

(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.	28	(2)	Press
~~B.P. No.~~			~~Mis.~~
Dated	5-1-		1876.

Not to be folded or roughly handled

No. 55. Read the following endorsement of the Chief Engineer for Irrigation, dated Fort St. George, 14th December 1875, No. 1,456:—

From Lieutenant-Colonel R. F. OAKES, R.E., Superintending Engineer, Tanjore, to Lieutenant-Colonel J. MULLINS, R.E., Chief Engineer for Irrigation, dated Tanjore, 11th November 1875, No. 2,126.

I HAVE the honor to inform you that the fish chamber sanctioned in G.O., No. 360, of 14th February 1874, has been completed, but the shutters have not been fixed.

- 1 Section of Anicut.
- 1 Comparative Statement.
- 1 Estimate for Baulk Shutters.

2. The height of the shutters provided is $7\frac{1}{2}$ feet, as directed by you in your Memorandum No. 798-C, dated 12th November 1873. In my No. 547,* of 22nd

August 1873, I stated that the Hilsa made their way up against the stream during high floods, and it is then they must be passed up above the anicut. I further stated that the shutters for the chamber would have to be $14\frac{1}{2}$ feet high to be available in extraordinary floods, and as if solid shutters were used they could only be worked from standards placed 26 or 27 feet above the floors of the sluices, I proposed that the ordinary baulk shutter should be used for closing the vents of the fish chamber.

3. It is not explained in your memorandum, ordering the $7\frac{1}{2}$ feet shutter, under what circumstances you supposed it could be used; but it would raise the water in the chamber only to the level of the crest of the anicut, and by the time the water had fallen to that level not a Hilsa probably would be left in the pool below the anicut as I stated in paragraph 4 of my No. 547.

4. The enclosed section of the anicut, showing the high flood of 1873, will render it plain why a $7\frac{1}{2}$ feet shutter would be useless; the height of the water above the anicut, reckoned from the level of the floor of the sluice, was $12' \frac{1}{2}"$ and that below the anicut was 11 feet; in order to admit the fish passing above the anicut, it is necessary that the water level in the chamber should be raised to the level of the water above the anicut, or to $12' \frac{1}{2}"$ on the occasion selected for illustration, and hence a shutter $12\frac{1}{2}$ feet high would have been required.

5. As stated above, the water above the anicut might rise to $14\frac{1}{2}$ feet above the sluice floor level, but this would be during extraordinary floods, and then the difference of level of water above and below the anicut would be so small that the Hilsa might perhaps find their way up-stream without the aid of the chamber, but the shutter should not be less than $13\frac{1}{2}$ feet in height.

6. As a $7\frac{1}{2}$ feet shutter has been provided, I have been endeavouring to devise how an upper shutter of 6 feet might be placed and worked; but have come to the conclusion that an upper shutter cannot be used, and that we must fall back upon the baulk shutters, an estimate* for the provision of which I enclose.

* Rupees 450.

*Proceedings of the Madras Government, Public Works Department,
5th January 1876.*

The shutters already provided have cost Rupees 1,024-8-0, and a further sum of Rupees 80 is required for fixing them.

Public Works Stores Bill	Rs.	A.	P.	
Cost of carriage, &c.	913	3	0	
	81	5	0	
For two shutters...	1,024	8	0	

The latter sum will not be required if baulk shutters are used, and the excess on the supplemental estimate of Rs. 2,000, forwarded with No. 1,898, of 11th November 1874, will be Rupees 7-4-11, according to the enclosed comparative statement submitted by the Range Officer; but a further sum of Rupees 450 will be required to provide the baulk shutters.

From the same Officer, dated Tanjore, 6th December 1875, No. 2,275.

With reference to your memorandum* No. 1,331, of 18th ultimo, I have the

* Received 23th.
Vide paragraph 29 of Dr. Day's Report in season of the Hilsa has passed, and the water has fallen to below the crown of the Lower Anicut, hence the shutters will be put into the fish chamber during the next working season, but in the meantime I shall feel obliged if you will be good enough to lay this letter and also my letter No. 2,126, of the 11th ultimo, before Government, as I am unwilling that a fish chamber sanctioned on an estimate submitted by me should inevitably fail from alterations made in the design or arrangements proposed by me, and that a fair trial should not be given to the chamber for another year.

