

(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.	87	Press
		~~Mis.~~
186-87		
Dated	9 1	1866 .

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
9th January 1866.*

No. 186. Read the following letter from the Superintending Engineer, 6th Division, to the Secretary to Government, Department Public Works, dated Tanjore, 16th December 1865, No. 1,599—

1. I have the honor to inform you that with the exception of 30 feet of the dam and apron adjacent to the north abutment of the south branch of the Lower Coleeroon Anicut, and 6 feet of the dam north of the first set of sluices, the whole of the first section of the anicut with apron, and, as far as can be judged, their foundations, have been swept entirely away, leaving a gap of 189½ feet.

2. The cracks in the haunches of the arch immediately south of the sluice arch, referred to in the report dated 12th July, have increased in width, and Rupees 520. are found to extend to the dam and apron 8 feet south of the pier of the sluice arch, and the piers of the sluice arch show a decided inclination northwards; it will be necessary, therefore, to remove and re-construct the first set of sluices with 10 or 12 feet of the dam south of it, making in all about 233 feet of the dam to be re-built, and 8 arches to be turned inclusive of the sluice arch.

* Sent separately.

3. The accompanying plan,* elevation, and section of the work to be re-constructed, shows the manner in which I propose to restore it; and I forward the plan, before preparing the estimate, for the approval of Government, as the work is one upon which various opinions have been given, and there will doubtless be as many conflicting opinions regarding the manner of its restoration and preservation during the next monsoon.

4. In forming an opinion the following facts should be borne in mind :—

First—That a deep stream has for the past three years flowed through the gap, and that the level of the bed has been scoured out for some distance above the anicut to depths of from 6 to 9 feet, while the hole in rear measures 24 feet, showing that great disturbance has taken place in the river bed, and that unless the foundations are carried very deep they will rest upon recently deposited sand or alluvium; these holes will, in a great measure, have been filled up by deposit before the river becomes dry, and perhaps have been already partially silted up; and second, that little or no stone can be procured for the work.

5. I may state, briefly, that my opinion relative to the causes of destruction of the anicut accords with Colonel Lawford's, as expressed in his first Memorandum dated 17th January, though I cannot agree with him that "there was no inherent defectiveness in the original constructions." The foundations, I submit, were not laid sufficiently deeply, as they consisted of a 3 feet wall on a 6 feet well, and the fact of the anicut not having suffered for twenty-four years does not, I think, indicate that the foundations were sufficient: for some years the anicut would not affect the river to any great degree, but when it began to be injuriously affected the stability of the anicut should not, I submit, have depended entirely on the care and attention bestowed on the river bed above :—

First.—Because the charge of the anicut is constantly changing hands, and opinions differ as to the remedial measures to be adopted: for instance, during the seasons of 1863 and 1864, the sluices in the south branch of the anicut were closed under the orders of Government, while Colonel Lawford and I maintain that nothing

of the sluice arch show inclination

could have been more injurious to the river bed than the closing of the sluices ; and second, because the deep stream in large sandy river beds often shifts in the most capricious manner, without any apparently assignable cause.

6. I submit that the foundations hitherto given to the work are insufficient, and that if possible the whole of the work should now be incased, as it were, between two retaining walls carried down solid as deep as possible, and with this view I have proposed re-building the portion of the dam lately destroyed on ordinary wells 3 feet in diameter with 6 feet of solid masonry above them, and the front and rear retaining walls on Bengal wells built in blocks of four cells each, with a 12 feet solid retaining wall above them. The wells are to be 2 feet thick, and with the aid of a steam pump I hope to be able to keep these cells dry or nearly so to a considerable depth, so as to be able to sink the wells 22 feet as proposed. Across the existing gap there should be little or no difficulty in getting these wells down to the required depth, as they will pass chiefly through a recent deposit, and should the retaining walls be continued along the rest of the anicut, and thick layers of clay be met with through which wells cannot be forced, the retaining wall should be built solid as in the portion of the dam re-built in 1862, in which the front retaining wall was carried down 9 feet in the solid without wells : I am of opinion that with a little perseverance the Bengal wells might be forced through the clayey strata, which are said to be very thin and mixed with a black sand.

