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MADRAS RECORD OFFICE.

Government of Madras.

DEPARTMENT.

G.O. No.

Press
Mis.

Dated

19

Not to be folded or roughly handled

Fort Saint George, Public Works Consultation of 3rd March 1857.

No. 8. Read the following letter from Colonel C. E. FABER, Chief Engineer; to H. FORBES, Esq., Acting Secretary to Government, D. P. W., dated 2nd February 1857, No. 9949.

Sir,

1. I have the honor to forward copy of a very interesting letter, No. 386, dated 16th Ultimo, from the Superintendent of the East Coast Canal, reporting fully on the effects of the late storms on the Canal embankments, and pointing out the general principles which it appears advisable should be followed for the future, in laying out new portions of the Canal, applying his conclusions directly to the Kistnapatam, project to be undertaken in the ensuing year.

2. The Superintendent states that on inspecting the embankments between the lock at Shadiencoopum and Madras, it appeared that the floods had over-topped them, and excepting in spots where they were overgrown with creepers, had reduced them, to one half their former height. A few small breaches had been made in places, and some of the drainage escapes had been turned by a rush of water round their wings. An estimate for the requisite repairs which was forwarded on the 10th Instant is about to be submitted to Government and the work is now being executed under the Superintendence of Mr. Konig.

3. The embankments at Amalie's cut off at the southern most point of the Pulicat lake, being sufficiently high, had suffered but little, but a new shed which Mr. Konig was engaged in erecting, near the site of a lock, to be constructed, was half destroyed. At this point of the Canal the repairs have already been executed.

4. The embankments at the Kotapillay and Mc. Dowells' cut offs, where the ground is moderately high, had escaped intact.

5. The Eastern embankment of the small cut, made to shorten the passage from the Pulicat lake, in which the rush of water, before the opening of the Bar is stated to have been very great, has almost entirely disappeared. A slight silting up which has taken place along the western side of the Channel, the Superintendent anticipates will be cleared away by the scour, effected by the Bar remaining open with this, for the present at all events he does not propose to do any thing, as the traffic will not be interrupted, observing that after May, a small sum may be expended from the estimate proposed for the general improvement of the Navigation between Madras and Streehurycottah, to remedy any defect that may by that time be developed.

6. In referring to the almost entire destruction of the embankment which had nearly been completed for the road from Shadiencoopum to Trivatore, on the sanctioned estimate of Rupees 4,720-7-7* the Superintendent observes that the difficulties of constructing a road across the Red hill drainage are greater than were supposed, and he recommends, should it seem worth while to go on with the work, that a much grater section be given to the embankment and more water way to the bridge which is to span the drainage channel.

7. The Superintendent who states that he has not yet had time to investigate all the circumstances of the case satisfactorily, recommends that for the present the matter may be kept in abeyance. Directions will be given to the Superintendent to take the earliest opportunity of completing his enquiries and inspections, and to report fully on the measures he would advocate for adoption.

8. In the 1st Section and in the northern portion of the 2nd Section of the Sadras Canal, where the ground is high, the damage done has been very trifling.

9. About 8 miles South of the Adyaur, opposite the village of Karapaukum, a drainage to the west during the December storm, having received a great accession of water, broke entirely across the Canal, cutting a channel of 80 feet in width, and in one place from 9 to 10 feet deep, very little silt was brought into the Canal, and the repairs are to be immediately executed by Mr. Kennedy.

* Extract Minutes Consultation No. 563, dated 23rd April 1856.

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Fort Saint George, Public Works Consultation of 3rd March 1857.

10. The Superintendent is to report further on Lieutenant Chamber's proposition for carrying this drainage into the Covelong backwater over a 2nd Class escape, which he is of opinion, requires some modification.

11. Along the 22 miles of Canal passing more or less through shallow backwaters, from a point 9 miles South of the Adyaur, to Yedyoor 3½ miles from Sadras only a slight quantity of earth being furnished by the excavations, the embankments throughout which were very low were over-topped by the floods, and entirely destroyed. The Canal does not appear to have suffered much from silt, a result attributed to the scour, which lasted for days during the escape of the flood water through the open bar.

12. From Yedyoor to Sadras, where the ground is again high, the embankments have not been damaged.

13. In para. 12 the Superintendent observes that the Canal works have probably been subjected to as severe a trial, as they are ever likely to undergo, and in para. 13 notices as the main features of the effects of the late storms.

