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*Proceedings of the Madras Government, Public Works Department,  
29th September 1875.*

No. 588. Read the following letter from Major J. BEATTY, R.E., District Engineer, Godavary, to Lieutenant-Colonel J. MULLINS, R.E., Chief Engineer for Irrigation, dated Dowlishwerant, 2nd March 1875, No. 3,734:—

I HAVE the honor to submit, herewith, the plans, estimates, and reports on the

- |                                         |                                             |
|-----------------------------------------|---------------------------------------------|
| 1 General Report by Lieutenant Langley. | Biccavole Sub-section of the village drain- |
| 1 Do. by Lieutenant Wilkinson.          | age scheme ordered by Government in         |
| Sent by Langley.                        | G. O., No. 1,980, of 15th April 1874.       |
| 27 Plans,                               |                                             |
| 17 Estimates, and                       | 2 The group of villages now reported        |
| 13 Reports.                             | on was selected by the Collector. It is     |

situated in the north-east corner of the Ramachandrapur Taluq. The surveys were carried out under the direction of Lieutenant C. B. Wilkinson, R.E., and after his removal from the district under Lieutenant L. Langley, R.E., who has completed and reported upon them. The latter officer has furnished a separate report on each village and a general report on the group.

3. The out-door work of the surveys was commenced at the end of August, and finished at the end of November; the preparation of the plans and reports was completed on 25th January, but it has been considered necessary to delay submitting them in order to obtain additional information on the subject of levels. Lieutenant Langley had not explained the values of his levels with reference to mean sea level; this has now been done by a note on each plan.

4. As in the case of the Kalli Sub-section, already reported on, it is proposed to form minor street drains by sectioning the streets from the sides to the centre, and providing main drains into which the street drains would discharge, the main drains again discharging into some natural or artificial channel or tank at the delta. In three cases masonry works have been found necessary in order not to interfere with existing roads and channels.

5. The reports which accompany the plans describe, in detail, what is proposed, which is more briefly as follows:—

(1.) Oolapully is to be provided with two main drains leading to an under tunnel which is to carry the drainage across an irrigation channel, below which one main drain carries the drainage into the Toolabaga. Part of the village on the eastern side will be drained into an irrigation channel on that side.

(2.) Biccavole, an existing drain is to be cleared to lead off the drainage by means of the side channel of the Biccavole and Chinnally road into the old Biccavole drain, one of the three principal natural drainage lines of the Eastern Delta.

(3.) Eelabhadrapuram, two new main drains lead drainage through existing culverts into the Samudottal Canal.

(4.) Panakalipaka, one new main drain is to lead the drainage of this village to the Toolabaga.

(5.) Eyalavole, this village is to lead to the Toolabaga, into which the main drains discharge.

(6.) Gundreddi, four short main drains lead the drainage of this village into existing irrigation channels near it.

(7.) Padapudi, this village is to be provided with one new main drain to carry all drainage into one of the branch drains of the delta, a tributary of the great Biccavole drain.

(8.) Gollanmahalidam: two principal drains are provided for this village which meet below it, thence forming one main drain, which carries the drainage by a culvert under a public or cross road into an existing branch drain, and this branch drain flows into the Peddada tank.

(34) Padmalambadivaram. It is proposed to provide this village with three main drains, one of which crosses a pond, and a sub-drain is estimated for at this place; these three drains will be made on existing road and cut on the Samudralah road by which the drainage is discharged into the canal.

(10) Drainage. It is proposed to furnish this village with two main drains, one to the east and the other to the south and west to carry drainage into the village lake.

(11.) Modaraba is proposed to discharge part of the drainage of this village by an existing culvert into the Samsatibi Canal, and to provide one more drain for the rest of the village, which will carry the drainage through another existing culvert on the Namdanihi road into the canal.

(10) Furthermore, this village does not require drainage works of any kind, as it stands high, with good structure, and has no swamps or bays near it.

