M.R.O. 1—77,006—8-6-37.

(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. 255 Press Mis.-

519-20

Dated 25 1 1869.

Not to be folded or roughly handled

93/10/30

1.V

Proceedings of the Madras Government, Public Works Department,
25th January 1867.

No. 519. Read the following letter from the Superintending Engineer, 6th Division, to the Secretary to Government, Department Public Works, dated Tanjore, 7th January 1867, No. 1,176 :—

1. With reference to the last paragraph of G. O. No. 3,725, dated 22nd November 1866, I have the honor to report upon the Iyaur bridge, which was destroyed in October last.

2. The Iyaur river joins the Agunda Cauvery immediately above the Upper Anicut, at an angle of about 30 degrees. The bridge was at the point of junction, and though it was built askew at an *L* of 70 degrees, the current still set obliquely on the piers and eastern abutment.

3. This is the second occasion on which the bridge over the Iyaur has been destroyed.

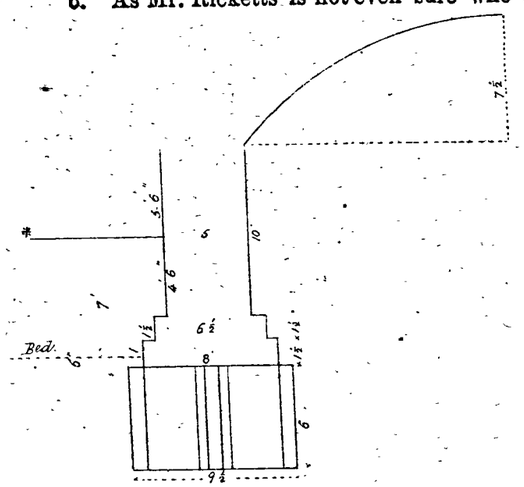
4. The first bridge was built in 1852 and 1853, and consisted of five arches of 35 feet span each, it was destroyed by the unprecedented floods of 1858. The second bridge was commenced in 1860, and it was intended that it should consist of three spans of 65 feet each. After the foundations for the lattice bridge of three spans had been laid, it was determined that a masonry bridge of six oblique arches of 30 feet span should be built, and the three intermediate piers were put in in 1862, and the bridge was completed in 1863; Mr. Ricketts being the Executive Officer, and Captain Palmer the Acting District Engineer of Trichinopoly.

Estimate Rupees 17,220.

Rupees 17,216.

5. According to the plan, the foundations consisted of 6-feet wells with 3 feet of solid masonry above them. In 1862, while *en route* for Europe, I inspected the bridge with Captain Palmer, when the foundations of the intermediate piers were being laid, and the impression left upon me is that wells were not used, but that the foundations were being put in solid. As Mr. Ricketts, the Executive Officer, is now a Deputy Collector stationed at Negapatam, I addressed him on the subject, and requested him to inform me whether the foundations were laid according to the plan, and if not, in what manner they were laid, and by whose authority the original plan was departed from. Mr. Ricketts, however, can afford no information on the subject, and states that he believes the foundations were laid according to the plan, and that if they were laid otherwise, it must have been with the sanction of the District Engineer, who, he believes, was Captain Palmer.

6. As Mr. Ricketts is not even sure who was the District Engineer in 1862 and 1863, it is hopeless to expect any information from him, and supposing the foundations to have been laid according to the plan, viz., with 6 feet wells with 3 feet of solid masonry above them, I find by means of a level, that the foundations were laid as per margin, or only 6 feet 6 inches below the proper bed of the Iyaur,



4 — The first bridge was under

regarding the proper* bed of the river as the level of the bed before the Upper Anicut was built. The northern section of the anicut is 7 feet high, and accumulations having formed above the anicut, the bed of the river is now from 3 feet to 5 feet higher than it used to be. In 1858, when the first Iyaur bridge was destroyed, two-thirds of the northern section of the anicut was also destroyed, and there was a very great scour through the breach and the bed of the Iyaur, and also that of the Agunda Cauvery must have been scoured out far below their proper level; bearing this fact in mind, and taking into consideration the fact that, with the foundations placed, as shown in the margin, a great part even of the wells must have stood in recently formed deposit, it is not surprising that the bridge fell when there was a scour through it, due to a head of from 3¾ feet to 4 feet, as there was in October last.

* Level of crown of Anicut.

