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(2) Date of repair 22 12 64

(3) Initials of the Referencer _____

MADRAS RECORD OFFICE.

Government of Madras.

Public Works **DEPARTMENT.**

G.O. No. 34 57	Press
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Dated 3 — 12 — 18 64.	

Not to be folded or roughly handled

[Signature]

*Proceedings of the Madras Government, Public Works Department,
3rd December 1864.*

No. 49. Read the following letter from Lieutenant-Colonel J. C. ANDERSON, R. E., Superintending Engineer, 2nd Division; to Colonel C. A. ORR, R. E., Secretary to Government, Department Public Works, dated Masulipatam, 18th November 1864, No. 101.—
SIR,

1. I have the honor to furnish some further particulars of the effects of the late storm on the 1st instant, in continuation of my letter, No. 98, dated 2nd instant.

2. The boat referred to in paragraph 3, which had been capsized in the Ellore Canal, ten miles from Bazoarah, was found bottom upwards. It was stove in; two men, strange to say, were taken out alive, and nineteen corpses; ten or twelve more were said to be missing. Excepting in this case, and at Bazoarah, but few fatal accidents seem to have occurred at a distance from the coast.

3. No authentic intelligence from Masulipatam was received till the night of the 4th instant, when a note from Mr. Thornhill, to his Head Assistant arrived, and made known the extent of the disaster that had occurred there. Great consternation was created among the Government servants and numerous residents in the bazaar, who had their families or relatives at Masulipatam. One man reported that he had tasted the Canal water at Pamurroo (18 feet above sea level) and had found it salt, and the general impression was that the town had been entirely washed away.

4. I started by Canal from Bazoarah on the morning of the 5th instant, and succeeded in reaching Nedemole by the evening. The Canal was obstructed in many places by fallen trees; houses were every where unroofed; the Cholum crop, where it had attained a height of about two feet, was laid, and numerous boats* were

* 17 in all.

sunk or driven up on the lunkas or fields; but on the whole the effects of the storm were not so severe as they had been in the gorge at Bazoarah. In the reach below Veerunky lock I saw the marks of a wave upwards of 6 feet above the usual level (19 feet above ordinary high water). I was informed that a wave had passed over Nedemole lock gates, and though it is possible that the fresh water in the canal may have been heaped up in this manner, it is also possible that sea water may have been mixed with it, and that the statement regarding salt water at Pamurroo, though it appeared incredible at first, may have been strictly true. The actual water mark of the wave over the surface of the country was afterwards noted by Captain Hasted near Nedemole, where the level is between 12 and 13 feet above ordinary high water.

5. From Nedemole to Sultanagram bridge on the outskirts of the Petta I passed in the night, traversing extensive pools of water and drift wood. At day light, I saw the ground in the vicinity of the bridge streamed with corpses. Two of the five arches of the bridge had fallen down, and it was only by scrambling over the ruins that a passage could be effected. I then walked through Robertson Pett to my own house, the greater portion of the road being still 2 feet under water. Many people were then leaving the place, others again were coming in to look after their friends. The appearance of the streets I passed through was hideous; not a house was uninjured, many were heaps of ruins; trees and drift wood, boxes, furniture, &c, were conglomerated in masses, where they had met with an obstruction sufficient to hold them, and scores of dead bodies were to be seen by the roadside.

6. The rest of the Petta, various quarters of which I visited subsequently were in a similar state. Some a degree better, others worse; but as the Collector will have furnished much more complete reports on the state of the town than I have the means of giving, I need not enter further into the subject.

7. With regard to the height to which the wave which inundated the place rose, it was apparently higher in the front line of the station than in the back, and higher at the Fort than either. At my own house, which is in the rear line (near St. Mary's Church), I find the level of the ground on which the house stands to be 7 feet 2 inches above ordinary high water; the floor is 3 feet 10 inches higher, and the sea rose 1 foot 3 inches on the floor. The height of the latter

would therefore be 12 feet 3 inches above ordinary high water. There can be no room for doubt as to the accuracy of this observation, as besides a well defined water line on the walls, I found an equally well defined line in some glasses, in a cellaret which was not opened till some days after the storm, while the lower tier of glasses were brimful of salt water. By means of the latter I have been able to ascertain, from the sediment deposited (measured by a graduated rain gauge measure) that the proportion of mud carried in suspension by the sea water was $\frac{1}{4}$ of its bulk. This would be considered enormous in a river in high flood, and I have mentioned the fact, as the quantity of mud deposited in the station and over the sandy plains in the vicinity is very striking.