"That without exception the deep cuttings and high banks have stood the test of an extraordinary flood, while the small weak banks, formed from the debris of the shallow ones have in a great measure melted away and even in a few cases left hardly a trace behind."

14. In para. 14 is noticed the evident necessity of allowing to the embankments such dimensions as will ensure them from destruction by floods, and 2 Sections are given of embankments calculated to meet the requirements of Canals of 30 and 60 feet width of sole, the level of the sole to be in all cases 3'6" below and the minimum height of the embankments 8' above mean Sea level.

15. On this data the Superintendent observes that only such backwaters should be allowed to form part of the East Coast Canal as have a full depth of 3'6" below mean tide and that even then, unless the deep water extend for at least 4 miles the economy of using them is doubtful, as the cost of the locks they entail would be equivalent to cutting (vide Sections) 6 miles of a Canal 30 feet wide or 4 miles of one 60 feet wide at sole. The conclusion arrived at and in which I fully concur is, that in laying out future new lines of Canal, it will be advisable not to enter the shallow lagoons excepting in extremely rare cases, but at the same time, to avoid an unnecessary depth of cutting to keep generally along their margins.

16. The Superintendent in concluding his letter, requests permission for introducing the principles he advocates, on the new Kistnapatam line, and being myself satisfied of their soundness, I have no hesitation in recommending them to the favorable consideration of Government.

No. 9. ORDER THEREON, No. 370; dated 26th February 1857.

The Chief Engineer submits an interesting report from Lieutenant Sankey, Superintendent of the East Coast Canal, on the effects of the storms of November and December last, on the Canal embankments between Pulicat and Sadras.

2. The effects of the floods on the embankments are described by Lieutenant Sankey in paras. 2 to 12 of his Report, and are re-capitulated by the Chief Engineer. The main features of those effects are, that while deep cuts and high banks have withstood the floods, the small weak banks formed from the excavations of the shallower cuts have in a great measure melted away, and in a few cases have left hardly a trace behind. From these results, Lieutenant Sankey argues (para. 14) in favor of allowing such dimensions to embankments as will effectually protect them from floods, and gives two sections of embankments calculated to meet the requirements of Canals of 30 and 60 feet width of sole; the level of the sole being in all cases 3'6" below, and the minimum height of the embankments 8' above mean sea level. The general conclusion at which he arrives, is the impossibility of making use of shallow backwaters for the East Coast Canal, except in cases where they have a full depth of 3'6" below mean tide, and the line of deep water extends to a distance of at least 4

Fort Saint George, Public Works Consultation of 3rd March 1857.

miles. The Chief Engineer expresses himself satisfied as to the soundness of the principles advocated by Lieutenant Sankey; and the Right Honorable the Governor in Council authorizes their application to the Kistnapatam line of Canal, as recommended. At the same time he would remark, that it did not need the late storms to prove the necessity of strong embankments to a Canal crossing the drainage of a country. But the experience which has now been acquired, will be valuable in showing the section required to withstand the effects of the monsoon.

(Signed) H. FORBES,
Acting Secretary to Government.

From,

Lieutenant R. H. Sankery, Engineer,

Superintendent of the C. C. Canal.

To,

The Chief Engineer,

Department of Public Works,

Port Saint George.

Sir,

Having carefully inspected the Canal from Culicats to Tadras, I have the honor to bring to your notice a few facts in addition to those contained in my Communications as per margin, regarding the effects of the storms of the 19th & 20th November, and 8th, 9th and 10th December, and to state the general principles, which it seems to me should be followed for the future, in laying out new portions of the Eastern Coast Canal, applying the conclusions directly to the Kienapatom project, the carrying out of which will form one of my principal duties in the coming year 1857/58.

Letters Nos. 320 and 322
of 26 and 27. November.
1856
Summary for Nov/56

In the communication above alluded to I reported an extraordinary rise of water from 6 to 10 1/2 feet all around the Shediencopum Works on the 19th and 20th November, and estimated the damage thus inflicted at Rupees 1300. On viewing the Canal banks between that point and Tadras it appears that the flood for the most part overtopped them and distributed the materials to such an extent as to leave them only

only half their former height, excepting in spots overgrown with creepers. A few small breaches were made in places and some of the drainage escaped turned by a rush of water round the wings. An occasional estimate has already been forwarded and Mr. Honig is actively engaged in executing them.

