

(1) Number of pages _____

(2) Date of repair _____

(3) Initials of the Referencer _____

MADRAS RECORD OFFICE

Government of Madras

Public Works DEPARTMENT

G.O. No.	2536	Press	<i>Original</i>
B.P. No.		Mis.	
Dated	22-9-	1876.	
		-195-	

Not to be folded or roughly handled

No. 371. Read the following letter from Major P. MONTGOMERIE, R E, Officiating District Engineer, Presidency, to Major-General G W. WALKER, R E, Chief Engineer and Secretary to Government, Public Works Department, dated Fort St George, 2nd September 1876, No 3,019 —

BEFORE reporting to Government the progress made in carrying out "the measures recommended by the Committee appointed in G O, No. 727, dated 6th July 1876, (Public Department,) for ameliorating the condition of the river Cooum,"

1 Register of heights of water in Cooum.
1 Cross Section of Cooum Bar
2 Estimates.
1 Data

the immediate execution of which measures was ordered in G O, No 1,992, dated the 3rd August 1876, I have the honor to draw your attention to the very considerable discrepancy which exists between the measures actually suggested by the Committee (for the execution of which I furnished them with an approximate estimate) and the work which it would appear the Government expect to be done for the same money

2 The Committee in their report state that they are of opinion that the "only remedy" for the evils complained of is to "dilute" as much as possible the contaminated contents of the river, and they consequently recommend that the Cooum Bar be cut to "mean tide level" to a width of 100 feet, and that the cutting be kept open to the depth named until heavy rain falls and the river assumes its monsoon condition. In the approximate estimate furnished by me, I have only allowed for the cutting being made to the mean sea level (according to DeHaviland's B.M.) as required by the Committee. But the Government in their order under reference add that "the Cooum Bar will accordingly be cut down to low water level," which is upwards of 3 feet lower than the level recommended by the Committee and for which my approximate estimate only allows

3 As the amount placed at my disposal is quite inadequate to cut the bar to low water level, and as the effect of such a proceeding (even if it were possible by manual labor alone) under the present condition of the river would most probably be to expose the "contaminated contents" of the river to a most dangerous extent; instead of "diluting" them as much as possible as recommended by the Committee, I have considered it my duty, until the receipt of more explicit orders from Government on the subject, to carry out, as far as possible, the recommendations made by the Committee

4 To enable me to explain what has been done in the matter, I beg to enclose the register of the heights of water in the river Cooum for the months of July and August 1876, in which I have entered in a diary form the state of the bar for each day since the commencement of operations, with other information connected with the subject. I also submit a cross section of the bar taken before it was cut down to mean sea level, on which are shown the different levels of the sea and of the Cooum as compared with Major DeHaviland's mean sea level, and also the effect produced by one tide in silting up the cut.

5 The process of silting up is so rapid and certain that, before the level of the sea reaches the level to which the cut has been made, a considerable barrier of sand is thrown up by the waves alone, and this barrier, if unattended to, would reach the height of the original surf bank in about four days. From this it will be evident

that the only sea-water that can be admitted into the river under its present condition must be by the wash of the waves

6. Owing to the very great difficulty experienced in clearing out the sand from the cut daily to the full width of 100 feet, the results were so unsatisfactory that I had almost made up my mind to recommend the discontinuance of the work. As a last resource, however, on the 21st instant, a funnel-shaped cut was attempted; this was carried out by excavating a channel only 3 yards wide from the edge of the Cooum (B) (*vide* section) to the centre of the surf bank (A), and the outer section only of the bank (A C D) was cut out and thrown into the sea for about 70 or 80 feet on either side of the channel; the effect of this was that the advancing waves (along the whole width of the 150 feet) were caught on the ledge formed between C and D and rolled down the narrow channel in such volume that for about two or three hours there was a constant flow of sea-water into the Cooum averaging from

3 inches to 1 foot 3 inches in depth, with
a velocity of from $\frac{1}{2}$ to 3 feet per second*

according to the size of the waves, the width of the channel being gradually increased to about 15 feet by the action of the water, and shoaling up again as the tide began to recede.

