

(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.	<i>2055</i>	Press
B.P. No.		Mis.
Dated	<i>10-8</i>	<i>08.76</i> 195 .

Not to be folded or roughly handled

1819

San Francisco, Cal. Aug 1819

Dear Sir

Wm. R. Pugh Esq

San Francisco

Major-General Wm. R. Pugh Esq

Secretary to the Government

San Francisco

As nothing has been allotted in the
Provincial Budget just received for
work done in the margin, since the
change of the law on the subject
of the change of the law on the subject
of the change of the law on the subject

of the change of the law on the subject
of the change of the law on the subject
of the change of the law on the subject
of the change of the law on the subject

I have the honor to

Yours most obediently

Wm. R. Pugh

San Francisco

4. 10. 1875
10. 10. 1875

[Faint, illegible handwritten text, likely bleed-through from the reverse side of the page.]

15. 11. 1875
1875. 11. 15

15. 11. 1875

15. 11. 1875
1875. 11. 15

No. 26

South Canara District Engineer's Office,
Mangalore 12th June 1875

From

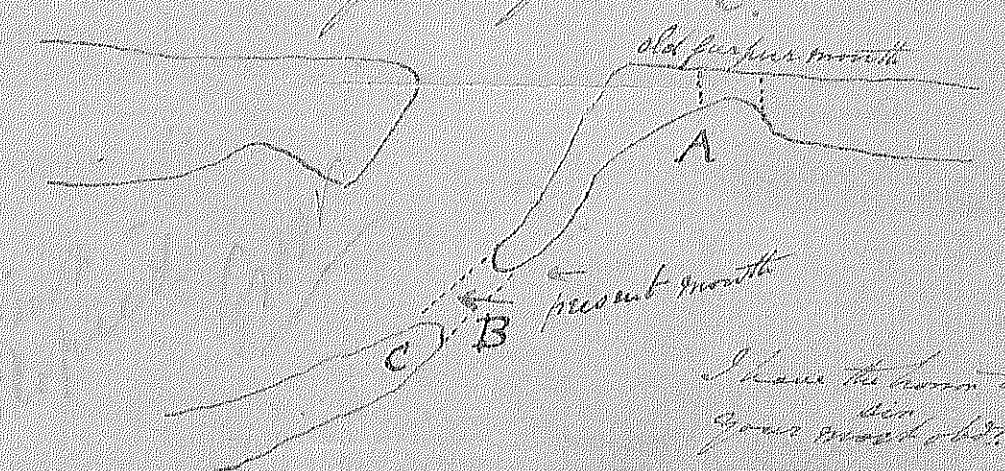
The District Engineer
South Canara.

The Secretary to Government
D. P. W. Madras.

Sir,

In participation of the report and
survey of changes in the Mangalore harbour
prior to the monsoon of 1875-76, I have the honor
to inform you that the old mouth of the
Gurpur river has closed, and the stream now
runs into the Nethravathi somewhat as shown
in the sketch below. I am of opinion that
the river will not be able to reopen the Gap at
A unless a very heavy flood occurs, but I
have the honor to ask if any measures should be
taken to protect the sand from scour at this
place.

2. The tendency of the Gurpur river seems
to be cut away the spit at C.



I have the honor to be
Your most obedt. servt.

For. Loring
District Engineer, Mangalore

Vol. - 32876 Ma 12 1876
 Page 106-4

the all around of English
 some - spanning the
 - the standard requires
 that any measurement should
 be taken to prevent the
 kind that would result
 from these delays

Vol. 12 1/2 } from 1875
 No. 110 }
 No. 109 }
 No. 108 }
 No. 107 }
 No. 106 }
 No. 105 }
 No. 104 }
 No. 103 }
 No. 102 }
 No. 101 }

32876 Ma 12 1876

Statement showing the work expected to be but not completed on or before
 1876 of which no provision has been made in the Budget for 1876-77.

Name of work	Amount in duty to of the order and to be paid by the Estimate	Cost of the work in the Estimate	Total cost of the work in the Estimate	Remarks
Portland Cement Works at Mill Hill, Cal. By purchase of 6000 casks of cement for the Marine Hospital				elected for during and other work connected with this project for which \$24,000 are granted
Mangalore Harbour mouth & wharf				ed during 1875-76 and 1876-77
Gap.				Mar 1876 of 10 Sept 1876

South America at Lagos' office
 at Lagos 22nd May 1876. B
 Page 232 - 233

For my
 the Secy of the
 South America

No. 983 dated 26th June 1876.