(13) Later in the morning, it is proposed to transfer the village with two main reasons which would increase the drainage into existing drainage channels.

10. Eleven of these villages, Nos. 2, 3, 4, 5, 9, 7, 8, 10, 11, 12, and 13 are no longer self-sufficient in rice; that is, they would have been if no ancient works had been constructed. Some villages in the inland plains are quite as much entitled to be irrigated as the rest of the State as they are. The work proposed is small in quantity and cost.

$\frac{1}{2} \times \frac{1}{2}$

[illegible]

Of the 1,000,000 vehicles now estimated and accompanied by a clutch of passengers, only a negligible number of them are in the grip of the principal canals of commerce, and the remainder is distributed in a haphazard way.

The official name of the water resource is Figure 3.30B, and, as promised, I changed it accordingly. Report 4.084 is changed to Imperial Pacific and the figure number is added to the title under "Caption."

11. I will also use your information in a report made me by Lieutenant Wasson, in which it is stated that you are in the custody of New Orleans

drainages, on which he had been employed for about two months and giving the general ideas he was led to form about it.

From Lieutenant C. B. WILLIEMSON, R.E., Assistant Engineer in charge of Eastern Delta Drainage Scheme, to Major J. BEATTY, R.E., District Engineer, Godavary, dated Camp at Chintapally, 30th October 1874, No. 46.

Report by Lieutenant W. Benson on the Village Terraces.

Before I hand over charge of this office, I think it advisable to make the following remarks and suggestions:—

This drainage scheme was undertaken in consequence of the reports received by Government of the great prevalence of fever in this district. I have made many inquiries with reference to these reports, and have come to the conclusion that this epidemic arises more from the habits of the inhabitants than from the locality of their dwellings.

I may remark here that, though there is a good deal of fever, the most general complaint is *typhus*.

Now it seems surprising that this latter complaint (agria) is not more prevalent than it is when one considers that the greater number of the inhabitants of these villages spend a large portion of their time during the day in the midst of their fields, these fields being submerged several inches. Thus for several hours a man is wading about in water; he then goes back to his village, the path leading *through* (not *over*) several channels from 2 to 4 feet deep; he reaches his house towards evening, when a damp mist arises from the whole country; the submerged fields reach to the very wall of his compound; the whole atmosphere regularly penetrated with damp; here he sleeps in his damp clothes and then returns in the morning to his work in the wet fields. How is he to avoid agria and such complaints arising from exposure to damp? His illness does not arise from the defective drainage of the village so much as from his damp position and the malarious nature of his life.

I therefore deem that this earnings scheme will not attain the end required.

All the villages are built on rising grounds. The houses on the margin of the village will be as high as ever, but those on the border will be as high as ever.

To make the villages as healthy as possible, it will be necessary to build villages with either within a quarter of a mile of the outside of the mangrove, which will thus be well drained, and the infirmities which are inseparable from a water-logged land. The space between the villages and the fields I would propose to plant with jack-wood, mangrove trees and other shrubs which possess of the nature of the *Lumnitzera gracilis* in absorbing a large quantity of moisture.

The only place where fire is not used for collection or drying purposes are two or three within the boundaries of each village. These are used as barns and for curing external fire without the amount of smoke which is produced. There can be no doubt that such an arrangement is very important to these living near and around it will be necessary to make every arrangement for supplying the material such as creating properly built barns on the dry earth system.

For the above reasons, I feel it my duty to request to you that, unless the Government are prepared to do a great deal for her in this matter, they will be spending a great deal of money with no adequate result.

The cost of the repairs alone of the village in the Hamlet of Tain will come to \$1,000.00. The cost of the carrying out of the same will be much more than this amount.

From what I have seen of German life, I should say that German youth will be much such as our youth being retrained for, will be in the best shape in a year or two, in the course of which time the bulk of German military equipment will be sold off. Therefore, such early life will cost the Government about \$100,000,000.

Now, there is a well-known calculation to the effect that each British Soldier is worth £ 100 or Rupees 1,000.