2. With regard to your remark that the fish "should be able to pass over the crest of the anicut when the river is in the state shown on the tracing," I have only to observe that experience has proved that they cannot or do not then pass, perhaps because when heavy with roe the fish are incapable of the exertion of jumping a foot or more, and to pass over the anicut, when the water above and below vary by a foot or more, a jump and not a run is necessary.

3. With regard to the conclusion you arrive at, that because the fish cannot jump a foot the chamber with any shutters would be useless, I have only to state that I have seen the fish, during a heavy flood, take refuge in the recess of comparatively smooth water in rear of sluices when closed in such numbers that in dropping a stone from above you could hardly fail to strike one of the fish. It is then that the rear shutters should be closed, and the chamber be gradually filled, and the shutters of the upper vents be then entirely removed, when the fish would find their way above the anicut with facility by swimming and not by jumping, and hence your conclusion is, I think, erroneous.

4. With reference to my remark, that when the water fell to 6 inches below the anicut "not a Hilsa probably would be left in the pool below the anicut," on which you observe that my expressed belief is opposed to the experience in the Godavery, I have to observe that it is a simple fact that as the water falls the Hilsa disappear;

*Proceedings of the Madras Government, Public Works Department,
5th January 1876.*

this may be due to the fact that when the water in the Coleroon falls, as the river has

About 2 feet a mile.

a comparatively heavy fall, the water in the bed in rear becomes shallow (the

enclosed Memorandum A. shows the depth of water on rear apron during September 1875 under various depths over crown), while the fall in the Godavery being far less

About 1 foot a mile.

than in the Coleroon it is probable that a far greater depth of water is to be found

in rear of the Dowlaishweram than in rear of the Coleroon anicut when a small depth of water is passing over the dams.

5. Whether, as the water falls the fish which are not taken, through an instinct of self-preservation, make their way down stream to deep pools, such as exist at Sootamully, Saraswathivelagum, &c. &c., there to deposit their spawn, I am not aware.

6. The enclosures returned with your memorandum under reply are resubmitted, in order that if Government do not approve of my proposal sanction may be obtained to the estimate of Rupees 2,038 required to complete the work, as no orders have been passed by Government on letter No. 1,898, of 11th November 1874, with which a revised estimate of Rupees 2,000 was submitted from this office; the amount sanctioned for the fish chamber up to

G.O., No. 360, 14th February 1874.

date is Rupees 1,570, the abstract of the

estimate for this amount is now included in the comparative statement herewith submitted.

Enclosures.

- 1 Memorandum A.
- 1 Comparative Statement.
- 1 Estimate of Rupees 450.
- 1 Section of south branch of Anicut.

SUBMITTED to Government as requested by the Superintending Engineer, Tanjore.

2. The undersigned does not concur in the opinion expressed by Lieutenant-Colonel Oakes that, with the water levels as shown in the tracing, dated 11th November 1875, it would be necessary for the fish to jump; the water would not take the form shown by the blue line, but somewhat that of the dotted black line, and the water in passing the anicut would be only a rapid with a not excessive current.

3. The circumstance, mentioned in paragraph 3 of this officer's letter, that fish in great numbers find their way into the under-sluices when the shutters are closed and the river is in flood, is no proof that they do not pass the anicut at such times.

4. It appears from the information given by Colonel Oakes that Hilsa are not to be found immediately below the anicut unless there is a considerable discharge over the crest, so as to maintain a sufficient depth of water below the weir. It has not

Given

Proceedings of the Madras Government, Public Works Department,
5th January 1876.

2. The 1,400 Rupees surrendered under Revenue will, with reference to G.O., No. 3,036, dated 23th October 1875, be made available for the repair of floating plant, Kistna Delta.

(True Extract.)

Major-General, R.E.,
Secretary to Government.

Dist Engineer's letter of 3 July, 75 was not received in this office nor in that of the Secy. Probably the Departmental letter was sanctioned locally as it is within the limits of the original file. — D. H.