7. The front and rear retaining walls are thrown beyond or without the line of the original retaining walls, in order that the debris of the old work may be avoided, and that they may be in a line with the retaining walls placed on both sides of the work which now stands, should it be determined to continue them along the old work as I propose. The apron will be extended 12 feet to the rear retaining wall, and will be built 1 foot lower than the present apron. The flooring would be extended to the front retaining wall, and if the wall can be got down 12 feet in the solid I think the small wings from the sluices, such as exist in the upper anicut, may be dispensed with, though I recognize the necessity for their supply in a work built as the upper and lower anicuts were, on 6 feet wells with only 3 feet of solid masonry above them.

8. The estimate will provide for extending the aprons of all the sluices as shown on the plan, and this work should be undertaken early in order that it may be possible to secure the sluices so as to admit of their being kept open next season, Nos. 132, 1,544, 6th June.

and the measures proposed in May last adopted for the removal of the sand banks. As the stream now sets from the head of the south Raja Voikal to the north bank, groyne from the head of the island would have little or no effect in destroying the accumulations, unless extended almost half across the river, and before remedial measures higher up the river are attempted the effect of the closing of the northern section of the south branch of the anicut for a season should be observed.

9. Owing to the low state of the river during the north-east monsoon, boat have not been able to pass over the Cauvery dam at the Vennar head for many days together, and we have not been able to procure stone from Trichinopoly to any great extent, and by the close of the season I fear we shall not have obtained more

than 700 or 800 cubic yards, this will be formed into a rough apron along the new work if the north section is not to be closed, but if closed, it will be placed around the extended aprons of the sluices as far as it will go.

10. With regard to a suggestion which has been made that the portion of the anicut to be restored should be built to only half its height next season, I would observe that were this done the current would be drawn to this portion of the work, and would set upon it more severely than if the work were restored to its full height ; what is required is, if possible, to divert the stream from the north section, and to allow the river bed both above and below that section to resume, as far as possible, its normal condition, and this can only be effected by cutting off that section altogether for a season or perhaps

Vide paragraph 9 of Memorandum No. 3 of 12th July, by Colonel Lawford, G. O. No. 2,228, 3rd August.

more, as I proposed to do last season, and to prevent any water passing over the work now about to be re-constructed.

11. The embankment to cut off this portion of the work will commence from a distance of about 320 yards above the anicut, in an oblique direction, across the deep stream to about 80 yards above the dam, where it will rest upon the remains of the island opposite the 8 and 9-inch arches of the bridge, and be carried to the dam almost at right angles to it.

12. There will, I am aware, be no ordinary difficulty in maintaining this bank throughout the season, even though provided with a puddle bank, both on account of its position and the nature of the soil of which it will consist, but I am of opinion that unless the water is prevented from passing over the dam till the river bed is more nearly restored to its normal condition there is no hope of the new work standing. Were it to be again destroyed I would propose building a fresh abutment for the last sound arch, and continuing the road-way up to it, thus reducing the length of the anicut by about 82 yards.

13. I would on no account recommend the continuation of the dam from the south abutment of the north branch through the island, as proposed by Paragraph 10, 3rd Memorandum, 12th July. Colonel Lawford. It would be years

before the portion of the island above the dam would be cut away and destroyed by the current, and while its destruction was in progress the current, would be thrown on the present north branch obliquely, and in a largely increased volume, for the greater part of the island is from 6 feet to 8 feet above the height of the dam, and the ordinary high floods rise only 6 feet above the dam. Again, where the island is only a few feet above the level of the dam, the effect of the water flowing over the dam would be very injurious to the apron, and judging by the diagram of illustrations of the effect of the rise of a river bed above an anicut, which accompanied Colonel Lawford's fourth Memorandum, a very broad and therefore costly apron would be required.

