Revenue Dept
No 2728.

Govt. of [1869] Madras.

PUBLIC WORKS.

To

THE SUPERINTENDING ENGINEER,

4TH DIVISION.

&c., &c., &c.

Dated August, 11th.

Read 14th. Encl.

G. O., 11th August 1869, No. 2,613.

AUGUST.

Nos. 242-243

Irrigation Works.—Passing orders on a letter from the Superintending Engineer of the 4th Division regarding the irrigation works referred to in a report by the Collector of North Arcot.

Pro June 18 No 125—26

No 109.
Communicated to the Revenue Board—

No 1150/69

26th Augt 69

No 109 - 26 Augt 69
With an order—

No. 242. Read the following letter from the Acting Superintending Engineer, 4th Division, to the Secretary to Government, Public Works Department, dated camp at Punur, 22nd May 1869, No. 1,021 :—

I HAVE the honour to report, for the information of Government, on the several irrigation projects referred to by the Collector of North Arcot in G. O., No. 1,716, dated 29th May 1868, and especially on the progress made in their investigation.

2. In doing so, I will take the list of works as they are referred to in Mr. Robinson's Statement A., accompanying his letter of the 20th March 1868, No. 96, to the Board of Revenue.

Restoration of Numala ruined tank of Malarapally in Polakal Poyakat.
Constructing a dam across Irall stream near a point where present channel leaves, and widening and strengthening the former.

3. This project is proposed by the Collector to utilize the waters of the Irall river, principally, in connection with the restoration of the Beerut and Numala tanks. There has been a preliminary investigation of this project, and the following surveys and plans have been made :—

(1.) Survey of the Beerut tank.

(2.) Do. do. Irall river and adjacent country.

(3.) Sheet of sections of the Beerut tank-bund.

(4.) Longitudinal section of the Irall river.

There is also accompanying them five statements of revenue.

4. The sum of 2,669 Rupees only is the increase expected from this work, so it will probably prove unremunerative. The revenue returns, however, are not correct, and they will be sent back to the Collector for scrutiny and, if necessary, revision. The bed of the Beerut tank falls so rapidly to the bund that it would be a difficult and probably unremunerative work.

5. Mr. O'Shaughnessy's opinion is, that it will be better to build one or two anicuts in the Irall river, and to lead off the water direct to a few tanks so as to utilize the floods. These tanks, however, are now in a semi-ruinous state, the repair of which will add much to the cost.

6. The river has been surveyed for a length of fourteen miles on each bank, and a longitudinal section of bed also taken for this distance, showing a fall of 2·8 feet per mile. Mr. O'Shaughnessy's survey shows thirty-four tanks on each side capable of supply from the river. The section shows that from eighteen to twenty tanks would be commanded from the river by a channel from three to five miles long. Numala tank might be fed from an anicut through other tanks. I have asked the Collector for the probable revenue returns of the Numala tank. In his remarks, he says the ayacut is 200 cawnies, of which 95 are cultivated now by means of wells, also 50 of unassessed waste. There are 23 cawnies cultivated in the bed. This tank appears to have been, when in use, fed from hill-streams and surface-drainage.

Restoration of the Mootkar tank, 2.

7. The late Assistant-Engineer of Chittoor, Mr. O'Shaughnessy, did not refer to this tank, as he did not consider the project for its restoration remunerative.

Extension of western main channel from Poiney Anicut, 3.

G. O., Public Works Department, No. 2,693, dated 3rd September 1867.

8. I am given to understand that the irrigation from the Poiney Anicut will not bear further development. In paragraph 8 of the Collector's letter to the Board of Revenue, dated 27th July 1867, No. 198, he reports that the channels are completed. There is, however, a project in connection with this anicut, which consisted of cutting a channel from it to supply the Karikal tank in the Chittoor Range. The reservoir itself being in a ruined state was to be restored, and two sluices and a calingulah built. The estimates amounted to Rupees 49,000, and were submitted in March 1863, by Captain Vertue, R.E., to Lieutenant-Colonel Hitchens, the Deputy Chief Engineer. The plans and estimates were sent to Mr. Fraser, C.E., in April 1865, for investigation, but nothing was done, and the Executive-Engineer now reports that this was because there was doubt as to the quantity of water available, and the small capacity of the reservoir did not admit of much cultivation. The project does not appear to have been properly investigated, though the Deputy Chief and District Engineer both expressed doubts as to the feasibility of the project. The plans of the proposed water-spread of the tank, sections of the bund, and drawings of the sluices, are in my office; the latter made out by an Overseer, but the project does not look a very satisfactory one. The bund, originally six yards high, was to be raised eight yards more, two villages were to be submerged, and the compensation and rates of estimates, for the present day, are quite insufficient. There were also doubts, as I said above, as to the quantity of water available and extent of cultivation. There was also an alternative project for bringing water to the Karikal tank from the Perencanjee or Sholinghur tank.