Letter from Arthur C. Ferguson
Canning No. 26 of 12th June

The information given is
so meagre that no action
could be proposed. Regard-
ed as Mr. Pringle is with
all former correspondence
he is well aware that it
is greatly to be desired that
the close mouth of the
Goodfellow River should not
reopen again. Whether
any measures should be
adopted to protect the sand-
bank at the spot is a mat-
ter of which he is most
competent to judge on the
spot. It is satisfactory
to find from a private
letter since received from
him, that there appears
to be no danger of the
mouth reopening of its
self.

Mr. Pringle should at
once communicate with

P. N. 8806/76

Mr
The British Legation
to
The Secretary of State
S. P. M. House.

Recd 22nd
Sept 23rd } May 1876.
Recd 29th

Statement showing the
work expected to be done
not completed on 31st Dec
1876, for which provision
has been made in the
Budget for 1876-77.

with the collector, and
obtain his assurances
that on no pretence what-
ever of damage from
floods along the Pacific
River banks, shall any
more be allowed against
the cut a second opening
to the sea from the back-
water. Whatever relief
from River floods may
be obtained by means of
cuttings to the sea from
either the North or South
or from both Rivers, will be
dearly purchased by the
statement of the Harbour
Board. That cannot but
be at its best state, when
secured by the combined
action of both rivers not
only as one.

Now that there is but one
cut to the sea, the Chief
Engineer is of opinion that
it will eventually become

Southwards. It is intended
a position opposite to and
convenient for the Town -
Nothing whatever should
be done towards fixing it,
till the action of untoward
forces has been isolated
for a few seasons during
which records of its vic-
itudes should be kept by
Inveys made in the first
fortnights of April and
October - A survey of 30th
Sept: 1873, which is at hand
is furnished with a re-
quest that the present
state of the Harbour Board
may be shown on it, for
the sake of comparison.

The Chief Engineer's guide
agrees with the District
Engineer in the opinion
expressed in his present

note.

No. 35 South Canara District Office
Mangalore 21 July 1876.

To Mr. E. M. Pringle Esq.
District Engineer
South Canara

From Major General C. M. D. M. Esq.
Secretary to Government
Madras.

Preliminary. I have the honor to forward a
survey of portion of the Mangalore
Harbour showing recent changes in the
configuration of the sand spits at the
entrance.

2. I much promise that owing to the
fact that the survey was only commenced
after my assuming charge of the District,
it is not so complete as I could have
desired, however there is sufficient data
to show the action of the two rivers,
and the changes that have occurred
since the commencement of the
monsoon have been personally observed by
myself and will be detailed below.

No 210 B-

3876
H. Stuart 48 July

3. For the sake of clearness & ease
of future reference, I have lettered
the several spits of sand and par- <sup>Lettering & numbering
of spits of sand
on survey.</sup>
ticular positions on them are denoted
by an index number attached to the
general letter. In further reports of
changes unaccompanied by surveys
these positions will be adhered to.

4. The most important change
that has occurred is the closing of <sup>Closing of the
old mouth of
Guspar river</sup>
the old mouth of the Guspar river,
or more properly speaking its progres-
sion southwards, as a glance at the
Survey will show.

5. This movement has been effect- <sup>Cause of both
ed by identically the same action as <sup>sand move-
ment</sup>
that which has caused the northward
movement of the Schetaway river
mouth namely the deposit of coarse
sand, swept into the harbour by
oblique wave action.</sup>

6. During last dry season the <sup>State of Guspar
river mouth the
town was all but filled up, but since</sup>
Guspar river mouth in its new posi-
tion was all but filled up, but since

the sand spit in it has widened and
deepened greatly and carried off the
major portion of the water of the river.

7. ^{Spit of Guspar 7.} From the blue arrows on the Survey
river current & it will be seen that the spit of the
shore would be. ^{Spit of sand spit} Guspar river is on the spit C, and that
sand bank is being steadily driven shore-
wards principally through surf action,
which sweeps the sand over the bank
into the still water beyond.

8. ^{Portion of the} Portion of the sand stored up by
the beaching waves inward however be-
longing to spit B. ^{Portion of the sand stored up by}
swept outwards by the river current
to form a small bar in front of the
entrance to the Guspar river, and which
eventually will aid the progression of
the spit B.

9. <sup>Probability of ex-
tension of spit</sup> The spit B will probably go on
lengthening so long as its proximity
to the mouth of the Schetaway admits
of waves, lapping along its sea face
and carrying sand inward.