8 The level I have mentioned 7 feet 2 inches above ordinary high water, is nearly the average level of the ground on which the houses in the station and principal line of bazaar are raised. Some few isolated points are 3 feet higher; but these are quite exceptional; while the great mass of the lower class of houses in the Petta are in a lower level, 4, 5, and 6 feet above high water. The height of the water that passed over the place may therefore be estimated at from 8 to 4 or 5 feet, excepting in a few favored spots; and impelled as the wave was by a hurricane of tremendous force, it is not surprising that the havoc it created was frightful. The European community were, under Providence, indebted for their escape to the circumstance that their houses are built on well raised platforms and to the short duration of the flood at its full height.

9. The Manager of my Office, his wife, and a young Overseer, Mr. Carr, who lived with them, occupied a house in Cantonment. It was found a heap of rubbish the following day, and all three were drowned. Near the remains of the house lay a part of the keel of a ship, the lower beam of which was 60 feet long, and this may possibly have been instrumental in destroying the house.

10. In the Fort, in proportion to population, there was even greater loss of life than in the town. The ramparts had been in part removed, and there were no topos or other obstacles to break the force of the wave. The huts of the natives were almost entirely swept away, and the East Indian community and the few Europeans in the Fort, also suffered severely. Mr. Fruvall had ten of his family buried in the ruins of his house. One of the rear gates of the tidal lock must have been dashed against it, and probably was the cause of its destruction. It still lies on the top of the ruins many feet above high water, and at the distance of a quarter of a mile from the lock.

11. As regards the damage done to Government property, I would beg to report that in the non-delta Taluqs, it is chiefly confined to the untiling of roofs of Taluq Cutcherries, Travellers' Bungalows and other permanent buildings, and to the destruction of Police huts and temporary sheds. A few tanks of minor importance have been breached, and the roads have also been injured in some places, and avenues very much destroyed. In the Delta the Ellore Canal, as far as the Kistna limit, has stood well, though heavy drainage had to be passed across it. The Commamoor Channel has been subjected to very heavy floods, and a number of breaches have occurred. Most of the tanks which are fed by it escaped, as there had been a drought previously, and few or none of them were full. I have received no report that any masonry works on that channel have suffered, and I have no reason to apprehend that the paddy crop will have suffered.

12. On the Nizampatam Canal there has been considerable damage in the lower section. The sea passed inland for a considerable distance (it is supposed six feet above its usual level), and washed away the canal embankments, destroying also a considerable quantity of paddy in the low lying lands. Locks and other masonry works are uninjured however, and Lieutenant Vibart roughly estimates that 7,000 Rupees will repair the damage. The tidal lock at the terminus of the canal which would have been completed in about six weeks was submerged, and great delay will be experienced in baling out the water and in re-commencing work, especially as there is so great a demand for bricklayers at Masulipatam. A considerable loss of life occurred in numerous villages along the coast and inland, a few casualties are reported, among them the loss of four tank-diggers at Dooggerallah.

13. On the Masulipatam Canal there were a few breaches between Bazoarah and Akumuroo, 43 miles, which have since been closed. The embankments have also been a good deal

injured by the wave, but not so severely as to require any extraordinary outlay for their repair. Between Akumuroo and the Fort, the banks are washed away in some places; the principal breach is where the Canal crosses the Sultanagram swamp, and the tunnel which was designed to drain the latter, is destroyed. The other injuries to the Channel itself are not nearly so severe as might have been expected, and will be easily repaired in the course of another month. One abutment of the bridge at Chintagoontapolem has however given way, and as before mentioned the Sultanagram bridge is also destroyed. Though the tidal lock gates have been much injured, I am glad to say that the masonry work of the lock itself is quite uninjured. The parapets and spandril walls of the adjacent Calingulah have been carried away, but the body of the work is sound, and the repair will be unexpensive. The causeway leading to the Fort is almost entirely demolished.

14. The Salt platforms and indeed the whole Cotaur of Munganapudi have been obliterated, and a small bridge (3 arches of 12 feet each), across the Moonjooloor swamp has also been carried away.

15. All public buildings throughout the District have been more or less injured, chiefly in the roofs, doors and windows. No permanent buildings have been carried away, excepting the Salt Cutcherry at Munganapudi.