4th August, G. O. No. 2,462, 24th August.

of the water when in motion - inclination

14. Were it necessary to re-build the south branch of the anicut on a new site, the head of the island I would regard as its proper position. The disadvantage of its present position, about 800 yards below the head of the island, is that where it is necessary to attempt to effect a change in the course of the deep stream the head of the island itself forms an obstruction, any remedial measures must be adopted far higher up than the head of the island, large groynes from the island itself would throw the current obliquely on some portion of the anicut.

15. Between two and three lacs of bricks are now ready, and other materials are in course of preparation, and I would solicit an early reply on the two following points:—

Is the new work to be carried out this season, to be built as shown in the plan with Bengal wells, &c.?

Paragraph 10.

7th July.

Is the new work to be banked off, for a season, as proposed or not?

16. The sections called for in paragraph 6 of G. O. No. 1,901, will be submitted as soon as the river will admit of their being taken.

No. 187.

ORDER THEREON, 9th January 1866, No. 89.

CIVIL WORKS, No. 33.

1. In the letter which is recorded at the head of these Proceedings, the Superintending Engineer of the 6th Division reports the extent of the damages which the southern branch of the Coleroon Anicut sustained when it breached for the third time near its northern flank on the 5th of July last, and, suggesting the mode in which he considers the work should be repaired and strengthened, requests further instructions.

2. It appears that at thirty feet from the northern abutment, the dam, with its apron and foundations, has been totally swept away to a length of 189½ feet, and that, as would naturally be the case, the river bed has been scoured out to a depth of from 6 to 9 feet in front of the breach, and to 24 feet in its rear. The damage has, however, extended further than this, for the cracks, which were reported in Captain Oakes' letter of the 12th July last as having appeared in the haunches of the arch immediately south of the sluice adjoining the breach, have opened, and are found to extend downwards through the dam to the apron, and the piers, carrying the arch over the sluices in question, show an inclination out of the perpendicular. Thus the portion of the work to be re-built includes not only the perpendicular, but also the adjacent sluice, and some ten or twelve feet of the dam beyond, making in all about 233 feet of anicut to be restored, and eight arches, inclusive of the sluice arch, to be turned.

3. There is no reason to suppose that the work of repairing the breach last year was not done in a good and substantial manner. That it did not stand may, in some measure, have been owing to its not having had time to set before the river came down, or to the undue strain to which it was subjected from the current

being diverted upon it with concentrated force by the sand bank which has been allowed to form in the river bed; but it is no less clear that the new work had not a fair chance given it, as the neglect of the precaution of cutting the embankment in front of it till the river had risen so much as to be passing 4 feet 6 inches in depth over the northern branch of the dam, was quite sufficient to ensure its destruction under any circumstances. A similar mistake should not be allowed to occur again, and every exertion should be made this season to complete the repairs in time to allow of the embankment being removed before the first freshes. The sluices should also be put in working order, and every means be brought into operation to sweep away the sand bank which now so injuriously occupies a large part of the river channel. Captain Oakes is of opinion that the closing of the sluices, and the consequent growth of the sand bank are amongst the primary causes of the first failure of the anicut, but he confirms, what was easily seen during its repair in 1862-63, that the original work was extremely defective both in construction and in the character of its foundations. That it stood so long is a matter of surprise, and that it gave way when it was deprived of the relief which the sluices afforded, and as soon as a lateral current was established, is not to be wondered at. There can now be little doubt that the sanction which the Government were led to give to the closing of the sluices was a mistake, and that it will be necessary to maintain them henceforth in full working order, and by their judicious management to prevent all accumulation of silt.

4. The mode in which Captain Oakes proposes to repair and strengthen the anicut appears to be judicious. It is essential that the foundations of the front and rear retaining walls should be got down in as solid and substantial a manner as possible at all costs, and, as it is difficult to sink the ordinary wells, on which it is thought sufficient for foundations to rest in similar cases in this Presidency, the Superintending Engineer is authorized to adopt the Bengal method of sinking them in blocks, or to carry them to the greatest depth possible in such a manner as he may find practicable with the means at his disposal. Captain Oakes proposes to place these retaining walls further apart than they have hitherto been, or, in other words, to increase the width of both front and rear apron. This will add greatly to the stability of the work, and as the continuation of the same walls along the rest of the anicut, and the extension of the aprons to them will afford very great additional security to the whole structure, the Superintending Engineer is authorized to proceed with these improvements on the understanding that the necessary materials and labor for carrying them out can be supplied without detriment to the progress of the thorough repair of the breach, or to the completion of such essential operations as the strengthening of the sluices, and the cutting through of the sand bank to facilitate its removal by their action. A separate estimate will, however, have to be submitted for these additions as a new work.