I doubt much whether each Indian coolie is worth as much as a British Soldier.

*Report on the Proposed Sub-section of the Eastern Delta Godavary Drainage Scheme.*

**PRELIMINARY REMARKS.**—This sub-section originally consisted of twelve villages chosen by the Collector, W. Foster, Esq. Lieutenant Wilkinson, R.E., who was in charge of this sub-section from August till the end of October 1874, added the village of Lutchunarepparam, which is a hamlet of Gollamarrudala, to the original number. These villages have apparently been chosen simply from their proximity to Biccavada, and without any regard to their size, importance, or capability of being drained. A list of the villages giving the amount of the estimate for each and the total amount of the estimate of the sub-section, &c., is given at the end of this report. The villages have been numbered for convenience of reference. Three of them, viz. Nos. 3, 9, and 11, are not in the delta, being on the north bank of the Samulcooth Canal.

**ON THE PROPOSED METHOD OF DRAINAGE.**—The streets of the villages in this delta generally slope from the sides towards the centre. It is proposed to drain the streets along their centres, but the slope which they usually have from the sides towards the centre has not been allowed for in the estimate, the cross-section of the streets having been taken as a plane. The estimates have been arrived at in this way:—Take a street of 20 feet broad; lay off 5 feet from each side of the centre line, dig a drain 6 inches deep at the centre and sloping up uniformly to the edges of the 5 feet laid off on each side; then pile up the excavated earth on either side,

and you have the cross-section of the street as in the figure. This gives a slope on each side of 1 in 10 and an average depth of 3 inches for the drain. The breadth of the streets varies,

and in some cases it is necessary to dig a drain with a greater average depth than 3 inches, and the side slopes would be steeper, but the principle is the same in all cases, and in every case the street works drain itself. It is considered that the consequent traffic through the village streets would fully consolidate the earth, and that if the work was carried out in the hot weather, the streets would be properly cross-sectioned by the time the rainy weather set in. As many streets have already now got towards the centre, there will not be much to do in the way of cross-sectioning, and the street drainage should be done easily within the estimates. In many villages catch-water drains have been dug, and the village has been provided. They vary in section from 6 to 12 feet according to their position, the amount of drainage they have to carry off, and the slope of the ground. In three cases the village drainage is taken into an old drainage channel called the *Devanahalli* channel, which carries the water into the Godavary, and the *Coonada* Canal just below the *Devanahalli* dam. The three villages north of the Samulcooth Canal, Nos. 3, 9, and 11, have been drained into the canal. As for the drainage of those villages there are already culverts leading into the canal, and the village drainage has been extended to the culvert. For the other villages, one is drained into the *Devanahalli* drain, two into branch drainage channels, one into a tank, and one into the Godavary, and the remaining two have been drained into irrigation channels.

The method of draining a village must depend on the capability the village has of making a drain. In cases where it is found that a village has a drainage channel or a canal, I have not hesitated to drain a village into a drain or canal, even if the village has been surrounded by irrigation channels. I have not done this in the drainage here, because it is under them, and the nearest drainage channel is 100 feet or more away, and it is necessary to dig a drain 100 feet or more long, and the drain would be very shallow, and the water would be very muddy, and the land would be very much damaged. Villages Nos. 3, 9, and 11 are not in the delta, and are drained into the canal. They are surrounded by a net-work of irrigation channels, and are very low, and they are a long way from the nearest drainage channel.

No. 7 has a drainage channel which, no doubt, carries off some of the village drainage, but which wants deepening and clearing out. This, however, cannot be done at present, as the water in the drainage channel is used for irrigation.

No. 10 drains chiefly into the village tank. This tank depends for its water-supply on the drainage of another village which runs into it, and the water of the tank is used for irrigation. The inhabitants object to having any drainage operations carried out in their village, as they say they want all the water they can get for irrigation. Only three masonry works seemed absolutely necessary and these have been provided for.