7. It has been found advisable to discontinue the work for about five days between the periods of springs, as no satisfactory work can be done while the tide is advancing and until about one and a half hours after it commences to recede, and the coolies will not work at night without extra pay.

8. In the first period (from the 8th to the 12th instant) during which the operations have been carried out, a good deal of rain fell, and it is difficult to say how much of the rise in the Cooum was due to rain-water and how much to the influx of the sea. But during the second period (from the 19th to 25th instant) no rain fell, and it is evident that the rise of the Cooum from 20 19 on the 22nd to 20 22 on the 23rd, and which was maintained at the latter height during the 24th and 25th, must have been due to the sea-water alone admitted through the funnel-shaped cut, and by the lowest estimate we may allow that the quantity of water admitted was sufficient to overcome evaporation, &c, &c, or sufficient to raise the Cooum $\frac{1}{8}$ th of an inch

9. The surface area of the water in the Cooum basin is 8,000,000 square feet, so that at the least 83,333 cubic feet of sea-water must have flowed into the Cooum during the 23rd, 24th, and 25th instant, respectively

10 With regard to the rise and fall of the tide at Madras, there is absolutely no data whatever, and as Government have ordered that a permanent gauge not to be erected by the District Engineer at the Pier end, I have been obliged to fall back upon approximate tidal observations made with a floating gauge in the sea. These observations give the mean level of the sea during August 1876 to be 10 1 inches lower than the mean sea level recorded by DeHaviland's B M, and this may be accounted for by the fact that the south-west monsoon has been blowing steadily off shore for about three months, when the north-east monsoon comes round again the mean level of the sea may be as much above the recorded level as it is at present below it. This process of piling up of water may be seen on a small scale in any

tideless fresh-water lake or reach of a river which has been subjected to a constant current of wind in one direction for a length of time.

11 I propose continuing these observations during the month of September, when the sea at Madras is said to be exceptionally calm. And I am in hopes of being able to arrive at some fairly reliable data by the use of different descriptions of floats.

12 In conclusion, I have the honor to submit for sanction as directed the formal estimate for keeping the Cooum Bar open (as far as practicable) up to the end of October, amounting to Rupees 2,000, with an estimate for filling up the pond near the Marine Villa amounting to Rupees 1,530. The extra Conservancy Establishment authorized has been engaged, and will be employed in clearing the banks from all offensive deposits or accumulations until the setting in of the monsoon. And arrangements are being made with the Municipality regarding the settling tanks at the mouths of the drains near Government House Bridge.

No 372 ORDER THEREON, 22nd September 1876, No 2,536.

CIVIL WORKS, No. 24.

(a) *Heads of Service* — Provincial
Fund — Ordinary
Class — Original Works
Main-head — (3) Miscellaneous Public Improvement
Sub-head — A, Inland Improvement
Section — IV, Miscellaneous
Name of Work — Cutting the Cooum Bar and filling in a lagoon behind the Marine Villa.
Amount { Bar Rupees 2,000, No 143 W
 { Lagoon „ 1,530, „ 144 W
To be carried out by the Public Works Department

HIS GRACE the Governor in Council sanctions the estimates of Rupees 2,000 and Rupees 1,530, for cutting to mean sea level and keeping open the Cooum Bar until the end of October, and for filling in the lagoon behind the Marine Villa, for immediate execution; provision of funds being made from the Reserve under Provincial.

