Public Works (1898) Department.

G.O., No. 266

Dated 28th March 1898

[Despatch Abstract.]

Edwani Delta, Notes of Inspection by the Chief Engineer for Irrigation, of the — Canal & S.E. I Circle for Sudan

[P. W. 26. 1,000—12-2-98.]

Indexed.

## BACK PAPERS.

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IRRIGATION.

# Government {1898} of Madras.

## PUBLIC WORKS.

*Recd.* } 1898. *Enclosures*

*Regd.* } *Spare copies*

**G.O., No. 266 I., 25th March 1898.**

**MARCH.**

**Godavari Delta**

Notes of inspection, by the Chief Engineer for Irrigation, of the —, communicated to Superintending Engineer, I Circle, for guidance.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

**Irrigation.**

Read—the following paper:—

No. 102 I.

*Notes of Inspection by the Chief Engineer for Irrigation, February-March* 1898.

*Gódávari delta.*—For some years past a large sand shoal has been extending into the river between Rajahmundry and the Dowlaishweram branch of the anicut. The chart of 1896 shows this bank connected with the mainland, but in the following year there was some improvement, a narrow channel having formed along the margin. On the other side the sand bank had extended further into the river. It is hoped the chart of this year will show a further improvement. The accretion on the left margin between the Dowlaishweram hill and the head sluice, referred to in my inspection notes of last year, apparently continues to extend. It is not clear when this accretion, which appears to be due indirectly to the sand bank referred to above, began to form. It is first shown in the chart of 1894 as a mud bank and was then about 250 feet wide opposite the boat office. It is not shown at all in the 1895 chart. In 1896 it had increased to 300 feet width opposite the bungalows and workshop, and in the chart of 1897 it is shown as a sand bank of maximum width 400 feet. For many reasons it is most desirable to get rid of this accretion which is evidently of material not likely to be scoured away and which, if allowed to remain, will extend further towards the head and scouring sluices to which water can now flow only in a direction very oblique to the anicut. There is also a difficulty in navigation, boats leaving or approaching the lock having to keep at a considerable distance from shore. The shoal cannot be entirely removed by hand, but it would be a considerable improvement if a channel, 30 feet width, with bed as nearly as practicable at the level of the head sluice sill, were cut from the head of the shoal a little above the boat office to the end near the lock. The centre of this channel might be made 50 feet from the old high margin. The Superintending Engineer should have this done at once.

2. In the centre of the river at the head of the Central delta the trouble arising from the deposit of sand above the head works is about as bad as it ever has been and no serious attempt has been made for a good many years past to remedy it. The approach channel is confined between training walls, of which the left extends 5,200 * feet up the river from the head sluice, while that on the right extends only some 4,400 feet. As the river currents have of late set more from the west, the projecting part of the left wall is said to arrest the sand and cause its deposit near the head of the channel. Mr Larminie proposed to bring the ends of the walls to the same line by removing part of the left wall, but it seems to

* (This and other measurements are roughly scaled from the chart).



me there are other more evident causes to account for the sand deposit and, in fact, the whole arrangement of the approaches to the head sluice requires reconsideration. At the head of the leading channel the width between the groynes is 450 feet, and the channel narrows gradually to 160 feet about half way down and again widens to over 300 feet at the nose between the head and scouring sluices. The effect of the contraction must be to increase the velocity and deepen the bed during freshes and probably much of the sand, which is sucked down, is deposited where the channel widens again. The channel to the under sluices was silted to about the level of the main canal and bunded across. At my request the Superintending Engineer had the bund cut and some of the sluices were opened and orders given to open them every night as long as water could be spared, but as the river fell shortly afterwards to below the anicut level, it is presumed the experiment could not have had much result. The Superintending Engineer has been asked to have a large scale survey of the leading channel made so that necessary improvements may be decided on. It will probably never be possible to keep the leading channel as clear and the main canal as near its normal bed level as at the head of the Western delta, the initial error of building the lock between the head and scouring sluices being irremediable, but it is very probable that some real improvement may be effected. At the head of the Western delta the approach channel is of pretty uniform and suitable width and there is no serious silting, although the scouring sluices are opened only when there is more than 3 feet depth over the anicut. The scouring sluice belongs to the Eastern division. The gearing is very dirty and uncared for. The Executive Engineer should see that this is corrected.