**ON THE WANTS OF THE VILLAGES AS REGARDS DRAINAGE.**—The two villages which stand most in need of drainage are Nos. 1 and 8.

Six villages, Nos. 3, 4, 9, 11, 12, and 13, do not require drainage. The remainder would be all the better for being drained, but might do very well without it.

**ON THE ADVISABILITY OF THE SCHEME AND THE BENEFITS LIKELY TO BE DERIVED FROM IT.**—I believe this scheme has been undertaken with the view of diminishing the fever which prevails more or less in the villages of the delta. I do not think it an advisable one, firstly, because the delta is not yet prepared for village drainage, being not sufficiently well drained itself; and, secondly, because I do not think any sensible decrease of fever will accrue from it. It is a well-known fact in the Godavary District that the time when fever is most prevalent in the delta is not during the months of September and October, when from rain and from irrigation there is a very large amount of the delta under water, but during the cold weather in November, December, and January. The inhabitants of the delta suffer more from ague than from fever. Mortality in the delta is very heavy among the *Loak* *Tascars* who are exposed to chills at night. In this sub-section there are three villages on the north bank of the Samulcooth Canal. As they stand very high and drain freely into the canal, any fever which may prevail in them cannot be set down to want of drainage; yet in one of them, No. 11, I was told that eighteen of the inhabitants had died of fever from the beginning of January to the end of November 1874.

From the reports I received in answer to my Circular to the Village Mamals requesting information with regard to the prevalence of fever in their villages and their wants as regards drainage, it by no means appears that fever will be found very prevalent in a swampy and ill-drained village, or that a dry and clean village will be free from it.

Ague is produced by cold and damp, and if we drain the villages, we shall remove the damp, and there will be no more ague in the delta. But the amount of malarious which may be removed from the atmosphere of a village by draining the streets and any neighbouring swamps is a mere nothing compared to that produced by the acres and acres of wet cultivation, which in the case of many villages occupies almost the whole of the land, coming right up to the walls of the houses. The atmosphere of the delta is very damp all the year round, and this may be so as long as the greater part of the land is under wet cultivation; but the inhabitants will stand the damp, if only they had sufficiently warm clothing. In a few years when the drainage of the delta is properly developed, the villages ought to be drained much more cheaply and effectively than is possible now; but for the present I think the Government would do much better to spend its money in blankets than in a premature and therefore an inefficient attempt at village drainage.

If this scheme is carried out, I think some precautions should be taken to ensure the safety of the drainage works. Other than from the natural embankments of mud and clay, and secondary considerations, the street drains would be choked up with all kinds of filth within a very short time of their construction. The catch-water tanks outside the villages would also be choked up in all directions, in order that the water might be used for irrigation. The Village Mamals might be held responsible for keeping the drains in proper repair, and they should be frequently inspected, especially during the monsoon. The total amount of the estimate for the sub-section is Rupees 5,850.

CHIEF ENGINEER,  
23rd January 1875.

(Signed) L. LANGLEY, Esq., R.E.  
Assistant Engineer, Godavary.

Proceedings of the Madras Government, Public Works Department,  
29th September 1875.

AGRICULTURAL—ORDINARY—CAPITAL.

ABSTRACT ESTIMATE No. 8.

Taluk, Ramachandrapur, District, Godavery.

Work.—Drainage of the village of Gollanamidada.

| Quantity or Number | Description of Work                                       | Rate  | Per foot | Amount    | Total     |
|--------------------|-----------------------------------------------------------|-------|----------|-----------|-----------|
| 5,012              | Cubic yards of earth-work                                 | 0 1 0 | 0 3d.    | 813 10 0  |           |
| 5,589              | Do. do.                                                   | 0 1 0 |          | 582 9 0   |           |
| 500                | Do. do.                                                   | 0 1 0 |          | 25 2 0    |           |
| 10,500             | Do. do.                                                   | 0 2 0 |          | 1,312 8 0 |           |
| 5,278              | Do. do.                                                   | 0 1 1 |          | 327 5 10  |           |
|                    | Clearing drainage Pundia Tank to a distance of 1 mile     |       |          | 50 0 0    |           |
|                    | Clearing noxious jungle on east and west sides of village |       |          | 40 0 0    |           |
|                    | Contingencies at 3 per cent.                              |       |          | 96 3 2    |           |
|                    | Masonry work as per separate estimate                     |       |          | 830 0 0   |           |
|                    | Total                                                     |       |          |           | 5,160 0 0 |