2 It was not expected that the bar should have been cut to low water level at the same cost as estimated for opening it to mean sea level. But, as it appears that the cut is now confined to a much more moderate width than that of 100 feet originally estimated, it may be possible, as it appears to be desirable, considerably to increase its depth at the same cost

3 This sanction has been registered as Provincial Nos 143 and 144 W. of 1876-77.

(True Extract)

Colonel,

Offg Under Secy to Govt, P.W.D

To the District Engineer, Presidency
„ Examiner of Public Works Accounts
„ Marine Department

Exd. E C Shunker
Spare Copies

(a) Heads of Service—*Provincial*

Fund. *Military*

Class. *Original Works*

Main-head. (3) *M. Public Improvement*

Sub-head. *A. Inland Improvement*

Section. *IV. Miscellaneous*

Name of Work. *Cutting the Comm. bar and filling
in a Lagoon behind the Marine Villa*

Bar. *Rs 2000 N^o 143 W.*

Amount *Lagoon 1530 N^o 144 W.*

To be carried out by the *P. W.* Department.

Print in the margin of G. O. N^o 2586 of 22-9-76—

S. C. V.

*Major R. E.
Offg. District Engineer
Presidency.*

Presidency District.
 Estimate No. 229. 1876. 77.

Work.. Cutting the bottom of the Bar to Mean Sea Level
 according to De Havilland's Bench Mark and
 keeping the cut open while the tide suits wide G. O. No.
 1992 dated 3rd August 1876

Outlay from 7th to 22nd August.

Opening the Bar originally & once afterwards.	217 . .
Keeping Bar open for 12 days.	126 6 .

Total outlay for 22nd August No. 643 6 .

Estimated cost during September & October.

Opening the Bar four times.	280 . .
Keeping Bar open for thirty days	1050 . .

Total for September & October 1330 . .

Tools and Contingencies— 26 10 .

Total cost for opening the Bar—2000 . .

For Lt. Genl George
 2nd Sept 1876. 3.

Comd. C. V.

Montague
 Major R. E.
 Offr District Engineer
 Presidency.

P.W.D.
4 1276

11.11

Register of the heights of water in the River Corum
at the Wallajah Bridge and in the Fort Ditch.
at Wallajah Lunette Bridge

During the months of July and August 1876
The zero to which these heights refer is 20 feet below Mean Sea Level
according to De Havilland's Bench Mark

Month. and Date.	Corum	Fort Ditch.	State of Tides and Rain fall Rain fall in inches	Remarks
1876				
1	20.02	21.05		
2	20.01	21.04		
3	19.99	21.03		Sunday
4	19.98	21.05		
5	19.94	21.06		
6	19.93	21.05	0.04	
7	19.92	21.04	HW 7 30 AM	
8	19.91	21.02		
9	19.90	20.99		Sunday
10	19.89	20.97	0.01	
11	19.88	20.98	0.17	
12	19.89	21.06	0.04	
13	19.90	21.05	0.11	
14	19.91	21.05	0.52	
15	19.92	21.05	0.05	
16	19.93	21.02	0.79	Sunday
17	20.05	21.03		
18	20.03	21.02		
19	20.01	20.98		
20	20.-	20.95		
21	20.-	20.95	HW 7 30 PM	
22	20.08	21.-	0.07	
23	20.08	20.98	0.10	
24	20.10	20.97	1.05	Sunday
25	20.09	20.97	0.03	
26	20.09	21.01	0.16	
27	20.10	21.01	0.01	
28	20.08	21.01		
29	20.09	21.02		
30	20.06	21.01	0.01	Sunday
31	20.15	21.12	0.11	

Level of Corum on 7 March 1876 when
the observations were commenced was 20.50
This level fell steadily until the 29th
April 1876 when it was 19.83
The lowest level was on the 30 & 31 May 1876 19.78

Month & Date Current East State of Tide and Rain fall. Remarks.