16. There has been some loss of stores at Bazoarah (Rupees 694-10-3) and two of the four iron punts which were sunk in the river have not yet been recovered; but on the whole the injury sustained by Public Works, is not of extraordinary amount, and very far below what has been suffered by private individuals.

17. As the progress of new works will be thrown back by the extra demand for labour to repair damage in the villages and towns throughout the District, I think it improbable that any addition to the allotment already assigned to the District for the current year will be required.

18. One of the principal points requiring early attention is the supply of drinking water to Masulipatam. For some days after the inundation there were but two wells (both in Dr. Robertson's compound) in the place, that furnished good water. All the other wells had been submerged, and though now sweet water has been found in several places, there is every reason to apprehend that as the dry season advances the supply will fail. Canal water will shortly be brought down to one section of the Petta, and also to the Fort, but the lines of the Regiment, the station and a great part of the Petta, will not be within three miles of it. I have therefore arranged, with the approval of the Collector, to open out a small channel from Akumuroo to Sultanagram bridge, and an estimate will be prepared for a new bridge with an aqueduct attached and for a masonry conduit thence to Robertson Pett, which at the best of times would be a great benefit to the people, and under existing circumstances, must be regarded as an indispensable precaution against sickness. This subject will be brought to the notice of the President of the Sanitary Commission who is now enroute from Madras.

19. Another source of anxiety which the storm has developed, is the total destruction of the sea dyke, known as the eastern, or Topping's dyke. It ran nearly parallel to the sea margin, and backed as it was by a sandy ridge formed a tolerably effectual barrier against the encroachment of the sea. Now, dyke, sand ridge and all have been completely carried away, and the spring tides are now washing over the site, for the length of half a mile or more. Nothing can be done at present, while the tides are so high. I have every hope however that the sea will throw up a new margin, in much the same line as the old one, as the breakers seem to keep to the limit of the latter, and the water within is very shallow, so that men wade across. In short the sea is not encroaching on the land, and I have no fear of its doing so, but there will be some difficulty in restoring the dyke so effectually as to withstand the action of the sea during the severe storms which are common along the coast in the North east monsoon, and to prevent the swamp within

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3rd December 1864.*

being inundated at such times up to the boundary of the station and Petta, if not within it. I allude to ordinary storms, and need hardly say that no artificial barrier would stand for a moment against the force of a wave such as has lately inundated the place.

20. The Master Attendant has informed me that the effect of the Cyclone on the tidal creek near the Fort, has been beneficial, the depth of water having increased and a more direct communication with the sea having been opened.

21. In conclusion I beg to report that Captain Winscom and Captain Hasted have been very active in assisting the Civil authorities since the storm.

P. S.—Erratum in paragraph 2 of letter dated 2nd instant, instead of the direction of the wind during the Cyclone being W. N. W. and E, it was N. W., N. E. and S. E.

No 50 ORDER THEREON, 3rd December 1864, No 3,457.

Ordered to be laid on the Editor's Table.

(True Extract)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

Exd S. T. Augustin

101
Sup. Engr. Office 2nd Dr
Maulipalau
18 November 1864

From
Lieut. Col. J. C. Anderson R.E.
Sup. Engineer 2nd Dr
Colonel C. A. Orr R.E.
Secretary to Government
D. P. O.

Sir
I have the honor to furnish some further particulars of the effects of the late storm on the 1st inst. in continuation of my letter No 98 dated 2nd inst.

2 The boat referred to in para 3 which had been capsized in the Collore Canal 10 miles from Bazaroch was found bottom upward. It was stove in; two men, whose names were taken out alive, and 12 corpses. 10 or 12 more were said to be missing. Excepting in this case, and at Bazaroch, but few fatal accidents seem to have occurred at a distance from the Coast.

3. No authentic intelligence from
Masonlipatam was received till
the night of the 4th inst. when a note
from Mr. Chornhill to his Head
Assistant arrived, and made known
the extent of the disaster that had
occurred there. Great consternation
was created among the Government
servants and numerous residents
in the Dargah, who had their fa-
milies or relatives at Masonlipatam.
A man reported that he had
tasted the Canal water at Pannuroo
(18 feet above sea level) and had
found it salt, and the general impression
was that the town had been entirely
washed away.