10th Jan^r 1857
J. 380

3 At Amalick's Cut off (about the most point of the Culicat Canal) the embankments being higher than the flood, suffered little, but the new shed, which Mr. Honig was engaged in erecting to aid in the construction of a Lock, was half destroyed. The necessary repair has already been executed.

4 The Katampilly and Mr. Dowell's cut offs being through moderately high ground, and consequently having high embankments have escaped intact.

5 At Culicat the small cut made to shorten the passage from the lake has suffered considerably. On the first burst of the storm, and previous to the opening of the Culicat bar an enormous rush of water must have taken place down this cut, it is not therefore surprising that the eastern embankment which was low and weak almost entirely disappeared. A slight silting up has taken place along the west side of the channel, but I am in hopes that the scour effected by the bar remains.

It may carry away the material thus deposited; the traffic not being interrupted, we may leave the matter for the present to time. After May a small dam expended out of the Estimate sanctioned for the general improvement of the navigation between Nadras and Trichuray Cotta will

Ex. Minis. Com.
J. 1635 of 12th April 57

will remedy any defect may then appear.

6 Before quitting the Northern Canal, I am anxious to bring to your notice the state of the road joining Sivattoor and Shediancooppum Village, for the construction of which the sum of Rupees 4,720-7-7 was lately sanctioned. Mr. Honig had almost completed the embankment for the roads to its full proposed height 6 feet, when the flood came and swept nearly every particle away. I feel the difficulties of establishing a road across the Red Hill drainage, are greater than were supposed, and would strongly recommend, should it seem worth while to go on with the work, that a much greater section be given to the embankment, and a larger waterway to the bridge, which is to span the drainage channel. Not having time to investigate all the circumstances of the case satisfactorily, I beg that for the present the matter may be left in abeyance. The Villagers are enabled to go on foot from one place to another without any inconvenience, and therefore they may easily do without the luxury of a cart road for a short time.

7 On the 8th Section of the Nadras Canal, the injuries inflicted by the storm as reported in my letter as p. Margin Letter N. 320 of 26th November 1856. were of the most trifling nature. The same may be said of the Northern portion of section N. 2 which like Mr. Kennedy's is through higher ground than the remainder of the line.

About

V^o 370

Extract from the Minutes of Consultation
Under date the 26th February 1857.

Read the following
letter from the Chief
Engineer

(Here enters 2^d Feby. 1857 149949)

The Chief Engineer
= neer submits an interest-
= ing report from Lieuten-
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= intendent of the East
Coast Canal, on the ef-
= fects of the storms of
November and December
last on the canal em-
= bankments between
Pulicat and Sadras.

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H
M. G. M.

8 About 8 miles south of the Adyaur opposite the village
of Karapankum, a drainage to the west having received a
great accession of water from the down-fall, of 8th 9th & 10th
December, and probably from some tanks having burst
their bunds, broke through both west and east embankments
cutting a channel 80 feet in width and in one place 9 to 10
feet deep. Very little silt was however brought into the
channel, and Mr. Kennedy will at once undertake the ne-
= cessary temporary repairs. Lieutenant Chambers had proposed leading
the drainage into the Cove-long backwaters over a 2nd class weir
which was to have been built this season. I think some slight
modification of his plan will have to be adopted, but this point
can be determined better on my return from the north.

9 For 22 miles as you are aware the Sadras Canal runs
more or less through shallow backwaters, the stretch being included
between a point 9 miles south of the Adyaur, and Yedyoor 3 1/2 miles
from the village of Sadras. Only a slight quantity of earth being
furnished by the channel, the embankments were low and weak
throughout, they were therefore easily surmounted by both floods, and
the material dispersed. As far as I have as yet been enabled
to determine, the channel has not suffered much from silt brought in,
a result no doubt attributable to the scour which lasted for days during
the escape of the flood water through the open bars.