3. *Anicut.*—The shutters are fitted for about 2,500 feet length on the Dowlaishweram branch and some more shutters being made in workshop. As reported by the Superintending Engineer in his letter printed with G.O., No. 924 I., dated 19th October 1897, the shutters are not very well made, but the fault in this respect is less and of less consequence than the faults in fitting. The position of the Lewis bolts by which the tie-bars are attached to the crest were not properly spaced out and some of the shutters are consequently so much out of place that there are large spaces between many of the shutters. In some places battens have been attached to ends of shutters to diminish the leakage. The shutters fall very easily. Those which were up last season appear to have fallen with nearly the depth of water calculated to overturn them. Shortly after the estimate was sanctioned the Superintending Engineer reported that there was much difficulty in getting any large supply of stone and recommended the substitution of Portland cement concrete. This was permitted and the work is now being all done in concrete. The Dowlaishweram, Ralli and Madur branches at least will be completed this season. The shutters for the Dowlaishweram branch only are being made at the workshop. The remainder are given on contract to Jessop & Co. of Calcutta, but none have been delivered as yet.

4. *Central delta.*—A little above the head sluice the channel is greatly contracted, having silted in on the right side. This portion will have to be widened to normal lines which will be laid down when the general improvement of the leading channel is designed. Since the opening in last June sections have been taken every ten days immediately in rear of the head sluice and at 300 feet, 600 feet and 900 feet down the channel in order to get some information as to the changes in the silt deposit. It is very remarkable that the deposit at the above points, viz., about 100 square feet at the sluice and 340 to 390 square feet at the other points, is almost exactly the same now as in June. In the *interim* the position of maximum deposit has varied. It was at 300 feet while the river was high, or up to the beginning of September, and gradually moved down. The deposit reached its maximum at 900 feet in the middle of November. The area of deposit at one time slightly exceeded 500 square feet which represents a depth of over $3\frac{1}{2}$ feet if the channel be assumed of the width it was originally made. The removal in the latter part of the season of the upper portion of the silt wedge is similar to what has been observed in the Sirhind canal in the Punjab, the Vennár in Tanjore and in other places. The most probable explanation is that the deposit in heavy freshes is composed of sand of varying quality and of silt, and when the water entering the channel becomes clearer after the river freshes it picks up the silt leaving the sand. Beyond 900 feet the deposit gradually reduces and

quite a short way down there is but little. If the bed of the leading channel from the river is lowered it is to be expected that the canal bed will be also lowered. It was right to leave off adding to the mountains of sand cleared from the canal in former years. The annual clearance, which was the custom, was only a very temporary remedy.

5. *Gunnaram canal.*—The Gunnaram aqueduct is in good order, except the tow-path, which is very much broken up and should be repaired.