Karikal tank, 17.

Palmanair Project, 6.

9. Restoration of weir across Punganur river at Panjany. This project has been investigated to a certain extent, and a Surveyor was employed on it for a considerable period. The following plans and documents have been prepared:—

(1.) Map of the country to be irrigated, showing the proposed tank and works on a scale of 500 feet to an inch.

(2.) The above reduced to a scale of four inches to the mile.

(3.) Contour map of the proposed reservoir.

(4.) Sheet of longitudinal and cross section of the proposed bund.

(5.) Sections of tanks supposed to be irrigated ayacut-assessment and supposed increase of revenue.

(6.) Rough memorandum of supposed cost.

10. Mr. Robinson estimates the cost of this project at 70,000 Rupees, and the revenue to be returned at Rupees 7,000, or ten per cent. The rough computation of the cost by Mr. O'Shaughnessy amounts to Rupees 1,45,000, and the ayacut statements, received from the Tahsildar, show a supposed increase of revenue of nearly 8,000 Rupees, or about five-and-a-half per cent. on the outlay. The Chief Engineer for Irrigation observed on this project, that notwithstanding the very great height at which the bund was to be raised, the head of water would not command some of the tanks. The branch river also which falls into the Punganur river and below

the junction of which it is proposed to restore the bund, would sweep along the face of the bank from the westwards in high floods, and perhaps endanger its safety. Colonel Anderson also observed that several small tanks, holding three or four months, supply of water, were to be filled, and that it would not be safe to count on the increased cultivation derivable from waste land under these tanks. I observe, however, on looking over the statements, that the principal return expected is from punjah "terva jasti," *viz.*, Rupees 5,000 out of Rupees 8,000 ; and this is a very uncertain and unreliable item to look upon for our remunerative results. Another grave objection to the project as it stands is, that the whole of the submerged land is the property of the Punganur Zemindar, and it is probable that his demands for compensation will be very exorbitant.

11. Under these circumstances, I think it would be desirable to turn our attention to the feasibility of modifying the project by building an anicut below the junction of the Chellamungalum river above referred to, and of the Punganur river, on fifteen feet lower level, embracing the supply of a fewer number of tanks than those entered in the Collector's statement which amounted to fifty. This modified project had Colonel Anderson's approval, and Mr. O'Shaughnessy sketched out the probable cost of such a project, with a channel eight miles long feeding about eighteen tanks and extending to Palmanair, to the amount of about Rupees 35,000. He estimated the returns as Rupees 3,000, or about nine per cent on the outlay.

12. It must be remembered that one great object of this project was, to supply the increasing want, felt at Palmanair, of water for man and beast, and it must not be looked upon merely as an irrigation project, and its merits judged of only with reference to the remunerative returns it will yield.

Melmarji tank, 11.

13. The range officer believed that it was desirable that the project for the restoration of this tank should be investigated, but nothing has been done as yet.

Groeme's and Sadarkhan's tanks, 8 and 9.

14. Mr. O'Shaughnessy also states that he has inspected the site of Groeme's and Sadarkhan's tanks at Mr. Robinson's request, and finds that it is waste of time to pursue the investigation further.

Anicut across the Gudiattum river at Champalli, 10.

15. The range officer considered that an anicut might most probably be constructed with advantage across this river, and tanks fed from it, such as the old Champalli reservoir and others. This project, however, has not been investigated.

Anicut at Mambuakum across Kamardala river, 13.

16. Being investigated.

Restoration of Melcuppum tank, 14.