1876					Rain
1	20 13	21 07			
2	20 12	21 06			
3	20 11	21 02			0.02
4	20 31	21 07			0.74
5	20 27	21 03	OHW 7:30 AM		
6	20 24	21 01		SUNDAY	
7	20 21	20 99		Bar was cut & opened on evening of 8 th	Approximate tidal observations with a floating gauge
8	20 23	20 97		0.23	H.W.C. ^{in sea} 21.87 — 16.19
9	20 21	20 96		0.08	Bar opened. 21.17 — 17.31
10	20 25	20 91		di. di.	21.49 — 16.99
11	20 27	20 93		0.01	di. di. 21.19 — 16.72
12	20 26	20 95		di. di.	— 16.99
13	20 25	20 95		SUNDAY	Sea rough.
14	20 24	20 95		0.06	Sea very rough.
15	20 21	20 97		0.04	No satisfactory observations taken.
16	20 22	20 98			
17	20 20	21 00		0.03	Tide did not get to cut the Bar
18	20 20	21 02			Bar was again cut & opened on evening of 19 th
19	20 19	21 03	H.W 7:30 P.M.	0.03	21.38 — 17.24
20	20 20	21 03			21.32 — 17.10
21	20 18	21 03		SUNDAY	Kept opened 21.35 — 16.72
22	20 19	21 05		Bar opened.	Gauge out of order
23	20 22	21 03		di. di. fuel cut	
24	20 22	21 05		di. di. 5	Mean of above
25	20 22	21 07		di. di. 2	H.W.C. 2 W.C.
26	20 26	21 14		0.14	Levee again stopped 21.39 — 16.87
27	20 31	21 30			Mean Rise & Fall of Tide in August } — 14.62
28	20 35	21 30			Mean Low of Sea in August 1876 } — 19.13
29	20 35	21 33			
30	20 17	21 43			
31	20 51	21 17			

W. Montgomerie
Major P.E.
Off. District Engineer
Presidency

Fort Saint George
2nd September 1876

Leulatin only
2/9/76

P.W.D.

4 1376

No. 3411

2

Dated 2nd 3 September 1876.
Recd.

Register of the heights
of water in the River Cooum.

Surk. A. Gunge }
(29 September 1876)

Exd Calculations only

29/9/76

No 2287 1876-77.

Approximate Estimate for filling the Lagoon behind
the Marine Villa in Government Park Madras, prepared
agreeably to the District Engineer's Presidency Orders and
P.O. No. 1992 dated 3 August 1876.

Measurements					Rate		Amount	
No.	Length	Breadth	Depth	Content	Rs	P	Rs	P
1	5606	12	6409	Cubic Yds in Government Park	2 1/2	30	1226	5
2	4250	12	6048	Cubic Yds taken from Government House	6	00	226	9
Deduct 2.5 Per Cent							77	2
Total Estimate							1530	0

Monty Lewis Major R.E.
Offg. District Engineer
Presidency

No. 3019.

9 f 1

From,

The District Engineer
Presidency

To,

The Chief Engineer, and
Secretary to Government,

P.W.D.

Sir,

Before reporting to Government the progress made in carrying out the measures recommended by the Committee, appointed in G.O. No. 127, dated 6th July 1876 (Public Deptt) for ameliorating the "condition of the River Cooum" - the immediate execution of which measures was ordered in G.O. No. 1992, dated the 3rd August 1876, I have the honor to draw your attention to the very considerable discrepancy which exists between the measures actually suggested by the Committee for the execution, of which I furnished them with an approximate estimate, and the work which it would appear the Government expect to be done for the same money.

2 The Committee in their report state that they are of opinion that the "only remedy" for the evils

Encls:

- 1 Register of heights of water in Cooum
- 1 Cross section of Cooum Bar.
- 2 Estimates
- 1 Data.

evils complained of is to "dilute" as much as possible the contaminated contents of the river, and they consequently recommend that the Cozum Bar be cut to "mean tide level" to a width of one hundred feet, and that the cutting be kept open to the depth named until heavy rain falls and the river assumes its monsoon condition. In the approximate estimate furnished by me I have only allowed for the cutting being made to the mean sea level (according to Des Saviland's B.M.) as required by the Committee. But the Government in their order under reference add that "the Cozum Bar will, accordingly, be cut down to 'low water level,' which is upwards of three feet lower than the level recommended by the Committee and for which my approximate estimate only allows.