Checked by L. LANGLEY, Lieut. R.E.,  
25th January 1875. Assistant Engineer, Godavery.

No. 1,045.

Note by the Chief Engineer for Irrigation on the Biccavole Sub-section of the Godavery Eastern Delta Village Drainage Scheme.

The papers submitted need but few remarks. Major Deatty has carefully examined the information obtained, and has shown that out of the thirteen villages, the condition of which has been investigated, seven are no worse of than would have been the case had no delta irrigation scheme been carried out, while in the case of two villages (Totapilly and Gollanamidada) drainage is required, and from the obstruction caused by irrigation canals is considered to be fairly chargeable to Imperial Funds, inasmuch as it is the drainage system of this part of the delta. The estimate for the former village is Rupees 980 and for the latter Rupees 3,100. For one village, Ramachandrapur (No. 14), no drainage is required, and no estimate has been prepared. One village (No. 11) Pandalapaka, is Zamindari, and as probably Government have no intention of clearing Zamindari villages the amount of the estimate, Rupees 310, will have to be deducted.

2. The opinions of Lieutenants W. Brown and Langford, who have been employed in investigating the condition of the villages in detail, are adverse to the ruling of the drainage scheme. But all sanitary improvements it will do some good, but whether the results will be in proportion to the cost is a question not capable of demonstration. The undersigned considers that in cases like Totapilly and Gollanamidada, the provision of the means of carrying off drainage from the outskirts of villages so circumstanced is properly a charge against the delta works, but it is difficult to understand how the settlement and drainage of village streets can under any circumstances appertain to these works.

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29th September 1875.

3. The drainage of Gollanamidada\* will be a budget work, and may be sanctioned in part 3 of the estimates for 1876-77.

\* Estimate, Rupees 3,100. The estimate for Totapilly, Rupees 980, may be sanctioned as a Minor New Work for immediate execution from the district grant.

NOTACAMUND, (Signed) JOHN MULLINS, Lieut. Colonel, R.E.,  
8th September 1875. Chief Engineer for Irrigation.

No. 589. ORDER THEREON, 29th September 1875, No. 2,779.

|                     |
|---------------------|
| IRRIGATION, No. 53. |
| Account.            |

The Honorable the Governor in Council observes that the general question of the provision of funds for drainage purposes is under consideration in connection with a recent reference from the Government of India, and the papers connected with the Biccavole Sub-section of the Godavery Eastern Delta villages drainage will be taken into consideration at the same time.

2. It is observed that out of the group of thirteen villages included in this sub-section one needs no drainage at all, while for the other twelve the estimates amount to Rupees 5,320 as follows:—

|                                                     |         |
|-----------------------------------------------------|---------|
| 1. Zamindari village (Pandalapaka)                  | Rs. 310 |
| 9 Government villages unaffected by the delta works | 1,000   |
| 2 Do. do. affected by delta works                   | 4,010   |

3. There is no necessity for postponing the drainage of the 21 villages admittedly requiring relief from obstructions caused by irrigation works, and the estimates for the two villages so circumstanced will be dealt with as suggested in the last paragraph of the Note by the Chief Engineer for Irrigation. Expenditure will be charged to Capital.

(True Extract.)

Major-General D.C.,  
Secretary to Government.

- Chief Engineer for Irrigation
- Chief Engineer for Public Works
- Revenue Department
- Collector of Godavery

Edw. A. Graham

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