17. Sanctioned by Government in G. O., No. 3,759, dated 2nd December 1868, and the work in progress.

New anicut to Cheyaur river near tandry, 16.

18. A Surveyor has been employed, and the project is still under investigation.

Restoration of Esanaick Tank, Vellore Range, 12.

19. Partly investigated by Lieutenant Brockman.

Restoration of Negaputla tank, 4.

20. This work has frequently been brought to notice by the Collector, and its probable remunerative character, if restored, urged upon the attention of Government and the district officers. In Appendix B. Mr. Robinson gives a precis of the correspondence since 1860, and he quotes the remunerative results of this project at 5,444 Rupees. In 1867, when Acting Superintending Engineer, plans and estimates for this project were sent to me by the Supervisor of the ra[illegible] and they were returned in order that they might be re-submitted in proper detail and with fuller information. On taking charge temporarily at the end of last year these plans and estimates were received again by me somewhat altered, but still wanting in much of the information which would be required by Government to enable them to judge of the financial prospects of the project.

21. I then sent them to the Chief Engineer for Irrigation, and remarked that the Collector's returns of revenue had been reduced to Rupees 4,900, and this on the supposition that all the land, consisting of nearly 800 acres, would be irrigated. The tank, however, as estimated for, showed only a capacity of one lac of cubic yards sufficient for 200 acres, and as the cost of the project as it then stood was 25,000 Rupees, the return would probably not exceed 1,000 Rupees, or four per cent.

22. The bed of the tank was 36 to 38 feet below the head of the supply channel, and the fall of the jungle-stream supplying it 40 feet per mile. Owing to the hard nature of the ground and the existence apparently of rocky ridges near the tank, the channel had been taken a circuitous route on a fall of three feet per mile, and which would involve heavy masonry works.

23. If any improvement, therefore, is to be carried out in connection with the work to increase the revenue, it will be necessary to increase the storage capacity of the tank which might possibly be done, and on this point the Chief Engineer, in returning the plans and estimates, laid stress, and pointed out that some of the masonry works had not been included in the estimate, such as provision for crossing the drainage channels.

24. Though the Kulatuwunkah, which is to supply the tank, is said to be in fresh for three months, and to contain ample wafer for the project, there are no registers of the available supply, and unfortunately the failure of the last two rainy seasons has prevented us obtaining any information on this point, which must be procured hereafter. I have asked Mr. Hayes to furnish me with the area of the catchment basin of this river and the registered rain-fall.

25. The plans and estimates are now in the hands of the range officer, and Government will learn from these remarks that the project does not promise very remunerative results.

Restoration of Maleswarum ruined tank, 5.

26. This is also a work strongly recommended as the first of importance after the former. The Collector quotes correspondence from 1860 to 1865 regarding it. The prospects of a very remunerative return from this project are not bright, but more hopeful than in the case of the former one.

27. Plans and estimates were submitted by the range officer in 1867 and returned for revision. I received them again in the end of 1868 and sent them to the Chief Engineer. The project consisted of restoring the bund of the tank,

constructing a calingulah and sluice, as well as cutting a supply channel from the Dosallawunkah, a large jungle-stream, at a cost of Rupees 12,700.

28. I pointed out that the capacity of the tank, as now proposed, was under ten lacs of cubic yards, sufficient for 160 acres, perhaps giving a profit at 5 Rupees per acre of barely seven per cent. The range officer made the capacity of the reservoir rather more so as to yield a return of [illegible] per cent.

29. The Collector's statements show that 561 [illegible] could be wet cultivated; but that the land is now under punjah assessment, and he gives the probable increased revenue at 4,293 Rupees, reduced by the Tahsildar in his last return to Rupees 3,928.

30. There are difficulties to be encountered in carrying out this project. The channel is to be cut with a fall of four feet per mile, and it is not certain whether the nature of the soil will bear the velocity generated. If the soil is hard, I would propose a rather greater fall to avoid heavy embankments which are contemplated.

31. Such a channel as the one provided for, with four feet of water, would give a discharge of 35,000 cubic yards per hour, sufficient to fill the tank in three days if the supply were kept up; but we have no registers of water through the failure of the rains, though they have been ordered to be recorded. I believe there is sufficient water in the jungle-stream, and I have asked Mr. Hayes for the area of drainage and average rain-fall.