There is a sum of Rs 1422 at present at the disposal of Govt under J. & P. Revenue. — a statement of surrenders & demands up to date is under preparation. —
21/12/75

Extract from the Appropriation & outlay Returns of the Vizagapatnam Sd for the quarter ended 30 September 1875-

Tools & Plant Agricultural ordinary	
Budget allotment	5,000
Appropriation	6,500
Expenditure	2
Remarks by Secretary	
Chief Engr for Irrigation should be informed that a large amount is available from Tools & Plant Agricultural Sd. G. W. W.	
4-11-75- <i>W. J. D. O. Chief Asst. Secretary. P. W. D.</i>	

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been very clearly indicated what depth on the crest, with a rising or falling river, would be necessary to give the required quantity and depth in the lower reach, but it would seem probable that with 2 feet on the under-sluice floor the fish could always get into the chamber. This depth is to be formed with a depth of 5 inches on the crest and a falling river, and probably with from 9 to 10 inches and a rising river.

5. The undersigned is of opinion that with 1 foot of water passing over the anicut, the fish chamber with the rear gates $7\frac{1}{2}$ feet high, or equal in height to the anicut crest, could be effectively worked. At such times the lower reach water would be about 3 feet over floor of chamber with the upper shutters closed. The lower edge of the rear shutters would be kept just at lower water surface level until the chamber was about to be used to lock fish into the pond above the anicut. Then, fish being in the chamber, the rear shutters would be lowered and the upper or front shutters removed. The fish could then pass into the pond through any part of the large front opening and would meet but an extremely slight current, viz., the current due to water 1 foot in depth passing over the rear shutter, which water would enter the chamber through an opening $8\frac{1}{2}$ feet deep. Only within a very short distance of the line of the rear shutter would there be any current which would be felt, and the maximum velocity

About 3.35.

of the water here would be under $3\frac{1}{2}$ feet a second, or under $2\frac{1}{2}$ miles an hour, which

even a Hilsa in roe must be quite capable of withstanding. It seems further to be extremely probable that with water 2 feet above the crest of the anicut the shutters as sanctioned will suffice, for then the maximum velocity of water near the line of the rear shutter will be only just over 6 miles an hour, and the mean velocity of that supplying the chamber will be $\frac{6 \times 2}{\sqrt{3}} = \frac{24}{1.73} =$ about $1\frac{1}{4}$ miles an hour.

6. It is considered, therefore, that probably the sanctioned arrangements would suffice, and that at any rate the only modification of them at all likely to be necessary will be the adding of a few inches—certainly not more than a foot at the outside,—and this only in the event of its being shown that there are many days during the spawning season that the water is more than 2 feet above the crest of the anicut to the height of the rear shutters, a modification which, if found desirable in the future, can easily be carried out.

7. The undersigned has no doubt of the efficiency of the sanctioned arrangements and of their superiority to those advocated by Colonel Oakes. He objects altogether to the use of baulk or needle shutters for closing the chamber in rear; he believes that while putting such shutters down fish would be alarmed and would escape from the chamber, and that, on the other hand, all or nearly all the fish in the chamber at the time of lowering the gate shutters of the sanctioned arrangements will readily pass above the anicut; at the same time it would not be safe to conclude that any very great number of the fish of the more valuable kinds will use this or any other form of fish lock, and results will be ascertainable only from experience, while no doubt much will depend upon the way in which the lock chamber is worked, and especially on the maintenance of a moderate current of water through and below the chamber to give the fish a lead thereto.

(Signed) JOHN MULLINS, Lieut.-Colonel, R.E.,
Chief Engineer for Irrigation.

No. 56.

ORDER THEREON, 5th January 1876, No. 28.

IRRIGATION, No. 5-A.

Account.

THE Chief Engineer for Irrigation has, in the foregoing note, given at length his reasons for believing that the fish lock at the Lower Coleroon Anicut will, with the

sanctioned arrangement of the lower shutters, or with but a slight modification of their height, prove effective, and those shutters should therefore be tried in the manner detailed, and the results reported after a season's trial.

2. The revised estimate, amounting to Rupees 2,088, is sanctioned, but it is observed that the excess on the shutters and screw gearing is very large and that no explanation has been given to account for it, while the differences in the details of the estimates of November 1874 and November 1875 are very material, though the totals, approximate. The entry in the sanctioned estimate of Rupees 1,570 for the shutters appears to have been based on information obtained from the Public Works Workshops and it should be reported therefore why the shutters, without iron screw piles, have cost more than the estimate for shutters and piles together.

(True Extract.)