5. As it will be advisable to prevent the new work of the breach being too soon exposed to the action of the stream, and as an embankment to cut it off will obstruct a mere fraction of the water-way, and be easily formed, the Superintending Engineer is authorized to use his discretion in constructing it, or in adopting any other method which may suggest itself of isolating the breach for a season.

of the Sluice Arch shows a new inclination

Proceedings of the Madras Government, Public Works Department,
9th January 1866.

6. The Government are of opinion that the consideration of the question of closing the south branch of the river altogether, and extending the northern section of the ancient southward across the intervening island, may be deferred till the necessity arise for giving a decision on it.

(True Extract.)

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

To the Superintending Engineer, 6th Division.
" Controller of Public Works Accounts.

Exd. S. T. Augustin.

No 1599

Supr Engg Office 6th Division
Poupin 16th December/65

From, Captain R. F. Baker R.E.
Supr Engineer 6th Division
To, Colonel C. A. Orr: R.E.:
Secretary to Government &c.

Sir,
I have the honor to inform you that with the exception of 30' of the Dam and Apron adjacent to the North Abutment of the South Branch of the Lower Coleroon Ancient and 6' of the Dam North of the 1st set of sluices the whole of the Section of the Ancient with Apron as far as can be judged, their foundations have been swept entirely away leaving a gap of 187 1/4 feet.

No 520.

2 The cracks in the haunches of the Arch immediately South of the Sluice Arch referred to in the report dated 12th July increased in width and are found to extend to the Dam, and Apron 8' South of the Pier of the Sluice Arch & the Piers of the Sluice Arch show a decided inclination

inclination towards, it will be necessary therefore to remove & reconstruct the 1st Set of Sluices with 10 or 12' of the Dam South of it making in all about 233' of the Dam to be rebuilt & 8 Arches to be turned inclusive of the Sluice Arch.

3. The accompanying Plan, Elevation [†] and Section of the Work to be reconstructed [†] sent separately shows the manner in which I propose to restore it, and I forward the Plan, before preparing the Estimate for the approval of Government as the Work is one upon which various opinions have been given and there will doubtless be as many conflicting opinions regarding the manner of its restoration & preservation during the next Monsoon.

4. In forming an opinion the following facts should be borne in mind:

1st That a deep stream has for the past 3 years flowed through the gap and that the level of the bed has been scoured out for some distance - the Ancient to depth of from 6 to 9 feet above

first while the hole in rear measures 24' showing that great disturbance has taken place in the River bed and that unless the foundations are carried very deep they will rest upon recently deposited sand or alluvium, these holes will in a great measure have been filled up by deposit before the River becomes dry and perhaps have been already partially silted up, and

2nd That little or no stone can be procured for the Work.

5. I may state briefly that my opinion relative to the cause of destruction of the Ancient accords with Colonel Lawford as expressed in his first Memo dated 17th January though I cannot agree with him that there was no ~~defect~~ defect in the original construction. The foundations I submit were not laid sufficiently deeply as they consisted of a 3' wall on a 6' well and the fact of the Ancient not having suffered for

for 24 years does not, I think, indicate that the foundations were sufficient: for some years the Amnicut would not affect the River to any great degree but when it began to be injuriously affected the stability of the Amnicut should not I submit have depended entirely on the care and attention bestowed on the River bed above.

1st Because the charge of the Amnicut is constantly changing hands & opinions as to the remedial measures to be adopted: for instance, during the seasons of 1863 & 64 the sluices in the South Branch of the Amnicut were closed under the orders of Government while Colonel Darford and I maintain that nothing could have been more injurious to the River bed than the closing of the sluices, and 2nd Because the deep stream in large sandy River bed often shifts in the most capricious manner without any apparently assignable cause.