3 As the amount placed at my disposal is quite inadequate to cut the Bar to low water level, and as the effect of such a proceeding (even if it were possible by manual labor alone) under the present condition of the river would most probably be to expose the "contaminated contents" of the river to a most dangerous extent, instead of "diluting" them as

as much as possible, as recommended by the Committee. I have considered it my duty until the receipt of more explicit orders from Government on the subject, to carry out as far as possible the recommendations made by the Committee.

4. To enable me to explain what has been done in the matter I beg to enclose the Register of the heights of water in the River Cozum for the months of July and August 1876 in which I have entered in a diary form the state of the Bar for each day since the commencement of operations with other information connected with the subject. I also submit a cross section of the Bar taken before it was cut down to mean sea level, on which are shown the different levels of the sea and of the Cozum as compared with Major Des Saviland's mean sea level - and also the effect produced by one tide in silting up the cut.

5. The process of silting up is so rapid and certain that, before the level of the sea reaches the level to which the cut has been made, a considerable barrier of sand is thrown up by the waves alone, and this barrier if unattended

unattended to would reach the height of the original surf bank in about four days. From this it will be evident that the only sea water that can be admitted into the river under its present condition must be by the wash of the waves.

b Owing to the very great difficulty experienced in clearing out the sand from the cut daily to the full width of 100 feet the results were so unsatisfactory that I had almost made up my mind to recommend the discontinuance of the work. As a last resource however on the 21st instant a funnel shaped cut was attempted: this was carried out by excavating a channel, only 3 yards wide from the edge of the boom (B) (wide section) to the centre of the surf bank (A), and the outer section only of the bank (A, C & D) was cut out and thrown into the sea for about 70, or 80 feet, on either side of the channel; the effect of this was that the advancing waves (along the whole width of the 150 feet) were caught on the ledge formed between C and D, and rolled down the narrow channel in such volume that for about 2, or 3 hours there was a constant flow of sea water into the boom

11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

boom averaging from 3" to 1.3" in depth with a velocity of from $\frac{1}{2}$ to 3 feet per second according to the size of the waves, the width of the channel being gradually increased to about 15 feet by the action of the water, and shoaling up again as the tide began to recede.

7. It has been found advisable to discontinue the work for about 5 days between the periods of springs as no satisfactory work can be done, while the tide is advancing, and until about $1\frac{1}{2}$ hours after it commences to recede, and the coolies will not work at night without extra pay.

8. In the first period (from the 8th to the 12th instant) during which the operations have been carried out, a good deal of rain fell, and it is difficult to say how much of the rise in the boom was due to rain water, and how much to the influx of the sea. But during the second period (from the 19th to 25th instant) no rain fell, and it is evident that the rise of the boom from 20.19 on the 22nd to 20.22 on the 23rd, and which was maintained at the latter height during the 24th and 25th must have been due to the sea water alone

alone, admitted through the funnel shaped cut, and by the lowest estimate we may allow that the quantity of ^{admitted} water was sufficient to overcome evaporation & ~~was~~ sufficient to raise the ~~bottom~~ ^{bottom} $\frac{1}{8}$ of an inch.

9. The surface area of the water in the Coorun basin is 8,000,000 square feet, so that at the least 83,333 cubic feet of sea water must have flowed into the Coorun during the 23rd, 24th, and 25th instant respectively.