6. *Vadumudi set.*—This set is a very old one and large sums have been spent in endeavours to protect the Bank canal. Of late ten groynes and three tree spurs have been constructed in a distance of $1\frac{1}{2}$ miles at a cost of Rs. 32,000. The groynes have acted fairly well and seem likely to last until the set moves further down, when they will be no longer required, and it is only at the end of them that any serious damage is now being done. The right bank of the canal at about 23/4 has slipped. An estimate for its repair and protection has been sanctioned and work is put in hand. Instead of sand for filling rear slope of bund, ordered by the late Superintending Engineer, earth should be used as the river is likely to erode the slope. Materials have been collected and piles are partly driven for a groyne (above groyne No. 10) of the kind described in the Superintending Engineer's notes of inspection of November 1897. This consists of a framework of piles with sand filling and rubble outside at a slope of 1 to 1. There is no objection to a groyne of this kind being tried, but I do not expect it to be very successful. If a groyne is liable to be topped and thus to become a submerged dam the action of the water in rear may be more destructive than if there were no groyne at all. It is, therefore, necessary for efficiency that a groyne should be carried above flood level. A second point to be attended to is that as there is very severe action at the nose of a groyne it is not sufficient to lay stone at a steep slope. A toe should also be provided to fill hollows formed by erosion. On the Ganges above and below the Narora weir it has been found best to make the groynes perpendicular to the bank or even sloping slightly upstream and terminate them with a sort of T-head of stone. Groynes of this form where required for more than temporary protection would perhaps be most suitable for the Gódávari. It is only the T-head and a short length of the groyne itself which need be made wholly or partly of stone. The rest may be of earth or even sand properly protected. As there has been some controversy about the most suitable form of protective work, I express my opinion that where practicable it is better to build long strong groynes at once and maintain them properly. The system of constructing short groynes merely to hold on to a river margin has proved in the long run very expensive and cannot be said to have been successful. The other system is, however, impossible in many places owing to the depth of water.

7. *Western delta.*—The head sluice is in good order and the shutter gearing creditably clean, but the gauge indicators are said to be liable to slip. It should be easy to remedy this. The Executive Engineer has been asked to see to it.

8. *Chettipett weir.*—The woodwork of the platform is in bad order and should be repaired.

9. At Chettipett the main canal divides, forming the Ellore and the Kakaraparru canals. It is reported that owing to the greater draught down the Kakaraparru canal there is much difficulty in efficiently supplying the Ellore canal and its branches. The Kakaraparru canal divides at 15 miles from the anicut into the Narsapur and the Bank canals. There is a lock a mile below the head of the former, while the first lock on the latter is at the 25th mile. It has been proposed to construct one regulating lock on the Kakaraparru and another on the Bank canal, but opinions are divided as to whether both are necessary and which of the two is the more required if only one is to be built. The scheme has never been properly worked out. The extent of the evil due to the imperfect control should be ascertained by levels and gaugings and statistics of cultivation and definite proposals submitted.

CHEPÂK,
19th March 1898.

(Signed) W. HUGHES,
Chief Engineer for Irrigation.



ORDER—No. 266 I., dated 25th March 1898.

Communicated to the Superintending Engineer, I Circle, for information and guidance.

(True Extract.)

Under Secretary to Government,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, I Circle.
" Examiner, Public Works Accounts.

Exd. W. D'Mose.

# Public Works (1898) Department.

**CURRENT No.** 2735

*From* The Chief Engr for Irrign

*Order*

No. 102 I

*Dated* 19-3-98

*Received* } 24-3-98

*Registered* }

*Enclosures*

*Spare copies*

SUBJECT.

Notes of Inspection by the Chief Engr for Irrign Feb and Mar 98. Godeveridelta — Submitted

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FURTHER PAPERS.

| No. | Date. |
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PUBLIC WORKS DEPARTMENT,
IRRIGATION BRANCH.

# PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 9P

READ the following

Notes of Inspection by the Chief Engineer for Irrigation, Febry: - March/98 (H.E.No: 102 I, d/9-3-98)

Agt Cir

A-266 dg 25.3.98

Communicated to the Superintending Engineer, First Circle, for information and guidance.

W. Hudson

Issue

24.3.98

To

The Chief Engineer for Irrgtn:
,, Suptg:Engineer, I Circle.
,, Examiner of P.W.Accounts.

E. I. Form No 1—1,000—27-11-95.

Hyd 19/3

No 102-I.

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FOR IRRIGATION FE BRY: -MARCH 1898.

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continues to extend. It is not clear when this accretion,
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the boat office. It is not shown at all in the 1895 chart. In
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Chepâk,
19th March 1898.

W. Hyde.
Chief Engineer for Irrigation.

To,
The Joint Secretary to Government, P.W.D.,
Irrigation Branch.