6. I submit that the foundations hitherto given to the work are insufficient, and that if possible the whole of the work should now be increased, as it were between 2 retaining walls carried down solid as deep as possible & with this view I have proposed rebuilding the portion of the Dam lately destroyed on ordinary Walls 3' in diameter with 6' of solid masonry above them and the front & rear retaining Walls on Bangal Walls built in blocks of 4 cells each with a 12' solid retaining wall above them - The Walls are to be 2' thick & with the aid of a steam pump I hope to be able to keep these cells dry on nearly so to a considerable depth so as to be able to sink the Walls 22' as proposed. Across the existing gap there should be little or no difficulty in getting these Walls down to the required depth as they will pass chiefly through a recent deposit and should the retaining walls be

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walls might be forced through the
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thin and mixed with a black sand.

7. The front and rear retaining
walls are thrown beyond or without the
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and if the wall can be got down 12' in
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the Upper Ancient may be dis-
posed with though I recognize the
necessity for their supply in a Work
built as the Upper and Lower Ancient
were on 6' walls with only 3' of solid
masonry above them.

8. The Estimate will provide for
extending the Apron of all the sluices
as shown on the Plan & this work should
be undertaken early in order that it may
be possible to sluice the sluices so
as to admit of their being kept open
next season and the measures proposed
in May last and approved by Government
will be adopted for the removal of the
sand banks. As the stream now
sets from the head of the South Raja
Tikal to the North bank, groin from

N^o 132

1874.

6th June

from the head of the Island would have little or no effect in destroying the accumulation unless extended almost half across the River & before remedial measures higher up the River are attempted the effect of the closing of the Northern section of the South Branch of the Arinicut for a season should be observed.

9. - Owing to the low state of the River during the N.E. monsoon we have not been able to pass over the Cauey Dam at the Roman Head for many days together and we have not been able to procure stone from Trichinopoly to any great extent and by the close of the season I fear we shall not have obtained more than 700 or 800 cubic yards, this will be formed into a rough apron along the new Work but if closed, it will be placed around the extended apron of the Sluices as far as it will go.

10. - With regard to a suggestion which has

been made that the portion of the Arinicut to be restored should be built to only half its height with reason I would observe that were this done the current would be drawn to this portion of the Work & would set upon it more severely than if the work were restored to its full height what is required, is, if possible, to divert the stream from the north section and to allow the River bed both above and below that section to resume as far as possible its normal condition & this can only be effected by cutting off that section altogether for a season or perhaps more, as I pro-

vide
para 9 of
Memorandum No 3

of 12 July by
Col. Hardford

G.O. No 2228

3 Aug.

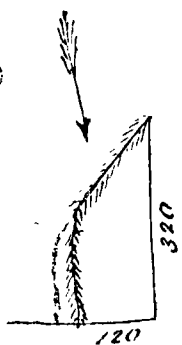
posed to do last season & to prevent any water passing over the Work now about to be reconstructed.

11. The embankment to cut off this portion of the Work will commence from a distance of about 320 yards above the Arinicut in an oblique direction across the deep stream to about

80 yards above the Dam where it will
rest upon the remains of the Island
opposite the 8' 9" Arch of the Bridge
and be carried to the Dam almost at
right angles to it.

12. There will I am aware be no ordi-
nary difficulty in maintaining this
bank throughout the season, even
though provided with a puddle bank,
both on account of its position & the
nature of the soil of which it will
consist, but I am of opinion that
unless the water is prevented from
passing over the Dam till the River
bed is more nearly restored to its
normal condition there is no hope
of the new work standing. Were it
to be again destroyed I would pro-
pose building a fresh abutment for
the last sound arch and continuing
the Roadway up to it, thus reducing
the length of the Aqueduct by about
82 yards.