32. The Chief Engineer replied as follows when returning the papers:—"The plans and estimates are sufficient detail, and if Colonel Bean obtains satisfactory information regarding the water-supply, and the sufficiency of the estimate, and also the capability of the soil on the line of the proposed channel, to withstand the velocity due to a fall of four or five feet per mile, the undersigned will be prepared to recommend the estimate for sanction."

No. 112, dated 4th December 1868.

33. The Chief Engineer also requested that the nature of the soil along the tank-bund and in the line of the channel should be noted in the specification, as the amount to be deducted from the gross returns for the maintenance of the tank must depend, in a great measure, on the character of the soil.

34. I have thus gone over the works enumerated by Mr. Robinson, and it will be seen that it is desirable to investigate further the projects connected with the irrigation from the Irall, Palmanair, and Gudiattum rivers, the second of these having already been carried out to some extent. The investigation of the Melmarji tank project also, and the *Esanaick tank in the* Vellore Talook under Lieutenant Brockman, may be taken up. The Surveyor hitherto employed in the projects mentioned above in the Chittoor Range, has been discharged, and I am endeavouring to procure another competent person to be placed under Lieutenant Walker's orders. Mr. Hayes will report finally on the Nagaputla tank, and complete his estimate of the Maleswarum tank. A Surveyor is employed under Mr. Leggatt's orders, and has nearly completed the surveys required for the anicut across the Cheyaur, and of the land and tanks on both banks in the Arcot, Wandiwash, and Madranticum talooks, in the North Arcot and Madras District. A former Surveyor had, in the first instance, surveyed and contoured all the tanks, and run

levels from the proposed anicut on the south bank of the river, and his work h been handed over to Mr. Leggatt's Surveyor who has now a large extent of countr mapped and levelled.

35. Captain Hasted will shortly report on the Mambaukum project f the irrigation of lands from an anicut near Polur in North Arcot on a branch the Cheyaur river, the preliminar eys and levels having been made. W are also endeavouring to ascertain th quantity of water required for the pr sent Cheyaur anicut irrigation works, which are being extended between Nunellu and Tetry, to enable us to determine the surplus available for these two other pr jects; and the correct register of the yearly discharge over this anicut has to b compiled. It will most probably be found that there is not sufficient water for th three anicut projects with their system of channels.

Vide G. O., No. 496, dated 5th February 1869.

36. I have already given instructions for guages to be put up in the river whose resources are under investigation, and for a correct register to be kept o the velocities and quantity of water passing down them.

No. 243. ORDER THEREON, 11th August 1869, No. 2,643.

IRRIGATION, No. 15.

IN this letter the Acting Superin tending Engineer of the 4th Divisio has reported on the several irrigatio projects referred to by the Collector of North Arcot in the papers communicate with the order of Government of the 29th May 1868, No. 1,716.

2. Colonel Bean reports that the project for the restoration of the Numal ruined tank of Malarapully in Polakul Poyakat has been partially investigated, an it is considered that the most remunerative scheme for this part of the district wil be to construct one or perhaps two anicuts across the Irall river. Many tanks and the Numala tank amongst them, could be supplied by such works, whereas th local supply of the Numala tank is insufficient to render an adequate return fo the cost of restoration probable. It is desirable that whatever can be done t render more certain the supply for irrigation in this part of North Arcot should b ascertained completely and conclusively, and Colonel Bean is therefore requeste to state what he proposes to do to complete the Irall river project, and when it i probable that it will be submitted for the consideration of Government.

3. The range officer should be desired to ascertain the cost of restoring th Mootkar tank, and to furnish a rough estimate of its capacity when restored. Th Collector should be asked for information regarding probable revenue returns, an it may be practicable then to come to a definite conclusion as to whether an outlay upon the tank would be desirable.

4. Before anything further is done with regard to the extension of the Poine anicut western main channel, an accurate return of water available for extendin the area of cultivation should be made out, and in the next place it should b ascertained in what direction this supply can be most easily utilized. It appears t be very improbable that the restoration of the Karikal tank would be a remunera tive work.

Proceedings of the Madras Government, Public Works Department,
11th August 1869.

