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MADRAS RECORD OFFICE.

Government of Madras.

Revenue DEPARTMENT.

G.O. No.	3158	Press / Mis.
298-99 Dated	18-12-	1868.

Not to be folded or roughly handled

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Proceedings of the Madras Government, Revenue Department,
18th December 1868.

No. 298. Read the following Proceedings of the Madras Government in the Public Works Department;—

Passing orders on Despatch from the Secretary of State for India on the subject of roads in the Neilgherry and Koondah Hills, and of Mr. McIvor's offer to construct an embankment across the Bowany valley. | (Here enter 5th December 1867, No. 3,787.)

No. 299. ORDER THEREON, 18th December 1868, No. 3,158.

Irrigation, No. 9.

Communicated to the Board of Revenue, and to the Commissioner Neilgherry Hills.

(True Extract.)

(Signed) F. BRANDT,
Under Secretary to Government.

To the Board of Revenue,
,, the Commissioner of the Neilgherry Hills, } With Procs. Public Works Department, No. 3,787.

Exd. S. T. Augustin.

Proceedings of the Madras Government, Public Works Department, 5th December 1867.

No. 98. Read the following Despatch from the Right Honorable the Secretary of State for India, (Public Works,) to His Excellency the Right Honorable the Governor in Council, Fort St. George, dated India Office, London, 7th October 1867, No. 32:—

1. I have received and considered in Council your Despatch, dated July 27th (No. 33), 1867, forwarding correspondence on the subject of roads in the Neilgherry and Koondah hills; and of Mr. McIvor's offer to construct an embankment across the Bowany valley, with the object of forming a reservoir for the storage of water, as well as of providing a roadway between the two ranges.

2. In your Despatch, dated May 9th (No. 19), 1867, on the subject of irrigation in Tanjore, you stated that the subject of storing water in the hills had never been lost sight of by your Government; and indeed your attention has very recently been drawn to it by my predecessor. The importance of the subject can scarcely be over-rated, for while the reservoirs are the obvious remedy for the evils caused by the destruction of forests, they are also essential to a thorough system of irrigation.

3. Mr. McIvor seems to have acquired a practical knowledge of a method of forming earth-works by a process of silting, which he appears to be fully convinced is both exceedingly economical, and ensures good and substantial work. Hitherto he has only worked on a small scale, but, as he states, his results have been uniformly satisfactory.

4. I perceive that you were, in the first instance, of opinion that the process of forming embankments by silting may, in some situations, be advantageously employed for the formation of the reservoirs; and that you were desirous that it should be tried on a small scale. Colonel Walker's Report, however, which passes a sweeping condemnation on Mr. McIvor's proposal, has led you to alter your decision.

5. I am unable to see sufficient reason, in the remarks submitted by Colonel Walker, for refusing to try an experiment on a moderate scale. Colonel Walker asserts that earth-work, by the silting process, can only be done at the rate of eight cubic yards to the rupee; while it appears that Mr. McIvor has actually done it at the rate of 80 to 100 cubic yards per rupee. This is the point at issue, and may well be decided by a small and inexpensive practical experiment.

6. The question seems to be one of quite sufficient importance to deserve a satisfactory practical solution. I am of opinion that Mr. McIvor's offer might be accepted to the extent of authorizing him to form an embankment, at some suitable site, of one hundred feet in height. Mr. McIvor should be called upon to submit an estimate of the probable cost of constructing such a dam by his method, and, if his estimate is reasonable, he should be allowed to carry out the work with as little interference as possible. But the work should be perfect in itself, and should not be liable to future alterations or additions.

7. I herewith transmit a copy of a letter which has been received from Mr. McIvor, and also a copy of Mr. Scott Russell's opinion of the method of forming embankments by the silting process.

8. One great advantage of an embankment in the Bowany valley would be the provision of a good line of road between the Koondah and Neilgherry hills

Govt. of [1868] Military.
REVENUE.
To
THE BOARD OF REVENUE,
&c. &c. &c.
Dated December, 18th,
Read.
Ext.
G. O., 18th December 1868, No. 3,158.
DECEMBER.
Nos. 298-299.
Mr. McIvor's offer to construct a dam by the silting process.—Order in the Public Works Department, on the Despatch from Home Government, on the subject of giving the scheme a trial, communicated to Board of Revenue and Neilgherry Commissioner.

avoiding the necessity for adopting the circuitous, inconvenient, and probably very expensive line by way of Yeddagadoo. I trust there will be no further delay in completing the road to Goodaloor, and the road and bridge to connect the Chinchona plantations.

From W. G. McIVOR, Esq., to CLEMENTS R. MARKHAM, Esq., Public Works Department, India Office, Westminster, dated Park Cottage, Kew, Surrey, 4th September 1867.