10 From Yedyoor to Sadras being through moderately high
ground, the Canal banks have stood well.

11 An examination of the ruins of the Sadras Arch elicited
no new facts, besides those already reported, as to the course of its fall.
Being engaged now in framing an estimate for its reconstruction,

may

the floods on the low-
bankments are des-
cribed by Lieutenant
Lankey in paras 2 to 12
of his report, and are
recapitulated by the
Chief Engineer. These
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from the ^{excavations} ~~debris~~ of the
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a few cases have left
hardly a trace behind.
From these results,
Lieutenant Lankey
argues (para 11) in
favor of allowing such

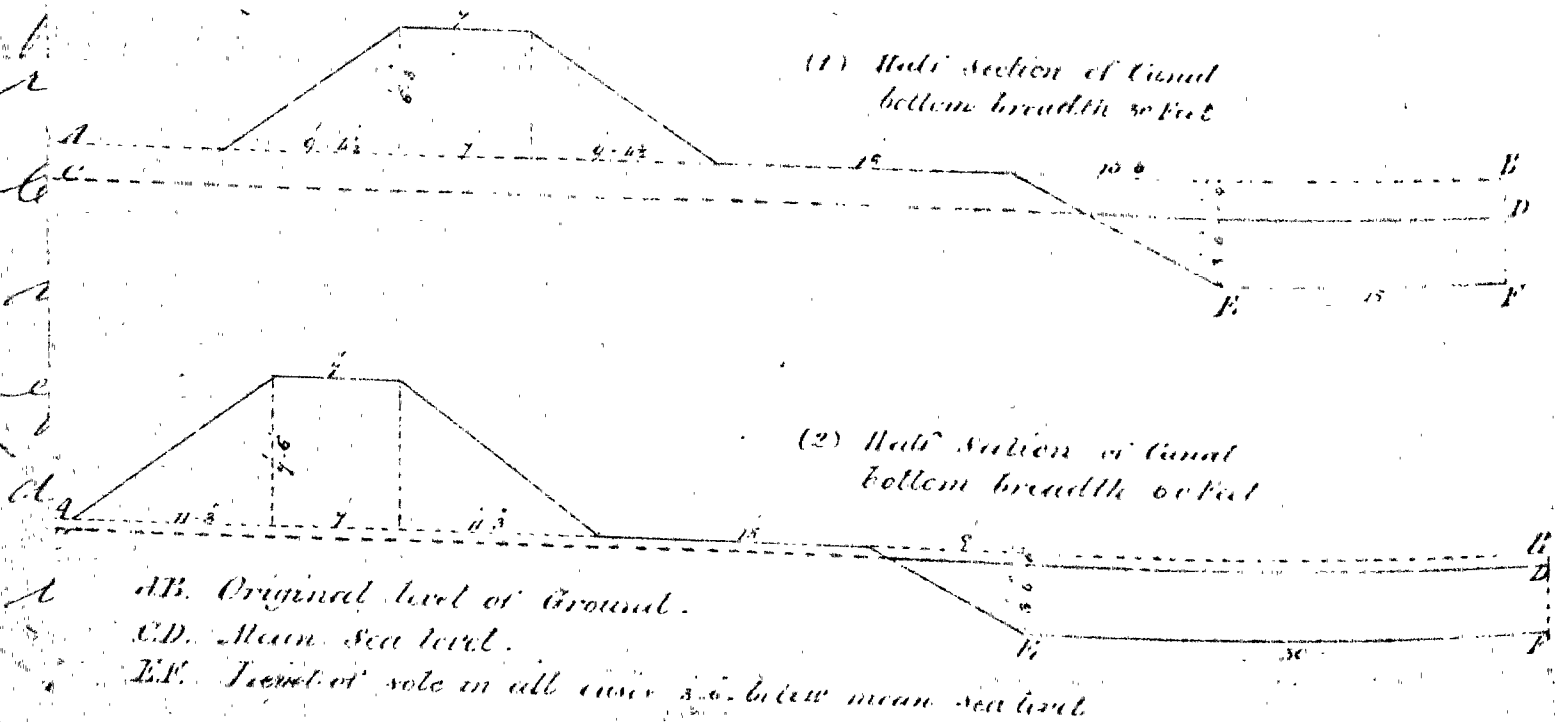
9
may omit all further remarks here as to its present state.
12 The floods whose effects I have endeavored concisely,
though I fear tediously to describe, subjected our works to perhaps as
severe a trial as they are likely ever to undergo. Considered in
this light, the skill with which they have been conducted in years
which afforded no standard, whatever to the Engineer of the power of
resistance necessary to be given to the banks, is most apparent. I do
not therefore think, I in the least take away from the merit due to the
general design of the Canals as hitherto executed, by saying in some
few points the principles of construction appears to me requiring
alteration.