10. With regard to the rise and fall of the tide at Madras there is absolutely no data whatever, and as Government have ordered that a permanent gauge is not to be erected by the District Engineer at the River end, I have been obliged to fall back upon approximate tidal observations made with a floating gauge in the sea. These observations give the mean level of the sea during August 1876 to be $10\frac{1}{2}$ inches lower than the mean sea level recorded by De Saviland's B.M. and this may be accounted for by the fact that the S.W. Monsoon has been blowing steadily off shore for about 3 months, when the N.E. Monsoon comes

G.O. No 1956 of
2nd Aug 1876

comes round again the mean level of the sea may be as much above the recorded level as it is at present below it. This process of piling up of water may be seen on a small scale in any tideless fresh water lake or reach of a river which has been subjected to a constant current of wind in one direction for a length of time.

11. I propose continuing these observations during the month of September when the sea at Madras is said to be exceptionally calm. And I am in hopes of being able to arrive at some fairly reliable data by the use of different descriptions of floats.

12. In conclusion I have the honor to submit for sanction as directed the formal estimate for keeping the Coorun Bar open (as far as practicable) up to the end of October amounting to Rs 2,000 with an estimate for filling up the Pond near the Marine Villa amounting to Rs 1,530. The extra Conservancy Establishment authorized has been engaged, and will be employed in clearing the banks from all offensive deposits or accumulations until the

the settling in of the Monsoon. And arrangements are being made with the Municipality regarding the settling tanks at the mouths of the drains near Govt House Bridge

I have the honor to be

Sir,

Your most obedient servant

Monty Henri Napier
Offg District Engineer
Presidency

Fort St George
2nd Sept. 1876

Enc.
JP

685-4-75 No 36
 " 7-1-76 - 43
 " 2-2-76 - 289
 " 4-4-76 - 886
 26-6-76-1597 & 1598
 " 6-7-76 - 34
 " 2-8-76 - 1956
 " 3-8-76 - 1992

P.W.D.

4176

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From

The District Engineer
Residency

The Chief Engineer
S.P.W.

Recd 27/9/76
11/11

Order No 3019

11 Plan given & Librarian
submit report & plan

the cutting of the town

road & the surrounding

with the water

No 371

Recd 19.9.76 Ptd 22.9.76
 Cir - 13.9.76
 Wd 25.9.76

From the District Engineer, Residency
 No 3019 dated 2nd September 1876.

FOR ORDERS.

Submitted for
Orders.

The Chief Engineer is
 of opinion that it is not
 worth while incurring
 any more outlay in
 opening the Bar only
 to mean sea level.

Major Genl R.R.
 Secretary to Govt P.W.

1111

FOR ORDERS.

Public Works Department.

PROCEEDINGS OF THE MADRAS GOVERNMENT

UNDER date the

22 Sept 76

Read the following —

From

The District Engineer
Presidency

(H.C. No. 3019 of 2nd Sept 1876)

His Grace the
Governor in Council sanc-
tions the Estimates of
Rs 2000, and Rs 1530,
for cutting to Mean
Sea Level and Keeping
open the Coorn Bar
until the end of October,
and for filling in the
Lagoon behind the
Marine Villa, for im-
mediate execution; provision
of funds being made
from the Reserve under
Provincial.

St

His Honor, J. J. Jones

2 It was not expected that the Bar should have been cut to Low Water Level at the same cost as estimated for opening it to Mean Sea Level. But as it appears that the cut is now confined to a much more moderate width than that of 100 feet originally estimated, it may be possible, as it appears to be desirable, considerably to increase its depth at the same cost.

This sanction has been registered as Provincial Nos 143 & 144 N. of 1876-77

N^o 371/72

ms dep: to DE 22/9
H. E. President
J. A. H. H. J.
Maine Dep: J.
Decd 9/10/78

X. L. H.

6411 

Gobt. of 1876 Madras.
PUBLIC WORKS.

To

The N. E. Presidency

Dated

Issued

Recd

Encl

G. O., *22/10/76* 1876, No. 2536

Nos. 371/72

Cutting the Coom bar
& filling in a Lagoon
behind the Marine Villa
772-2000 & 721530
Estimates for —
sanctioned by

*Left to Mr. [unclear]
10-10-76
[unclear]*