5. The Government do not think that either of the schemes for turning to account the Punganur river is likely to be financially feasible; but, as so much has been done towards preparing a project, it will be well to complete the investigation, so that it may finally be decided whether it will be worthwhile to make anv outlay.

6. The restoration of the Melm appears both by the Revenue and Public Works officers, and an estimate should therefore be prepared.

7. It should be stated on what grounds Mr. O'Shaughnessy concluded that the restoration of Groeme's and Sadarkhan's tanks would not be practicable.

8. The Government observe that the question of the advisability of constructing anicuts across the Gudiattum river, on the Cheyaur at Mambaukum, and on the same river at Tandry, will have to be decided with reference to their water supplies. Judging from the character of the rivers of the North Arcot District, it appears to be improbable that any adequate returns for the large outlay, which weirs with the channels connected with them require, will be shown to be obtainable, seeing that, for the most part, these rivers carry water for but a few days in the year. The Cheyaur below the junction of the Seear is the best source of supply in the southern part of the district, and it is possible that the construction of an anicut there may be found desirable. Captain Hasted has been engaged on the Mambaukum project, and Colonel Bean is requested to report when it is probable that it will be ready for submission.

9. Before the projects for the restoration of the Esanaick, Nagaputla, and Maleswarum tanks can be completed and brought forward, it is absolutely necessary that the nature and extent of the water-supply in each case should be ascertained. Upon this depends not only the value of the projects as works of irrigation, and their effect upon the villages which would be brought under their influence, but all the principal details of the tanks themselves and of supply-channels, subsidiary works, &c., must be determined with reference to this all-important question of water-supply available.

10. A careful consideration of the Superintending Engineer's report shows that the examination of most of the projects referred to was commenced at the wrong end. In nearly all, if not in all, cases the land available for irrigation is of much greater extent than can be supplied with the means of irrigation. The first thing, which should have been done, was therefore to find out, in each case, what the average water-supply is; then it should have been ascertained what is the maximum part of this supply which can be stored for use at the minimum relative cost, or, in other words, at the lowest rate per thousand cubic yards; the details of capacity of supply-channels, number and size of sluices, waste weirs, &c., would then have naturally followed, and all the work done would have tended to the solution of the problem which had to be investigated. As it is, many of the schemes have been examined independently of the circumstances which must determine how they shall be carried out, if it be practicable to carry them out at all, and the natural result has been that labour and time have been wasted.

11. Colonel Bean will readily understand that the investigation of the particulars of water-supply should vary, as regards definiteness, with the circumstances of the project. Where the outlay required would be heavy, too much care cannot be taken, and the fullest information, based upon actual registers and observations, must be afforded before the Government can sanction the estimates for works of this class. On the other hand, for small works, such as the restoration of tanks which are to water two or three hundred acres of land, it will generally be impossible to obtain direct evidence of the actual supply available, and yet in these cases also it is quite practicable to obtain such information as will enable the Government to determine whether the projects can be advantageously carried out. Small nullahs and jungle-streams, which run for a few hours only at a time after heavy rain-fall, cannot be gauged and their discharge accurately calculated, but there are generally existing tanks, in the same part of the country, which are supplied by catchment basins exactly similarly circumstanced as regards rain-fall, and it may safely and reasonably be argued that, if the drainage from fifty square-miles of country has, for a series of years, sufficed to irrigate, under tanks of a certain ascertained capacity, a known area of land, the irrigating power of the water-supply yielded by another contiguous part of the same country will be in direct proportion to its area, coupled with the facilities for storage which may be obtainable.

12. The Government consider that there is one other point which needs more attention than it has received. It is better in every respect that one project should be fully investigated, brought forward, and finally disposed of, than that half a dozen schemes should be taken up, partly gone into, and then postponed. Colonel Bean is requested therefore, with reference to the information which has been already obtained to determine which of the works in the North Arcot District can now be most easily brought forward for early disposal, at the same time giving the preference to those which the Collector considers will be most beneficial, and he is requested to report whether he will require any additional, and what, temporary establishments to enable the selected projects to be disposed of within a given time, which he should name.

(True Extract.)

W. Chamberlain Major R.E.,
Acting Joint-Secretary to Government.

To the Superintending Engineer, 4th Division.
,, Revenue Department.

Exd. F. R. Bantleman.