10. <sup>Coincidence of the
channel with a
channel existing
in 1858.</sup> It is a noteworthy fact that
the sand spit B tends to force the
Guspar river to form a channel

running towards the mainland in a direct
line almost straight with a channel
shown in Col Booth's survey of the
harbour in 1808, and of course a fair ac-
count of the high channel was a direct
line forward.

The northward extension of
the spit it continues and near that
the Ganges river has actually covered
the surface the current of the river
may have been built in the distance
as long as the latter river is
prevented from breaking through the
spit to the southward.

Other changes in the harbour
I can only speak generally. It is
very of the portion of spit is near
distal which was considered in 1872
and quite safe from an outbreak
of the Ganges is under prepara-
tion. Large deposits of sand have
taken place opposite the salt water
and along the banks but nothing
can be done in the way of surveying
these

Northward
movement of
spit a con-
siderable
distance.

Other changes
in the harbour

these until after the monsoon.

Conclusions
arrived at by
study of the
present and
past
measures.

13. From careful inspection of the
site of the old mouth of the river
and study of the sea & river action at
all state of tide and during moderate freshets
in the river I have come to the conclusion
that, I, there is but little danger of the
river opening their Channel, II, that
if it should open it would again close
at the cessation of the S. E. monsoon;
and III that protective works would en-
tail a great expenditure of money
without commensurate gain.

Chance of re-
opening of the
mouth

14. The chances of the re-opening of
the mouth lie in wave action sweeping
away the narrow bank of sand 8 1/2 to 10 ft
existing between the deep water in the old
Channel and the sea at a time when
the river was high, and in a very high flood
topping the same portion of sand spit
which is 1/2 lower than the spit to north
or south of it. Against these happening
it may be said that the probable ac-
tion of a heavy surf would be to
drive the spit inwards without breaking

through it and that only an excessive flood would raise the river at this point more than 4' above its ordinary mean low level.

15. In spanning that the river did again break out at this point, the bar of the river has been pushed so far north that I think it will quite protect the spit B from the sweep of the heavier waves that tend (as shown in a previous report of mine) to bear the sand northwards and leave the secondary waves from the bar to carry on their inward sand bearing action, by which the spit B has been extended southwards during the last two years.

16. III. The continual changes of coast line, evidencing the great power of the surf, argues against any attempt to protect the B₁ to B₄ of the spit which could only be done by massive work, whilst the depth of the small bay is varying from 6 to 10' at low water.

Probability that
if proposed
during monsoon
would close
subsequent to it.

Precautionary
measures
taken.

would make a groynes thrown into it expensive, and such a groyne might interfere with the position of the harbour entrance ultimately decided on.

17. To guard against the lowering of B₁ to B₄, I have had a spit along its river near the summit planted with casuarina which will bind the sand well and prevent rain and wave. The cost of this and the work by effect already produced is the raising of the spit to a slight extent. I have also requested the Collector of the District to forbid the removal of rubbish the run up by the surf and left by the river along the spit as this also tends to collect sand & prevent wash. The cost of giving bags has been ascertained in case it might be necessary to temporarily guard against a very high flood by placing sand bags. The cost is Rs 25 per 100 and only a limited number some hundred are available. Messrs Brito Brothers Salt Contractors possess 20,000 but refuse to sell unless the entire quantity is purchased when they will give them for Rs 20 per 100. This expenditure I should consider under the

The circumstances too great to be increased and should resort to the simpler though less substantial method of merely heaping up the sand with manholes and protecting this wall with brush work until the river water subsided.

18. A further reason for not increasing expenditure at the point is the fact of the spit continuing to move southward (para 11). This must throw back spit B and over throw any protection west of the most substantial work.

19. Since the foregoing was written, an ordinary monsoon flood has occurred and I find that the set of the current of the Gurgur river alters considerably. The water is much backed up between C and the mainland, flowing past C₄ at considerable velocity. Spit has been cut away by wave and river action from its point to about B, whilst dead water exists in front of C spit from C₁ to C₂, wave however washing freely over C and driving it landward. These changes I consider only temporary

Changes in sand spit C from a to C₄ and its interference with the river movement

ones due to the height of water in the straits.

20. The sand spit C has been shown to be retreating (para 7) it is also progressing northwards the material supplied being sand swept up its face by small waves.

It is a wave motion tends to force the current of the Gurgur river towards its old mouth during floods and increases the amount of nearly still water pent at its back.

Elongation of spit C might be checked by raising it with brushwork during high tide floods.

I am of opinion that this elongation of the spit might be checked and the shoreward motion aided by raising it with brushwork from C₁ to C₄ during high floods and high tides when waves are breaking over the bank. By this means the sand spit might be lowered so that during high floods much of the water at the back would flow over possibly forming a channel and cutting off part of the supply of sand that goes to spit C.