4. I started by Canal from
Dargah on the morning of the 5th inst.
and succeeded in reaching Nedemole
by the evening. The Canal was
obstructed in many places by
fallen trees; houses were everywhere
unroofed; the Cholera crop, where it
had attained a height of about
2 feet, was laid, and numerous

17 m all

boats were sunk or driven up on the
Dargah fields; but on the whole
the effects of the storm were not so
severe as they had been in the gorge
at Dargah. In the reach below
Dargah, I saw the marks of
a wave upwards of 6 feet above
the usual level (19 ft. above ordinary
H.W.). I was informed that a
wave had passed over Nedemole
lock gates, and though it is
possible that the fresh water in
the Canal may have been heaped
up in this manner, it is also possible
that sea water may have been
mixed with it, and that the statement
regarding salt water at Pannuroo,
though it appeared incredible at
first, may have been strictly true.
The actual water mark of the
wave over the surface of the country
was afterwards noted by Captain
Harte near Nedemole, where the
level is between 12 and 13 feet above
ordinary high water.

5. From Nedemole to Sultanagram
I passed in the night, to an early

extensive pools of water and drift
wood. At daylight, I saw the ground
in the vicinity of the bridge strewn
with coral &c. Two of the great arches
of the bridge had fallen down,
and it was only by scrambling
over the ruins that a passage could
be effected. I then walked through
Robertson's gate to my own house,
the greater portion of the road being
still two feet under water. Many
people were then leaving the place,
others ^{again} were coming in, to look
after their friends. The appearance
of the streets I passed through
was hideous; not a house was
uninjured. Many were heaps of
ruins; trees and drift-wood, boxes
furniture &c. were conglomerated
in masses, where they had met
with an obstruction sufficient
to hold them, and scores of dead
bodies were to be seen by the roadside.

The rest of the Petta, various
quarters of which I visited, subse-
quently were in a similar state. Some
a degree better, others worse, ^{as} the
Collector

2/

Collector will have furnished much
more complete reports on the state
of the town than I have the means
of giving. I need not enter further
into the subject.

With regard to the height to which
the wave which inundated ^{the} place rose,
it was apparently higher in the
front line of the station than in the
back, and higher at the Fort than
either. At my own house, which is
in the rear line / near St. Mary's Church
I found the level of the ground on
which the house stands to be 7 ft. 2 inches
above ordinary high water. The
floor is 3' 10" higher, and the sea
rose 1' 3" on the floor. The height
of the latter would therefore be
12' 3" above ordinary high water.
There can be no room for doubt
as to the accuracy of this observation,
as besides a well defined water
line on the walls, I found an
equally well defined line in some
glass in a cellar which was
not opened till some days after

the

the storm while the lower tier of claps were brimful of salt water. By means of the latter I have been able to ascertain from the sediment deposits (measured by a graduated rain gauge measure) that the proportion of mud carried in suspension by the sea water was $\frac{1}{44}$ of its bulk. This would be considered enormous in a river in high flood, and I have mentioned the fact, as the quantity of mud deposited in the station & over the sandy plains in the vicinity is very striking.

8. The level I have mentioned 7' 2" above ordinary high water is nearly the average level of the ground on which the houses in the station and principal line of Razan are raised. Some few isolated points are 3' higher, but these are quite exceptional, while the great mass of the lower class of houses in the Petta are in a lower level, 4, 5, and 6 feet above high water. The height of the water that

41
that passed over the place may therefore be estimated at from 8 to 10 or 5 feet. Excepting in a few favored spots, and impelled as the wave was by a hurricane of tremendous force, it is not surprising that the havoc it created was frightful. The European Community were, under Providence, indebted for their escape to the circumstances that their houses are built on well raised platforms and to the short duration of the flood at its full height.

9. The Manager of my Office, his wife, and a young overseer, Mr. Carr, who lived with them, occupied a house in Cantonment. It was found a heap of rubbish the following day, and all three were drowned. Near the remains of the house lay a part of the rail of a ship, the lower beam of which was 60 ft long, and this may possibly have been instrumental in destroying the house.

in proportion to population

10. In the Fort, there was even greater loss of life than in the Town. The ramparts had been in part removed and there were no towers or other obstacles to break the force of the wave. The huts of the natives were, almost entirely swept away and the East Indian Community and the few Europeans in the Fort also suffered severely. Mr. Truwall had ten of his family buried in the ruins of his house. One of the rear gates of the Beal Co. Co. must have been saved against it and probably was the cause of its destruction. It still lies on the top of the ruins many feet above A. W. and at the distance of a quarter of a mile from the Co. Co.