7. From levels which have since been taken, I find I was misinformed as to the height to which the water must actually have risen above the bridge before the bridge fell, if, as I was informed, and as I reported, the water had risen above the crown of the arches, the difference of level above and below the bridge would have been between 7 feet and 8 feet; from portions of the bank which were not breached, and to the level of which the water did not rise, it is clear that the actual head of water could have been but little above 4 feet.

Paragraph 2 of letter No. 936, dated 7th November 1866.

8. Owing to the proximity of the anicut which has raised the Iyaur bed, the difficulty of getting down masonry foundations for piers in the river bed must be very great, while the piers, when built, must be subjected to an oblique scour, owing to the acute angle at which the Iyaur meets the Agunda Cauvery. The site is, therefore, one for which an iron girder bridge on screw piles, such as those described in G. O. No. 3,961, dated 15th ultimo, is specially suited.

9. The area drained by the Iyaur is about 420 square miles, and estimating the fall of rain over the whole area at two inches in twenty-four hours, or a flood discharge of two cubic yards per second per square mile drained, and the velocity at 8 feet per second with a depth of 12 feet, a water-way of 236 lineal feet is required, or four spans of 60 feet each. Colonel Hart, I observe, recommends Mr. Brotherwood's design for a wrought-iron lattice girder bridge of 60 feet span; four spans and three piers would be required, and may be estimated roughly at Rupees 20,000. I am unable to estimate the probable cost of putting the girders up, but the total cost of the bridge, including abutments and wings, would probably not exceed Rs. 30,000 or 35,000. I would suggest, therefore, that four spans of 60 feet and three piers should at once be ordered from Mr. Brotherwood's works, and that the Principal of the Civil Engineering College should be requested to have copies made of the set of drawings forwarded to him with G. O. No. 3,961, and to send me the originals, and with the aid of the Railway Engineers I may be able to estimate approximately the cost of putting the bridge up.

15th December.

10. The depth of piles below the bed of the river should be 10 feet, *i. e.*, below the proper or original bed of the river, or about from 13 feet to 15 feet above the present bed, and the lower flange of the girder should be 21 feet above the river bed, this will admit of the Iyaur discharging nearly double the theoretical discharge required of it on extraordinary occasions, when its waters are swollen as in October last, by the breaching of tanks in its valley.

No. 520. ORDER THEREON, 25th January 1867, No. 255.

CIVIL WORKS, No. 103.

1. With reference to G. O. No. 3,961, dated the 22nd November 1866, the Superintending Engineer of the 6th Division reports in this letter on the fall of the Iyaur bridge in the Trichinopoly District during the heavy floods of October last.

2. The bridge, which consisted of six oblique arches of thirty feet span was completed in 1863 at a cost of Rupees 17,216, and, from recent observations which have been made by the Superintending Engineer, it appears that its destruction is attributable to its foundations having been undermined by the powerful scour produced by the flood rising to a height of several feet above the crown of the arches. Owing to the position of the bridge near the northern flank of the Upper Anicut, and to the bed of the Iyaur having been both scoured out and raised by the alternate effect of floods and the action of the anicut, there is some difficulty in finding sufficiently firm soil on which to rest the foundations of masonry piers. For this reason, and because the bridge must be built askew to suit the angle at which the Iyaur joins the Agunda Cauvery, the Superintending Engineer recommends that, instead of re-building a masonry bridge even of greater water-way than that which has been destroyed, it will be advisable to erect an iron screw pile bridge with girders in four spans of sixty feet. The Government fully concur in this suggestion, and they approve of Captain Oakes' proposition to obtain the bridge from England. The Principal of the Civil Engineering College is accordingly requested to forward to the Superintending Engineer of the 6th Division the book of bridge plans which accompanied the Proceedings marginally noted, and, on its receipt, the latter Officer will prepare the necessary plans and estimates for transmission to England with an Indent for the bridge.

No. 3,961, dated 15th December 1866.

(True Extract.)

Colonel, R. E.,
Secretary to Government.

To the Superintending Engineer, 6th Division.
,, Principal of the Civil Engineering College.
,, Controller of Public Works Accounts.
,, Store Department.

Exd. S. T. Augustin.

4 — The first bridge was over-
in

No 1176 — 5

Supdt Irrig Office 6th Dn
Lahore 7th January 67.

From

Captain R. H. Baker RE.
Supdt Engineer 6th Dn.