Major-General, R.E.,
Secretary to Government.

To the Superintending Engineer, Tanjore.

„ Chief Engineer for Irrigation.

„ Revenue Department.

Exd. S. T. Austin.

Spare Copies

G. O. No 28 of 5/11/76
has not been sent
to the Exr, as it should
have been, I think
it best to commu-
-nicate copies offh
now - RP

17/10/76
Certainly,
A.P. 17-10

The Chief Engineer
has given carefully
through these papers
to form the opinion
called for by the Str. Co.
Mr. Elliot, and ~~considers~~ ^{thinks}
it premature to refer
the subject for consider-
ation by Mr. Thomas,
or to make the alter-
-ations proposed by
Colonel Barker prob.
he submits my Exr.
of Rs. 450 - The work
as planned & carried
out should stand
as it is through another

Submitted to Government as
requested by the Superintending
Engineer, Chicago.

2. The undersigned does not concur
in the opinion expressed by L. H. Calkins
that, with the water levels as shown
in the tracing dated 11th November 1875,
it would be necessary for the fish to
jump; the water would not take the
form shown by the blue line, but
somewhat that of the dotted black
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anicut would be only a rapid with
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3. The circumstance, mentioned
in para 3 of this officer's letter, that
fish in great numbers find their
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pass the anicut at such times.

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with a depth of 5 inches on the crest
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from 9 to 10 inches and a rising river.

5. The undersigned is of opinion
that with 1 foot of water passing over
the ancient, the fish chamber with
the rear gates $4\frac{1}{2}$ feet high or equal
in height to the ancient crest could be
effectively worked. At such times
the lower reach water would be about
3 feet over floor of chamber with the
upper shutters closed. The lower

edge

about 3.35

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6. ... It is considered, therefore, that probably the sanctioned arrangements would suffice, and that at any rate the only modification of them at all likely to be necessary will be the adding of a few inches - certainly not more than a foot at the outside, and this only in the event of its being shown that there are many days during the spawning season, that the water is more than 2 feet above the crest of the ancient to the height of the rear shutters, a modification which, if found desirable in the future, can easily be carried out.

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Fort Saint George 3 Wundundins Lt. Col. R.E.
14th December 1875 3 Chief Engineer for Irrigation
S. The Secretary to Govt.
P.M.S.

No. 28

Mr D

Proceedings of the Madras Fort
Under date the 5 Jan'y 6
Read the following

From the Chief Engr for Irrigation
P.E. No 1456 of 14 Decr 75.

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for Irrigation has, in the
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therefore he tried in
the

All

C.M. Secy to Govt.

17-11-36

No: 8046

From

The Chief Engr for Irrigation

To the Secretary to Govt.

P.E. No 1456

Dated 14

Decr 75

Received 18

Enclosure 11.

G.O. No 28. S. 1. 76

18/12/11
11-12-11
16-12-11

Examine with observation
from the Chief Engr
to the Secretary to Govt.
The Chief Engr for Irrigation
P.E. No 1456
Dated 14 Decr 75
Received 18

10/12-11

No 55

2/1/12-35

the manner detailed,
and the result reported
after a season's trial.

My. 17/12

[Signature]

Therefore when the shutters,
without iron screw piles, have
cost more than the estimate
for shutters and piles together

My. 30/12/75

Chief Insp. for Sanitation

2. The revised estimate,
amounting to Rs. 2088
is sanctioned, but it is observed
that the creep on the shutters
and screw piling is very
large and that no explanation
has been given to account
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in the details of the estimates
of November 1874 and November 1875
are very material, though
the totals approximate. The
entry in the sanctioned
estimate of Rs. 1570, for the
shutters appears to have been
based on information obtained
from the Public Works Workshops,
and it should be reported

To The S. Insp. Langore 7
Chief Insp. for Sanitation 5 with 11 Enclosures
Revenue Dept. 21
Examiners, J. H. A. etc. 17-10-76
Appd 17
Recd - 17-1-76

8040
Govt. of 1876 Madras.

PUBLIC WORKS.

To

Supy. Secy. Supt.

Dated

Issued

Recd.

Encl.

G. O. No. 285

Recd. 55 58

Estimate at the Lower Cdn.
Incub. Supt. Supt.

Received Estimate amount
Rs 2088 for a ———, same
with remarks.