13. I would on no account recommend the



Para 10
3^d Memo
12th July

the continuation of the Dam from the
South about west of
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North branch obliquely, and in a large
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high flood rise only 6' above the
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Dam, the effect of the water flowing over
the Dam would be very injurious to
the apron and judging by the Diagram
of illustrations of the effect of the
Rise of a River bed above an Aqueduct
which accompanied Colonel Lawford

4th August 4th Memo a very broad & therefore costly
C.O. No 2462
24 August apron would be required.

14. Here it was necessary to rebuild the

the South branch of the Muniment on a new site the head of the Island I would regard as its proper position. The disadvantage of its present position, about 800 yards below the head of the Island, is that where it is necessary to attempt to affect a change in the course of the deep stream the head of the Island itself forms an obstruction, any remedial measures must be adopted far higher up than the head of the Island, large groynes from the Island itself would throw the current obliquely on some portion of the Muniment.

15. Between 243 acres of bricks are now ready & other materials are in course of preparation & I would solicit an early reply on the two following points -

Is the new work to be carried out this season to be built as shown in the plan with Bengal wells &c?

Is the new work to be backed off for a season as proposed or not?

The para 10

7th July.

16. The sections called for in para 6 of G.O. No 1901 will be submitted as soon as the River will admit of their being taken.

J. F. Walker Capt. R. S. S. S.

Memorandum

The Superintending Engineer of the W. & A. now reports the extent of the damages which the Southern Branch of the Lower Colorado Canal sustained when it breached for the third time near its northern flank on the 15th of July last, and suggests the mode in which he considers the work should be repaired and strengthened, requests further instructions.

It appears that at thirty feet from the head the abutment, the dam, as far as I could ascertain, and foundations has been totally swept away to a length of 189 1/2 feet, and that as would naturally

Re 12. April 1887 282 283
 13. June 1887 305 308
 14. June 1887 310 311
 15. July 1887 318 319
 16. Aug 1887 328 329
 17. Aug 1887 335 336

Re 18. 5. 20 April 1887
 19. 5. 11 15
 From the 28. 6. 1887
 To the 28. 6. 1887
 20. 7. 6 15
 21. 7. 15 99

3 10 Plan

Technical observation
 for relative to the restoration
 of the South Branch
 of the Lower Colorado
 Canal in the same
 location

21. 8. 9 - 9 January 1886

21. 8. 9 - 9 January 1886

naturally be the case, the river bed ^{require to be}
has been scoured out to a depth of ^{very carefully}
from 6 to 9 feet in front of the breach, ^{estimated}
and to 24 feet in its rear. The damage ^{Commissioner}
has however extended further than ^{Engineers}
this, for the cracks, which were re- ^{ported}
ported in Capt. A. C. Bates' letter ^{of the 12th July}
of the 12th July last, a having a ^{split under}
seen in the hammock of the ditch ^{to the}
immediately south of the sluice ^{and}
joining the breach, have opened ^{and}
and one found to extend

and one found to extend down. So far I can include
 words through the dam to the ^{load & judicious} Laque with Mr.
 a front, and the piers, carrying ^{Receipt in to this} a lot of heavy
 the arch over the sluices in question ^{business without} of a sufficient
 show an inclination out of the ^{it work as this will} be not well be on
 perpendicular. Thus the portion ^{fortune to most of} the uncommon test
 of the work to be rebuilt includes ^{introduces the} they be supposed to be
 not only the breach but also the ^{discovered - a Mr} ^{London has seen} ^{awake been seen} ^{but as I suspect} ^{unseen at the present}
 adjacent sluices and some ten ^{chamber table} ^{saw reason when I visited} ^{of Tangier wood to} ^{whether he or this} ^{sat of person} ^{whether is important} ^{work that he was} ^{interested in the same} ^{of my special duty} ^{presently supervising} ^{be removed here}
 or twelve feet of the dam beyond ^{feet} about 233

of ancient to be restored, and
eight arches, inclusive of the
sluice arch to be turned.