Proposed and based on previous letter state of harbor

21. This proposed work is based on the assumption (vide para 10) that the Gurgur river is reverting to a channel formed at an earlier time and open when

The Harbour was in a better condition

23. There is one point that should be considered, and that is the fact ^{Probability of} ~~harbour silting~~ ^{up in time.} that annually large quantities of sand

are carried both by waves and wind into the Harbour and kept a portion of

this is swept out. To give an instance of the sand bearing power of the surf,

I recently watched a portion of sand spit (roughly 60 x 12 x 20 or thereabouts) swept inwards in about half an hour by waves racing round the end of the spit.

The river in flood was running rapidly back in an opposite direction, but was powerless to resist the force of the surf nor could it support the quantities of coarse sand carried by the wave in flood like masses. If it is considered that the wave action is nearly continuous, whilst a strong current in the river is by no means an every day occurrence even during the S. W. monsoon, that a strong westerly wind is frequent during the monsoon, whilst sea breezes blow each day

day during the fine weather, I think it must be conceded that it will take no very great length of time to show a marked decrease in the depth of the backwaters. The sand carried out to sea by the river is necessarily of a finer grain than that washed in and the river action will be principally confined to rolling a layer of it along the river bottom, an operation that is at work inland also, so that the supply will almost balance the outgoing.

Silting of harbour
borne out by
the force of
the waves

24. I think the view of the possibility of the harbour eventually silting up until the river has to force a new and direct channel to sea is borne out by the existence along the coast of long stretches of sand extending far inland & showing the traces of backwaters evidently due to rivers now entering the sea far away. Such exist north of the Ganges river, and again, south of Delhi is a broad plain of sand, some miles in length and of considerable breadth, that may possibly have been once formed by the river formerly flowing southward.

Delay in submitting
this report on the
cause

25. A further delay in submitting

The report has I regret to say occurred
through the inaccuracy of the survey which
had to be returned to the officers. Even
now the sections are far from correct
as may be seen at a glance, but the
spits of sand vary daily, and the sections
as far as they show height and breadth
give an approximate mean. Difference
of level between sea and river can in no
case be as accurate as the surf renders
the observations of the former impossible.

26. The delay however enables me ^{high flood with}
to give the results of a considerable ^{rise and fall of}
flood in the rivers and its after effects.

The water reached within about 18' of
the highest flood that I have before
observed in Mangalore. As anticipated
there was no work of current on the
spit B₃ to B₄ which was well above river
level and the surf drove back the spit
from B₄ to B₆, the river flowing out over
B₆ to the point without however cutting
a deep channel. The surf broke over
and breached the spit C at about 10
and I am informed today that the
major portion of the Ganges river

13
at ordinary monsoon level, is flowing
outwards over the spit which is broad
and of a depth of about 5'. This does
away with the necessity for the aid
proposed in para 28.

Section of B. 27. There seems therefore every probability
of the rapid extension of B when unaf-
fected by high floods, and it remains
to be seen whether that extension will
cease or virtually cease when the ad-
vance of the head of a spit protects
it from surf action.

28. If this happens the point desired
by Government will so far be gained,
that the combined waters of the ~~river~~
Ganges & Ganges rivers will flow from
one mouth, and northward movement
of the harbour entrance can be carefully
watched, and its effect on the bar &
the backing up of the ebb-tide water.

29. When the mouth opposite Salt
Battery it might be considered whether
we might not be made of that rocky
prominence to fix the southward flow
of the Ganges river and the northward

movement of the stratum by an
extended groin seaward between
the two rivers.

I have the honor to be,
Sir,
Your most obedient servant,

Erasmus C.
District Engineer
Panama

July

14
long
no
spedy
acc.
and
also
1000
of
now

P. W. 1876 Dept.

No 5293



Telegram.

From

Colombo

To

Madras

From Mangalore

To Ootacamund.

Properly described flood, in
extraordinary prices. No time taken along
banks for a mile, particularly in the
river, but up to 100 ft. in some places,
but no considerable damage. 30,000 Rupees.
Salt also being surrounded by some
part of water, all of floor of one and
half of another garden garden. 30,000
Rupees salt exposed to action of
water. Rain ceased water not
rising.

27th July 1876.

X^o Att^o

Secretary of the
Mangalore
showing the
in the
the
the
the

Booked 21
No 221
No 222
No 223

to
The
to
to

Booked 21

No 2106

2.8.76 P.W. 10.8.76
Sent to Port 2.5.76

Extract from semi official letter
from Mr. Bringle.

