace the Governor in Council does not approve of the suggestion contained in paragraph 22, to submit in future a plan to Government once every three months. While continuing to furnish the plans and progress reports monthly as at present, the Superintendent should arrange for using lithographed plans on which there would be no trouble in indicating progress monthly. This arrangement will obviate the inconvenience complained of in regard to the exclusive employment of the Draughtsmen on the monthly tracing.

(True Extract.)

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

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

Exd. S. T. Austin.
Spare Copies

BUILDINGS AND ROADS
PUBLIC WORKS

GOVT. OF MADRAS

PUBLIC WORKS.

THE SUPERINTENDENT,
MADRAS HARBOUR WORKS

Date: July 1879

Issue

Recd.

Recd.

G. O. No. 240, 1879, No. 1903 W.

JULY.

No. 173-174.

MADRAS HARBOUR WORKS Progress Report
for June 1879, recorded with remarks.

Mr. Grace to Mr. J. J. J. J.
Mr. W. W. W. W.

Order for Approval

Progress Report of
the Harbour works
in June.

In forwarding this to
the General information it
is only necessary for me
to draw attention to
the statement in para
1st Jan which it
seems Mr. Parker sees
no objection to the use
of a Supplementary Open
Channel in connection
with the interrupted
dunes - No reason was
assigned and it is
of course impossible
now to obtain them
in time, but I see no
reason in this report

Cir 17.7.79. Retd 21.7.79
15.7.79

to modify the
specimen I have already
submitted in this
series of illustrations

I am not quite
satisfied that it will
be a good arrangement
to substitute in
proposed quarterly in
the annual monthly
tracings of progress
but there are of course
no objection to the
use of lithographed
plates on which the
work can be made
in indicating progress
monthly - indeed I
do not clearly see why
this was not done
before

If on enquiry it
should appear that
there is no objection
to this arrangement
I shall write to Paris

5/19/79 I am sure have the
requisite alterations
made in the order
before use

Att

17-7-79

No objection to
Lithographing but
Monthly plates &
Reports of the
Antiquary

D. W.
Phase arrangement
arranged
21/7/79 Att

M

From

THE SUPERINTENDENT,
MADRAS HARBOUR WORKS.

To Colonel R. H. Sankar, R. G.
Secretary to Government, P. W. Dept.
Buildings & Roads
Fort St. George, Madras 3rd July 1879.

SIR,

I have the honor to submit the following report of the progress on these works during the past month of June.

North Pier.
Superstructure.

2. The weather during June has been very favourable for work and only on the 27th and 28th diving operations were stopped by a heavy ground swell. Work was carried on on 23 days and in that time 240 blocks were set advancing the pier by a length of 146½ lineal feet, and making the total length of block work from the commencement 1706½ feet on June 30th. From the 17th to the 26th that is to say on eight consecutive working days, the advance was 72 lineal feet, the greatest length that has ever been accomplished in the same time, and since the 28th this rate of progress has been kept up.

North Pier.
Rubble Base.

3. The rubble base has been kept sufficient-
ly in advance of the work by means of cargo
boats

boats without the use of the Hopper barges. -
There is now a good foundation for a dis-
tance of 1100 feet in advance of the blockwork
and a certain amount of stone is deposited
over the whole length of the straight portion
of the North pier. During the past month
8836 tons of stone were deposited, and since
January 1st of this year, the amount dis-
posed of in the North pier base alone
has been 62,992 tons. Next month the
formation of the base round the curve will
be commenced which will need constant
surveying and great care. -

3. From the 19th to the 29th blockmaking
was suspended for want of cement. There was
English cement in store but I did not wish
to use it all up for blockmaking and as
General Morgan's April, May and June
deliveries of cement were improving so
much in quality, I relied upon that sup-
ply for keeping up the stock of blocks. There
have been 282 blocks made during June
of which 43 were made by hand labour
at the South Pier block ground. - At present
18 blocks per day are being made with
Morgan's cement which is now supplied
of

Blockmaking

Quarries

2/53 p 2
of most excellent quality and in fair quanti-
ties. Since January 1st of this year there
have been 1596 blocks made on the works,
equivalent to about 40,000 tons of concrete. -
4. I am making the blocks now with a
rather more vertical slope or inclination
than formerly. - There has always been
hitherto a tendency for the end row of
blocks to "run out" at the foot and thereby
give too much slope to the face. - I am
greatly in hopes that the alteration now
being made will stop this tendency. - More-
over in going round the curved work the
difficulty of building will be increased by
reason of the batter, and the more nearly
vertical this is made within certain limits,
the simpler the work of construction becomes. -
It is therefore desirable to get the change
carried out before the curve is commenced. -
This point has been discussed with Mr. Parker
and he is not against the experiment being
made. - If the blocks run out at the foot
with the new arrangement of batter the
worst that can happen is for them to reach
the angle of inclination originally intended. -

5. The Umbathoor quarries are in
excellent working order and the supply of
limestone

laterite in the portion now being worked is practically unlimited. During June 18736 tons of laterite were sent down to Madras which kept two trains working daily. Next month the outturn will be increased to what it was in March and April.

