New No. Scott. I (i)-1—Old No. M.R.O. 1—10,006—10-6-68.

(1) Number of pages 68

(2) Date of repair 30-9-69.

(3) Initials of the Referencer

MADRAS RECORD OFFICE

GOVERNMENT OF MADRAS

Reference DEPARTMENT

G.O. No. 131
B.P. No.

Press
Mis.

Dated 19-1-1876 196 .

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.

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

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.

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.

* In G.O., No. 360.

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 of 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.

W. L.	10′	3″
Zero Level		9″
	11′	0

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-steam 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.

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

		Rs.	A.
Public Works Stores Bill	...	943	3
Cost of carriage, &c.	... ...	81	5
For two shutters...		1,024	8

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

With reference to your memorandum* No. 1,381, of 18th ultimo, I have the honor to inform you that the breeding 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 the 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.

* Received 29th.

Vide paragraph 2 of Dr. Day's Report in G.O., No. 1,580, of 13th May 1869.

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.

Paragraph 3 of my No. 547, 22nd August 1873.

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;

Paragraph 4 of 547.

this may be due to the fact that when the water in the Coleroon falls, as the river has 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 than in the Coleroon it is probable that a 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.

About 2 feet a mile.

About 1 foot a mile.

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 2,088 required to complete the work, as no orders have been passed by Government on letter N. 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 date is Rupees 1,570, the abstract of the estimate for this amount is now included in the comparative statement herewith submitted.

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

Enclosures.

1 Memorandum.
1 Comparative Sitement.
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

been very clearly indicated what dep[illegible]n the crest, with a rising or falling river, would be necessary to give the required [illegible]antity 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 [illegible] be formed with a depth of 5 inches on the crest and a falling river, and probably w[illegible]h from 9 to 10 inches and a rising river.

5. The undersigned is of opinio[illegible] that with 1 foot of water passing over the anicut, the fish chamber with the rea[illegible] gates $7\frac{1}{2}$ feet high, or equal in height to the anicut [illegible]st, could be effectively worked. At such times the lower reach water would be about 3 fe[illegible] over floor of chamber wit[illegible] the upper shutters closed. The lower edge of the rear shutters would be kept just [illegible] lower water surface level until the chamber was about to be used to lock fish int[illegible] pond above the anicut. Then, fish being in the ch[illegible]ber, the rear shutters wou[illegible]e lowered and the upper or front shutters removed. The fish could then pass int[illegible]e pond through any part of the large front opening and would meet but an extreme[illegible] slight current, *viz.*, the current due to water 1 foot in depth passing over the rear sh[illegible]ter, 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 cap[illegible] of withstanding. It seems further to be extremely probable that with water 2 fe[illegible] above the crest of the anicut the shutters as sanctioned will suffice, for then the ma[illegible]mum velocity of water [illegible]r the line of the rear shutter will be only just over 6 miles [illegible]n hour, and the mean velocity of that supplying the chamber will be $\frac{6 \times 2}{9\frac{1}{2}} = \frac{24}{19} =$ abot $1\frac{1}{4}$ 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 modificatio[illegible] 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 shutter of the sanctioned arrangements will readily pass above the anicut; at the same time [illegible] would not be safe to conclude that any very great number of the fish of the more v[illegible]ble kinds will use this or any other form of fish lock, and results will be ascertaina[illegible] only from experience, while no doubt much will depend upon the way in which the [illegible]ck 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.

3/181

No. 56. ORDER THEREON, 5th [illegible]ary 1876, No. 28.

IRRIGATION, No. 5-A.
Account.

THE Chief Engineer for Irrigation has, the foregoing note, given at length his [illegible]sons for believing that the fish lock at Lower Coleroon Anicut will, with the sanctioned arrangement of the lower sh[illegible]s, or with but a slight modification of their height, prove effective, and those shu[illegible]s should therefore be tried in the manner detailed, and the results reported after a se[illegible]'s trial.

2. The revised estimate, amountin[illegible] Rupees 2,088, is sanctioned, but it is observed that the excess on the shutters [illegible] screw gearing is very large and that no explanation has been given to account for [illegible]hile the differences in the details of the estimates of November 1874 and Novemb[illegible]75 are very material, though the totals, approximate. The entry in the sanction[illegible]timate of Rupees 1,57[illegible] for the shutters appears to have been based on information [illegible]ined from the Public Works Workshpos and it should be reported therefore why [illegible] shutters, without iron screw piles, have cost more than the estimate for shutters a[illegible] piles together.

(True [illegible]act.)

[illegible] Major-General, R.E.,
Secretary to Government.

To the Superintending Engineer, Tanjore.
,, Chief Engineer for Irrigation.
,, Revenue Department.

Exd. S. T. Austin.
Spare Copies

24-2-91

Revenue Department

No. 162

Govt. of {1876} Madras

PUBLIC WORKS.

To

THE SUPERINTENDING ENGINEER,
TANJORE,
&c., &c., &c.

Dated January 5th.

Issued

Recd. -a- 18th

Encl.

G. O., 5th January 1876, No. 28.

JANUARY.

Nos. 55-56

Fish Lock at the Lower Coleroon Anicut, Tanjore District.—Revised estimate, amounting to Rupees 2,088, for a —, sanctioned with remarks.

No. 131

Commd. to the Board of Revenue

19. Jany/76

12 To the Board of Revenue