risen so much as to be passing
4' 6" in depth over the Northern
branch of the dam, was quite suffi-
cient to ensure its destruction un-
der any circumstances - a similar
mistake will not be allowed to
occur again, and every exertion will
be made to ensure to complete
the present time to allow of the
embankments being removed before
the first freshes. The sluices will
be kept full and working order, and
evening out the height into operation
to sweep away the sand beneath
which now so injuriously occupies
a large part of the river channel.
Captain Baker is of opinion that
the closing of the sluices, and the
consequent growth of the sand
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The

4. The mode in which Capt.
John Dalry proposed to repair
and strengthen the ancient appears
to be judicious. It is essential that
the foundations of the front and
rear retaining walls should be got
down in as solid and substantial a
manner as possible at all costs,
and, as it is difficult to sink
the ordinary wells, on which it
is thought sufficient for foundations
to rest in similar cases in this
Presidency, the Superintending
Engineer should, in the opinion
of the undersigned, be authorized
to adopt the Bengal method
of sinking them in blocks, or
to carry them to the greatest
depth possible in such a manner
as he may find practicable with
the

25
the means at his disposal.
Capt. Dalry proposed to place
these retaining walls further
apart than they have hitherto
been; or in other words, to increase
the width of both front and rear
apron. This will add greatly to the
stability of the work, and as the
continuation of the same walls
along the rest of the ancient
and the extension of the apron
to them will afford very great ad-
ditional security to the whole struc-
ture, the Superintending Engineer
might be authorized to proceed with
these improvements on the under-
standing that the necessary
materials and labor for carry-
ing them out can be supplied
without detriment to the progress
of the thorough repair of the beach
or

or to the completion of such
essential operations as the strength-
ening of the sluices, and the cutting
through of the sand bank to fa-
cilitate its removal by their action.
A separate estimate will however,
have to be submitted for these ad-
ditions as a new work.

As it will be advisable
to prevent the new work of the
breach being too soon exposed
to the action of the stream, and
as an embankment to cut it off
will obstruct a mere fraction of
the railway, and be easily re-
formed, the Superintending En-
gineer might be authorized to
use his discretion in constructing
it, or in adopting any other
method which may suggest itself.

for isolating the breach for a season.

The Government may
probably be of opinion that the
consideration of the question of
closing the South branch of the
River altogether, and extending the
Northern section of the Embankment
Southward across the intervening
island may be deferred till the
necessity arises for giving a de-
cision on it.

Port St George.
3rd January 1866

Charles M. (Col. Secy.)
Secy to Govt (P.R.)

Public Works Department
No 89

Proceedings of the Madras Government
Under date the 9th January 1866
Read the following

From the Supt Engineer
of the 6th Divⁿ (Here enter No. of 65 of 1599)

57/5

In the letter
which is recorded at the
head of these Proceedings,
the Superintending Engineer
of the 6th Division reports
the extent of the damages
which the Southern
branch of the Lower
Coleroon Aricut

Mica sustained when
it breached for the third
time near its northern
flank on the 5th of July
last and, suggesting the
mode in which he considers
the work should be repaired
and strengthened, requests
further instructions.

2. It appears that
at thirty feet from the
northern abutment, the
dam, with its apron
and foundations, has
been totally swept away
to a length of $189\frac{1}{4}$ feet,
and that, as would
naturally be the case, the
river bed has been scoured
out to a depth of from
6 to 9 feet in front of the
breach

breach, and to 24 feet³¹
in its rear. The damage
has, however, extended
further than this, for
the cracks, which were
reported in Captain
Oakes' letter of the 12th
July last as having
appeared in the haunches
of the arch immediately
south of the sluice ad-
joining the breach, have
opened, and are found
to extend downwards
through the dam to
the apron, and the
piers, carrying the arch
over the sluice in
question, show an in-
clination out of the
perpendicular. Thus
the portion of the work
to be rebuilt includes
not

not only the breach but also
the adjacent sluice and
some ten or twelve feet
of the dam beyond, making
in all about 233 feet
of Arnicus to be restored,
and eight arches, includ-
-ing of the sluice arch,
to be turned.