6 The quarries on the South Indian Railway have been rather a source of anxiety lately. In the Pallavaram district there exist two descriptions of stone in contiguous places. Both kinds are granite but one is durable and the other is not, owing to an excess of felspar. It now becomes a difficult matter to prevent some of the felspathic granite from being mixed with the good stone, and as I cannot, notwithstanding frequent visits to the quarries, fix a division or boundary between good and bad rock I have to trust to close inspection and rejection of the inferior kind of stone. I had recently proposed closing the quarry at the 15th mile and doubling the sidings at Pallavaram with a view to getting all stone from that place and thus doing away with the 14 additional miles "lead" but I am now reluctant to give up the other quarry so long as

as good stone can be obtained from it.

7. During June the South Indian Railway quarries supplied 13,709 tons of stone of different sizes and the total amount brought in the past month from all sources was 24,465 tons. Since January 1st 1874 there has been a grand total brought to these works of 154,858 tons of stone of all sorts.

South Pier
Superstructure.

8. From the 1st to the 7th June the work at the South pier progressed steadily and 53 blocks were set. In lowering the last block the mitre wheels which form the reversing gear of the crane on the Titan broke all to pieces but fortunately without doing any bodily harm to the men standing below. I can assign no reason for this mishap except the vibration of the Titan which may possibly have caused a toothed wheel to get jammed.

9. The gearing is complicated and difficult of repair. No duplicates and no patterns were supplied with the Titan so new patterns of all the broken parts have had to be made and the castings are now being bored and fitted in the Public Works Shops. The Titan will probably not be at work again for several days.

days apt. Owing to this accident, no work has been done since the ninth June, the advance during the month being only 20½ lineal feet, and the total length built being 1327 feet. The advance of the South Pier during the past six months has been 627 lineal feet.

10. The rubble base for the South pier has been tipped during June from barge boats entirely, and the amount deposited has been 1238 tons. There is now a good foundation for 350 feet in advance of the blockwork and stone is deposited in large quantities for 300 feet further. There has hitherto been no appearance of sand on the surface of the rubble base and we may therefore conclude that this obstruction has been left behind altogether.

11. There has not been any great alteration in the coast line to the North of the harbour during June. Encroachment has gone on in the fishing village North of Casemode, and in the neighbourhood of Mr. Coleman's house protective measures have still had to be carried on. The accompanying plan on a scale of 500 feet to an inch has been extended as far northward as any great alteration has occurred. The contour line

South Pier.
Rubble Base

Protective
Works & alterations
in Coast line.

Intercepting
sewer along
Beach.

9/1953 174
of June 30th is shown in blue dots. To the South of the harbour the advance of the shore line has not been so rapid as in former years and it may safely be assumed that each successive season's advance will be less than the previous one as predicted by Mr. Parkes before the commencement of these works.

12. For the protective works North of the Harbour 1900 tons of large laterite boulders were used in June, and this quantity was distributed over extension of groynes to the North and keeping up the revetment to the road by Mr. Coleman's compound. The total quantity of laterite used on these protective works since 1878 is now 15,342 tons.

13. The groyne to the South of the pumping station near the Fort has been extended about 20 feet seaward and it hitherto has answered the purpose for which it was intended perfectly well. The advance of the sandy fore-shore in front of the Fort is not yet serious.

14. The intercepting sewer has now been built from the Pumping Station to the inside of the South Surf bank, a length of 3120 feet, and here I have stopped work until receipt of further orders. The subject of the design and

and dimensions of the remaining portion is now under discussion, but it will not be out of place for me to remark here that I have this day learnt that Mr. Parker sees no objection to the use of a supplementary open channel for the overflow during heavy rains. —

15. The two steamers were at Coringa and Coconada on June 30th, but the "Hobart" is Steam Barge "Hobart" daily expected at Madras. She would have been here before but for delay in receipt of her crew wages. It seems that there is some difficulty in arranging for the payment of the wages by the Public Works Department owing to the Public Works Officer living some distance from Coconada and Coringa. The "Salisbury" has had her bottom doors removed at Coringa and is not yet ready for sea. She will come to work here on July 1st.

16. During June the following vessels brought stores and materials to the works. Stores received on works
The S.S. "Hindustan" with cement and sundry stores. The S.S. "Penguin" with 1130 casks of cement. The S.S. "Merchandise" "Mizapore" and "Sirdhana" with cement, canvas, diving dresses and sundries. The S.S. "Chanda" and "Ethiopia" with 1145 Sal wood sleepers from

25
from Gopaulpore supplied by the Forest Department.