13 The main features of the effects I have above described
are, that, without exception the deep cuttings and high banks
have stood the test of an extraordinary flood, while the small weak
banks formed from the debris of the shallower ones have in a
great measure melted away, and even in a few cases left hardly
a trace behind.

14 Banks are of such self evident necessity, in the working
of a Canal, that their preservation is of the first importance, in
their construction, therefore dimensions should be given capable of
effectually shielding them from destruction by any flood which
might possibly occur. The minimum height which I should
judge requisite for such banks is 8 feet above the mean sea level,
or about 2 feet more than the rise of water which took place lately,
with a breadth at top of 7 feet, and slopes of $1\frac{1}{2}$ to 1. In order
to obtain earth for the formation of banks of these dimensions
sufficient section must be given to the Channel. The first glance
will show that assuming the bottom breadth of the Canal even

20
below mean tide, and
the

20 yards in working through a shallow lagoon, no adequate quantity of earth can be obtained, in fact the only sections which will answer are the following, which are calculated for bottom breadth of 10 to 20 yards severally



In the first section where the bottom breadth of the Canal is taken at 10 yards, in order that the area of the Channel may equal that of the banks, the minimum height of which has been already assumed the natural level of the ground AB, must be 1' 9" above mean sea level - A slight calculation shows this, and in the same way if the bottom breadth be taken at 20 yards, the natural level of the ground through which the Channel is run, must at least be 6 inches above the mean level of the sea.

There are many conclusions to be drawn from this besides the one which I have now in view, for instance the comparative expensiveness of opening the line only 10 yards wide at first, and not giving it the full one of 20 yards by which a great saving might be made in the quantity of excavation equal

to 17600 Cubic Yards a mile, costing at least 1000 but I have not time at present to go into all these points.

The object I have in view is clearly to demonstrate the impossibility of making use of shallow backwater for the C. L. Canal, and that it is only when they have a full depth of 3' 6" below mean tide they ought to form part of our line - Even in this latter case unless the line of deep water be as long as to save the expense of 4 miles of inland cutting it is doubtful if any gain be made, for the expense of Locks at each end of the deep part of the backwater (works whose necessity cannot be for a moment doubted) would in the aggregate swallow up 40000 equivalent to six miles of a Canal 10 yards wide and 4 miles of one 20 yards cut as above proposed.

In carrying out new lines I would for the future in accordance with the above conclusions avoid going into the backwater excepting in extremely rare cases at the same time to avoid too deep diggings it will be necessary to keep generally along their margins.

I beg that I may be allowed to introduce these principles on the new Ristnapatam line should you consider them sound - In carrying them out I shall more than likely have to submit a Supplementary Estimate, as I see by the original estimate that Lieutenant Chambers had proposed making use of part of the Doogoorahpatam backwater in the same manner as in the Sadras Canal - Requesting your indulgence for the length of this Report.

E. L. Canal Office,
Ennore,
16th January, 1857.
By J. H. Keppel

A True copy of
The Chief Engineer.
I have W.
Supt. of the C. L. Canal.
below mean tide, and
the

to prove necessary.
The drainage of a
country - but
the actual work.
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the actual work.

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impossibility of making
use of shallow back-
waters for the East
Coast Canal, except in
cases where they have
a full depth of 3'-6"
below mean tide, and
the

the line of deep water
extends to a distance of
at least 4 miles. The
Chief Engineer expresses
himself satisfied
as to the soundness of
the principles advoca-
ted by Lieutenant Law-
key; and the Right
Honorable the Governor
in Council authorizes
their application to
the Krishna patam
line of Canal, as recom-
mended. At the same
time he would re-
mark that it did
not need the late
storms to prove the
necessity of strong em-
bankments to a canal
crossing the drainage
of a country. But in
the

the experience which
has now been acquired
will be valuable in
showing the section
required to withstand
the effects of the mon-
soon. BR

9 Copies to the Chief Eng.
Pip. 275

Ms 849

Col. J. M. G. & Co.
of New York 1857. May
Paris 14

Julie Marks 1857. Sept 18
John W. S. M. M. M.

1857. 10

Contract of Insurance

Sept 26, February 1857

Yours truly, Wm. W. H. W. H. W. H.

Authorizing the officers
of the Mercantile Marine & Co.
to obtain insurance for the
by the S. S. Canal.

130 July 1857