The purpose of the
mouth must have been
closed for some months,
but I only discovered that
it had not been superseded
either by District Engineer
or Callahan on the day the
gap had to be closed. I do not yet
know the exact date of closing
nor when nor where the
new mouth first formed.
It was so visible in such
proximity to the old one that
Lanford did not think it should
be so or so. I have watched
the action steadily since
the monsoon set in. So far
has been the first time that
the river has risen at all as
the monsoon has burst mildly.
I do not think there is danger
of the re-opening of the old
mouth.



mouth, unless through heavy
surfacing on the spit and
being a very high flood. The
new mouth has more than
60 ft water at low tide. The cur-
rent is rapid but does not set
on the bank between the Guipora
river and sea but rather on the
long sand spit thrown out by
the river and from the Custom
house - This spit is being thrown
thencewards, and certainly by
enough the new channel of the
Guipora river is taking a
parallel if not identical
course, to the Channel shown
in old surveys - It seems highly
probable from the way the
new spit is forming that the
old Channel was cut out in
the same manner.

I have ordered a lot of
bags to be ready which I pro-
pose to use in parallel rows
should the river to low high
seas.

I leave the sand at the old
mouth, but as there is a
current of still water
that is rapidly collecting
silt and strengthening the
sand bar I do not think
there will be necessary
to think the action of the
new current at B.B.
B.B. might be assisted by
sailing, I thought of suggesting
cutting through the spit
B.B.B.B., but I don't know that
it would be very good, as the
waves would throw up the
sand again and moreover
the Channel at C is dry at
low water. I really think that
the Harbour requires at this end is
careful watching and pre-
vention of sea at high floods
at the old Guipora mouth by
sand bags.

The

The Spit A must go on
 forming as long as the waves
 action interferes with the cur-
 rent, and brings down sand
 along the coast.

SC 4294.

PROCEEDINGS of the MADRAS GOVERNMENT.

Under date the 10th Aug 1876.

Read the following:—

- Letter from the District Eng. } (No. 19 of 22nd May 1876)
 South Canara
- Telegram from do } (No. 12th June)
- Letter from do } (No. 26th June)
- Memo by Chief Engineer P.M. } (No. 983 of 26th June)
- Letter from the Dist. Eng. } (No. 35 of 21st July)
 South Canara

It would appear
 from the District Engineer's
 communications and the
 Survey which he has pre-
 pared, that the double
 opening which has for so
 many years existed between
 the Mangalore Backwaters
 & the sea whereby the waters
 of the Nairavutti River
 to the south, and of the
 Goopur

Goosport River to the North,
made their way into the
sea by separate Channels,
has gradually merged into
one; by a process which, not
having been closely watched,
was so imperceptible that
its result has only now been
reported. It can only be
said to have been completed
when the sand spit from
the Northern Beach over-
lapped the head of the
Sand island within. It is
now evident that that sand
island is due to sand deposit,
which has so greatly dimin-
ished the depth and
capacity of the Backwater
as to have led to the
serious flood at Mangrove
reported in the Collector's
Telegram of the 27th July.

2. It is hoped that the
effect of that flood has
been to sweep before it a
considerable amount of
the sand deposit; and
all that can be done at
present is to register the
action of the Monsoon
floods by Surveys and
soundings of the Back-
water; for which the Chief
Engineer will issue the
necessary detailed instruc-
tions. To open another outlet
for them further South
would only be a tempo-
rary relief, purchased at
the cost of injuring the
Harbour entrance which
cannot but be at its best
when maintained by the
united action of both
streams.

3 A sum of Rs 400
for the prosecution of the
Surveys, will as in former
years be placed at the
District Engineer's disposal
from Port Funds; for
which he will duly account
to the Chief Engineer.

Marine Dept. No 802 of 27.
Aug 1875 & No 2549 of
10 Sept 75.

Dist. Engr. South Canara ✓
Examiner of P.W. Accts. ✓
Marine Dept. ✓

Decd 19/6/76

Exp. put up

12 April 72 - 1565
12 June - 1449
9 July 73 - 1772
12 Feb 74 - 24715
4 May - 19215
10 Sept 75 - 2599

42941
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601. of 118761 311adms.
PUBLIC WORKS.
The H. G. South Canada
August
2/2/76

Nov. 21st + 21st — ✓

2 1/2

Goor poor Gaur
Santi Canara S

Passing orders on
papers relative to the
closing of the ~~business~~ ^{firm}

21-8-1966