3. There is no rea-
-son to suppose that the
work of repairing the
breach last year was
not done in a good
and substantial man-
-ner. That it did not
stand may, in some
measures, have been
owing to its not having
had time to set before
the river came down,
or to the undue strain
to which it was subjected
from

from the current being
diverted upon it with
concentrated force by
the sand bank which
has been allowed to
form in the river bed,
but it is no less clear
that the new work had
not a fair chance given
it, as the neglect of the
precaution of cutting
the embankment in front
of it till the river had
risen so much as to ^{be} ~~the~~
passing 4-6" in depth
over the Northern branch
of the dam, was quite
sufficient to ensure its
destruction under any
circumstances. A similar
mistake should not
be allowed to occur
again

again, and every exertion
should be made this
season to complete the
repairs in time to allow
of the embankments
being removed before
the first freshet. The
Sluices should also be
put in working order
and every means be
brought into operation
to sweep away the sand
bank which now so
injuriously occupies a
large part of the river
channel. Captain Calkes
is of opinion that the
closing of the Sluices,
and the consequent
growth of the sand
bank are amongst
the primary causes
of

of the first failure of
the Arment, but he
confirms, what was
easily seen during
its repair in 1862/63,
that the original work
was extremely de-
fective both in con-
struction and in the
character of its foun-
dations. That it
stood so long is a
matter of surprise,
and that it gave
way when it was
deprived of the relief
which the Sluices
afforded, and as
soon as a lateral
current was established
is not to be wondered
at. There can now
be

be little doubt that the
sanction which the
Government were led
to give to the closing
of the sluices was a
mistake, and that it
will be necessary to
maintain them hence-
forth in full working
order, and by their
judicious management
to prevent all accumu-
lation of silt.

It is proposed
in which Captain
Oakes proposes to repair
and strengthen the
Ancient appears to be
judicious. It is essential
that the foundations of
the front and rear
retaining walls should
be

be got down in as solid
and substantial a
manner as possible
at all costs, and, as
it is difficult to sink
the ordinary wells,
on which it is thought
sufficient for foundations
to rest in similar
cases in this Presidency,
the Superintending
Engineer is authorized
to adopt the Bengal
method of sinking
them in blocks, or
to carry them to the
greatest depth possible
in such a manner
as he may find prac-
ticable with the means
at his disposal. Captain
Oakes proposes to
place

place those retaining
walls further apart
than they have hitherto
been, or in other words,
to increase the width
of both front and
rear apron. This
will add greatly to
the stability of the works,
and as the continuation
of the same walls
along the rest of the
Aicut, and the exten-
sion of the aprons to
them will afford very
great additional security
to the whole structure,
the Superintending
Engineer is authorized
to proceed with these
improvements on the
understanding that,
the

12
the necessary materials
and labor for carrying
them out can be sup-
plied without detri-
ment to the progress
of the thorough repair
of the breach, or to the
completion of such
essential operations
as the strengthening
of the sluices, and
the cutting through
of the sand bank to
facilitate its removal
by their action. A
separate estimate
will, however, have
to be submitted for
these additions as
a new work.

5 As it will
be advisable to prevent

the

the new work of the
breach being too soon
exposed to the action
of the stream, and
as an embankment
to cut it off will
obstruct a more fraction
of the waterway, and
be easily formed, the
Superintending Engineer
is authorized to use
his discretion in con-
structing it, or in adopting
any other method
which may suggest
itself of isolating the
breach for a season.

b. The Govern-
ment are of opinion
that the consideration
of the question of closing
the south branch of
the River altogether,
and

and extending the
Northern section of
the Ancient Southward
across the intervening
island, may be de-
ferred till the ne-
cessity arise for
giving a decision on
it.

ALB

4
To The Sup^e Engineer of the
Controlle of P. H. A.

Dec^r 9th January

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No 1866 Depo
Pro: of Govt for Jan/66

No 89
Pro: of the M Govt
Of 9 Jan/66.

Lower Coleross Micut
The Superintg Engineer, 6th Div,
furnished with certain instruc-
tions relative to the repair
of the damages sustained in
the southern branch of - on
the 5th July 1865.

No 186 187