11. As regards the damage done to Government property I would like to report that in the Hon Delta Taluq, it is chiefly confined to the smothering of roofs of Taluq Cutcheries, Tranceller Pungaloms and other permanent buildings, and

13. and to the destruction of Police huts and temporary sheds. A few Tanks of minor importance have been breached, and the roads have also been injured in some places and avenues very much destroyed. In the Delta the Ellore Canal as far as the Krishna limit has stood well, though heavy drainage had to be raised across it. The Commamoor Channel has been subjected to very heavy floods, and a number of breaches have occurred. Most of the Tanks which are fed by it escaped, as there had been a drought previously, and few or none of them were full. I have received no report that any masonry ^{works} in that Channel have suffered, and I have no reason to apprehend that the paddy crops will have suffered.

12. On the Rajampatam Canal there has been considerable damage in the lower section. The sea passed inland for a considerable distance (it is supposed 6 feet above its usual level) and washed away the Canal Embankments, destroying also

also a considerable quantity of
sandy in the low lying lands.
Locks and other masonry was
admirably however and Col Vibart
roughly estimates that 7000 Rs. will
repair damage. The tidal locks
at the terminus of the Canal which
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about 6 weeks was submerged,
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Tunnel which was designed to drain
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of another month. One abutment
of the Bridge at Chintapontapalem
has however given way, and as
before mentioned the Sultanpore
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the tidal lock gates have been
much injured, I am glad to say
that the masonry work of the locks
itself is quite unimpaired. The parapets
and span of the adjacent
Calingula have been carried away,
but the body of the work is sound,
and the repair will be unexpensive.
The causeway leading to the Fort is almost entirely demolished.
14. The salt platforms and
indeed

indeed the whole Cistern of Mungana. ¹⁵
The piers have been obliterated and a
small bridge (3 arches of 12 ft
each) across the Mungooloor Swamp
has also been carried away.

15. All Public Buildings
throughout the District have been
more or less injured chiefly in the roofs,
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buildings have been carried away.
Excepting the Salt Patcher at
Mungana piers -

16. There has been some loss
of stores at Daggarah ^{R. S. P.} 694-10-3/
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were sunk in the River have not
yet been recovered, but on the whole
the injury sustained by Public Works
is not of extraordinary amount
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As the progress of new works
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One of the principal points
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of drinking water to Madraspatnam.
For some days after the inundations
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and though now sweet water has
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there is every reason to apprehend
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will shortly be brought down to
one section of the Petta, and also to
the Fort, but the Lines of the Regiment,
the station and a great part of the
Petta, will not be within three miles
of it; I have therefore arranged,
with the approval of the Collector,
to open out a small Channel from
Ankumunoor to Sultanagar
Moor, and an Estimate will be
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the sea is not encroaching on the
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its doing so, but there will be some
difficulty in restoring the dyke so
effectually as to withstand the action
of the sea during the severe storms
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in the S. E. monsoon, and to prevent
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with the sea having been opened.

In conclusion I beg to report
that Captain Winslow and Captain
Haskell have been very active in
assisting the Civil Authorities during
the storm.

I have the honor to be

Yours most Obedt Servant.

J. C. Alden in Vt Col O. E.

Supr Engineer and D. N.

For information in par of letter
dated 2nd inst. Instead of the direction
of the wind during the cyclone being
W. N. W. and E. it was N. W. and E.
and S. E.

J. C. A.

L. H.

11th November 1864
No 323

1st W.D. Depart
12th Dec 1864

Prof. J. W. D. Depart

Thurs. 12th Dec 1864

Chas. Light. Engineer

2nd Division

Chas. Light. Engineer

2nd Division

Dated 18th November 1864

Received 20th

Chas. Light. Engineer

2nd Division

Chas. Light. Engineer

2nd Division

Chas. Light. Engineer

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2nd Division

Chas. Light. Engineer

31157

Ordered to be laid

in the Editor's Table

Chapman's
2nd Dec 1864

11th Nov - 50

W.D. Depart

12th Dec 1864

Chas. Light. Engineer

2nd Division

Chas. Light. Engineer

2nd Division

Chas. Light. Engineer

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Chas. Light. Engineer

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