To,

Colonel C. A. Orr RE.
Secretary to Government
P. W.

Sir,

With reference to the last
para of G.O. No 3725, dated 22nd Novr 66.
I have the honor to report upon the
Iyaun Bridge which was destroyed
in October last —

2 — The Iyaun River joins the
Augunda Canary immediately
above the Upper Aqueduct at an Angle
of about 30 degrees — The Bridge was
at the point of junction & though
it was built Sasken at an L of 70°
the Current still set obliquely on the
Piers & Eastern abutment —

3 — This is the 2nd occasion on
which the Bridge over the Iyaun has
been destroyed —

4 — The first Bridge was built
in

in 1852 and 1853 and consisted of 5 Arches of 35' span each, it was destroyed by the unprecedented flood of 1858— The second Bridge was commenced in 1860 and it was intended that it should consist of 3 spans of 65' each— After the foundations for the Lattice Bridge of 3 spans had been laid it was determined that a masonry Bridge of 6 oblique Arches of 30' span should be built & the three intermediate Piers were put in in 1862 & the Bridge was completed in 1863— Mr Ricketts being the Executive officer & Captain Palmer the Acting District Engineer of Trichinopoly—

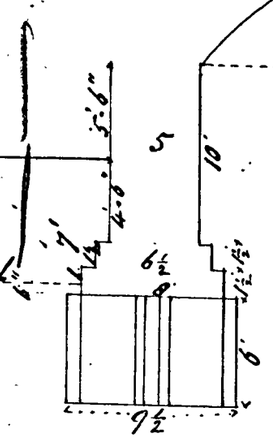
5— According to the Plan the foundations consisted of 6' Wells with 3' of solid masonry above them: In 1862 while "en route" for Europe I inspected the Bridge with Capt Palmer, when the foundations of the intermediate Piers were being laid & the impression left upon me is that Wells were not used

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but that the foundations were being put in solid: As Mr Ricketts the Executive officer is now a Deputy Collector stationed at Negapatam I addressed him on the subject & requested him to inform me whether the foundations were laid according to the Plan & if not, in what manner they were laid and by whose authority the original Plan was departed from— Mr Ricketts however, can afford no information on the subject and states that he believes the foundations were laid according to the Plan and that if they were laid otherwise, it must have been with the sanction of the District Engineer who he believes was Captain Palmer.

6— As Mr Ricketts is not even sure who was the District Engineer in 1862 and 63, it is hopeless to expect any information from him and supposing the foundations to have been laid according to the Plan viz with 6' Wells with 3' of solid masonry above them, I find, by means of a level, that the foundations were

were laid as per margin, or only 6'6" below the proper bed of the Dyaun, regarding the pro- -per bed of the River as the level of the bed before the Upper Amicut was built- The Northern Section of the Amicut is 7' high and accumulations having formed above the Amicut the bed of the River is now from 3' to 5' higher than it used to be — In 1858 when the first Dyaun Bridge was destroyed $\frac{2}{3}$ of the Northern Section of the Amicut was also destroyed and there was a very great scour through the Breach & the bed of the Dyaun & also that of the Angunda Cavery must have been scoured out far below their proper level; bearing this fact in mind and taking into considera- ration the fact that, with the foundations placed as shewn in the Margin, a great part even of the Walls must have stood in precisely formed deposit, it is not surprising that the Bridge fell when there was a



a scour through it due to a head from 3 $\frac{3}{4}$' to 4' as there was in October last —

7 — From levels which have since been taken I find I was misinformed as to the height to which the water must actually have risen above the Bridge before the Bridge fell, if, as I was informed and as I reported, the water had risen above the Crown of the Arches, the difference of level above & below the Bridge would have been between 7' & 8'; from portions of the bank which were not breached & to the level to which the water did not rise, it is clear that the actual head of water could have been but little above 4' —

8 — Owing to the proximity of the Amicut which has raised the Dyaun bed the difficulty of getting down Masonry foundations for Piers in the River bed must be very great, while the Piers when built must be subjected to an Oblique

Scour

Sowing to the Acute Angle at which the Lyaun meets the Angundacanecy— The site is therefore one for which an Iron Girder Bridge on Screw Piles, such as those described in J.O. No 3961 dated 15th Ultimo, is specially suited—