17. With regard to these sleepers I am placed in rather a difficult position. Having calculated carefully the estimated cost of sleepers from the Forest Department and being convinced that Sal wood was the most durable timber for the price that could be obtained, I ordered 6000 sleepers from the Forest Department Officer at Gummur. The price of the sleepers delivered at Gopaulpore is Rs 2. 12. per sleeper, and I estimated that this price would be increased to about Rs 13 delivered at Madras (see G.O. No. 11445 dated May 28th 1879 para 16 of letter).

18. The first consignment of 113 brought by the "Chanda" cost with all charges paid about Rs 14. 12. 8 per sleeper, as the freight was charged by measurement as is usual I believe with timber cargo. The second consignment of 332 by the "Ethiopia" has the freight charged by weight at the Government contract rate with the British India Steam Navigation Company of Rs 25 per ton. This brings the cost per sleeper to nearly Rs 6, or more than I have

have paid formally for leak.

19. If the British India Steam Navigation Company insist on payment by weight instead of by measurement, I shall be obliged to stop the supply from Japan/Java and shall have to get sleepers from some other place.

I shall in the meantime obtain the advice of the Harbour Committee on the subject as each step of the arrangement has been hitherto referred to them. I have applied to the Agents of the British India Steam Navigation Company at Madras and they are unable to interfere in any way.

20. Three tracings accompany this report, one is a plan showing the coast and the works to a scale of 500 feet to an inch, referred to in para 11. The two sections show the state of the rubble base in advance of each pier.

21. On the plans submitted monthly to Government there is necessarily a great amount of repetition in tracing the streets, buildings &c. The principal elements to be shown on the plans, however, are the advance of the two piers and the alterations on the coast. As a matter of fact
nearly

Plans sections

400

Expenditure

1879
nearly the whole time of the draughtsmen is taken up in preparing these monthly tracings, and I find it difficult to get any working drawings (such as are constantly needed for carrying on the work) taken in hand. I would therefore respectfully suggest that as the work has now got into a tolerably forward state, and as much draughtsmen's work will be needed in the coming six months preparatory to building the curves, it may be considered sufficient to submit a plan to Government once every three months in future. The written progress report will give the rate of advance every month.

22. The expenditure on the works up to the end of June 1879 has been Rs 28,33,417, subject to corrections in detail on account of issues and receipt of stores.

I have the honor to be
Sir,

Your most obedient servant,

J. N. Moorcroft

Superintendent
Madras Harbour Works

GO. N. 1619 N. 17-6-79
N. 1850 N. 14-7-79

Buildings & Roads

From
The Superintendent
Madras Harbour Works

Per 24-7-79 No. 1953 W

to 20-18
Dated 3rd July 1879

N^o of Enclosures 3
W. only

Progress of works
Submits Report for
June 1879

175
Cir 17.7.79. P. 21.7.79
L. 18-7

2/53 1953 W
Public Works Department.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Under date the 24th July 1879
Read the following:—

From
The Supt. M. H. Works (N. N. 20 W of 3rd July 1879)

Recorded, in
continuation of G.O. N. 1850
dated 14th July 1879.

2. With reference to para
1 of G.O. N. 1619 W dated
17th June 1879, the attention
of the Harbour Works
Committee will be drawn
to para 3 of the Super-
tendent's report in regard
to the improvement in
quality of Morgan's
Cement.

3. Separate orders

MR

will be issued on para
15 of the report in respect
of the superintendence and
payments connected with
the Steam Hopper Barges
while at Cocanada.

4. As suggested by
the Supt. Harbour Works
in para 24 it will be
sufficient to submit a
plan to Govt. once every
three months in future,
but the sections should be submitted
instead of monthly as
at present.

D.
15-7

M.H.

17-7-79

Wd
15-7

To City 15-7-

Hon W. Huddleston
H. S. Sec. General

Substitute para 4
written on
unrecipd
Sheet

Wd
24-7

35
14

Supt. M. H. W. H. A.
Secy: H. W. Committee
Marine Dept. of
Despd 6-8-79

Proposed para - 4. As the Govt. the
Governor in council does
not approve of the
suggestion contained in
para 21 to submit in
future a plan to Govt.
once every three
months, while continuing
to furnish the plans
and Progress Reports
monthly as at present,
the Superintendent should
arrange for ^{using} ~~having~~ the
Lithographed plans on
which there would be
no trouble in indicating
progress monthly - This
arrangement will
obviate the inconvenience
complained in regard
to the ^{excessive} employment of
the

the Draughtsmen on
the monthly tracing

\$ 200

per
for
the

1/2
24

C. 5062

Sept. of 1870 Madras

PUBLIC WORKS.

To

Dated

Issued

Recd.

Cont.

24 July 1870 No. 1763 W

Nos. 175-179

Introduce Harbour works

progress report for June

1879. recorded with remarks