9 — The Area drained by the Lyaun is about 420 Square Miles & Estimating the fall of rain over the whole Area at 2" in 24 hours or a flood discharge of 2 cubic yards per second per Square Mile drained and the Velocity at 8' per second with a depth of 12' a waterway of 236 lineal feet is required or 4 Spans of 60' Each — Colonel Hart observe recommends Mr Brotherwood design for a wrought Iron Lattice Girder Bridge of 60' span — 4 Spans and 3 Piers would be required & may be Estimated roughly at Rs 20,000. I am unable to Estimate the probable cost of putting the Girders up, but the total cost of the Bridge including abutments and Wings would probably not exceed Rs 30,000 or 35,000 I would suggest therefore that 4 Spans of 60' & 3 Piers should at once be ordered from Mr Brotherwood works & that the Principal of the C.E. College should be requested to have Copies made of the set of Drawings forwarded to him with J.O. No 3961, & to send me the original & with the Aid of the Railway Engineer I may be able to Estimate Approximately the Cost of putting the Bridge up —

B. T. Beresford

10 — The depth of Piles below the bed of the River should be 10' i.e. below the proper or original bed of the River or about from 13' to 15' above the present bed & the lower flange of the Girder should be 21' above the River bed, this will admit of the Lyaun discharging nearly double the theoretical discharge required of it on Extraordinary occasions when its waters are swollen as in Oct. when last by the breaching of Tanks in its Valley. —

I have the honor to be
Sir
Your most Obdt Servt
H. T. Hart Captain R.E.
Supt Engineer 6th Div —

13

Public Works Dept

No 255

Proceedings of the Madras Government

Under date the 25th January 1867

Read the following

From the Supdg Engineer
of the 6th Division

(Trichinopoly 7th January 1867
No 1176)

With reference to G.O
No 3961, dated the 22nd
November 1866, the Supdg
Engineer of the 6th Division
reports in this letter on
the fall of the Lyncer
Bridge in the Trichinopoly
District during the heavy
floods of October last.

The bridge, which con-
sisted of six oblique
arches of 30 feet span
was completed in 1863
at a cost of £17,216,
and from recent ob-
servations

Public Works Dept
Proceedings
No 255
Dated 25 January 1867
Received 30 January 1867
No 1176

To Government
G.O.

From The Supdg Engineer
of the 6th Division
Trichinopoly

Dated 7th January 1867
Received 30th January 1867
No 1176

Reporting circumstances
on the fall of Lyncer Bridge
which was observed by
Captain Cautley
on the 25th instant

No 519

2.16 Jany 1867 R. 1PA

=servations which have
been made by the Supt
Engineer it appears that
its destruction is attributable
to its foundations having
been undermined by
the powerful scour
produced by the flood
rising to a height of
several feet above the
crown of the Arches—
Owing to the position of
the bridge near the
northern flank of the
upper Amicut and to
the bed of the Iyaur having
been both scoured out
and raised by the
alternate effect of floods
and the action of the
Amicut, there is some
difficulty in finding
sufficiently firm soil
on which to rest the
foundations of masonry

piers. For this reason, and
because the bridge must be
built askew to suit the
angle at which the Iyaur
joins the Ayanda Channel
the Supt Engineer recom-
=mends that instead of
rebuilding the masonry
bridge, even of greater
water-way than that which
has been destroyed, it
will be advisable to
erect an iron screw
pile bridge, with girders
in four spans of 60 feet
The Government fully
concur in this suggestion
and they approve of Capt
Oakes proposition to obtain
the bridge from England.
The Principal of the Civil
Engineering College is accordingly
requested to forward to
the Supt Engr of the 6 Divn
the book of bridge plans
which accompanied the

the Proceedings marginally noted, and, on its receipt the latter Officer will prepare the necessary Plans and estimates for transmission to England with an Indent for the Bridge —

No 396 of 15th Dec 1864

(13)

6 to the Chief Engr 6 Dis
3 — to Principal of the T. & College
4 — to Inspectress of Prisons
2 — to Stone Dep Dis

Desp 25 Jan 65

25
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17

Ltr. 16 Jan. 1867 Dn. 19

Pub: Works 1867 Department

Pro: of Govt. for January

No. 255

Pro: of the Madras Govt.

Dt 25th January

2572

The proposal for
the construction of Bridges
(Iron Screw pile) over the Agaur
in the Trichinopoly District,
in place of the one destroyed
in October last, approved.

No. 519-520

16 Jan, 1867 Rs. 19