* Procs. of the Govt. of Madras, dated 8th May 1867, No. 1,393.
Do. 4th June 1867, No. 1,664.
Do. 27th July " " 33.

1. I have the honor to acknowledge the Proceedings of the Madras Government noted in the margin, * with reference to the construction, by the silting process, of a bund or embankment to connect the Koondah and Neilgherry range of mountains. This embankment is intended to answer two purposes, namely, to connect these ranges of mountains by a level road, and to form a store of water in the three valleys above.

2. In Proceedings, under date the 8th May 1867, No. 1,393, the Government express a belief "that the process of forming embankments by silting may, in some situations, be advan-"tageously employed, and they wish it to be tried on a small scale if a convenient site can be "found." It appears, however, that the Report of the Superintending Engineer, 7th Division, has led the Government to abandon their original intention of giving the silting process a trial.

3. The storing of water in India is admitted to be a work on which the wealth and prosperity of that great empire depends, I therefore regret that the Report of the Superintending Engineer, on a process he has not fully considered, should have led the Government to abandon a trial which, if successful, will enable hundreds of these gigantic works to be accomplished in the space of time, and at the cost that one such work can be completed by our present appliances.

4. Since my arrival in England, I have submitted my plans to the most eminent Engineers, and consulted them on this process, which has met with uniform approbation. This, combined with the fact that I have successfully executed numerous works by this process, will, I trust, receive the favorable consideration of Government, and lead to an experiment being tried on a scale sufficiently large to establish its success or otherwise.

5. In conversation with Colonel Walker on this subject in April last, he strongly expressed his conviction that the execution of the work was "impossible," I therefore did not enter into full explanations of the process.

6. Prior to leaving Madras, I had the honor to explain to the Right Honorable the Governor, that this embankment would contain between forty and fifty millions of cubic yards of earth, and that this work could be performed at a cost of from £15,000 to £20,000, and I am still of opinion that the earthwork can be completed for this sum.

7. Colonel Walker having fixed the maximum quantity of earth that can be removed by this process at eight cubic yards per rupee, clearly establishes that he has had no opportunity of forming an idea of the effects of the silting process. By this means, under the most unfavorable circumstances, I have removed from 80 to 100 cubic yards per rupee (2*s.*) under favorable conditions, and in large works, with a heavy flow of water, from 400 to 800 cubic yards of earth may easily be removed, and deposited, at a cost of one rupee. I would, however, observe that the smaller the scale on which the process is employed, the greater will be the expense in proportion.

8. The Superintending Engineer agrees to the importance of connecting the Neilgherry and Koondah range at this point by a level road over the top of the embankment, thus avoiding the descent into and rise out of the valley, which saves the construction of four and a half miles of road and a bridge, these works alone costing nearly as much as the earthwork of the embankment. It must also be borne in mind that this embankment would save nearly four miles to each passenger, and a rise and fall of nearly 1,400 feet.

9. With the locality and silt of the embankment I am well acquainted, and have given every matter connected therewith as careful consideration as is possible without a detailed survey; I also

Proceedings of the Madras Government, Public Works Department, 5th December 1867.

have taken the levels for the water storage, and this enables me to state that Colonel Walker will find on surveying the locality that this will greatly exceed his expectation.

10. I would respectfully observe that I am convinced of the efficiency of this system, by observing the results produced by it. No one can be more anxious than I am to learn every point where it is likely to fail. With this view I have visited all the important water-works in this country, and all I have observed tends to establish that by the silting process only can these works be constructed, substantial and impermeable, and this, apart from the rapidity and cheapness of construction, is sufficient to recommend this system for general use.

From J. SCOTT RUSSELL, Esq., to W. McIVOR, Esq., dated London, 5, Westminster Chambers, Victoria Street, S. W., August 9th, 1867.

I have read over with great care your account of a method of constructing embankments and water-courses for irrigation, and heavy works for roads and railways, which you have practically tested by the construction of works in India.

I think I may say that your plan is a new and very important application of the power of water to the construction of vast works, which have hitherto been only carried into effect, and at great expense, by an organized system of human labor.

It is not easy for an Engineer, who has been used only to works constructed in the ordinary method employed in Europe, to reconcile his mind readily to a great change of system like this. At the same time, it is obvious that if water-power can be effectually applied, without the intervention of expensive machinery, to such a purpose, it will probably be able to produce works on a larger scale, more expeditiously, and at less cost and with greater security, than by mere manual labor, however well organized.

I should not have ventured, however, to give a decided and strong expression to any conviction I might form of its usefulness and importance for the construction of public works in India, excepting that peculiar circumstances have enabled me to form a judgment of the nature and efficiency of this peculiar kind of work.

I was many years ago engaged in executing work in connection with the very earliest example of storing water for the creation of power, and using that water for mechanical operations, which was the earliest, most extensive, and successful example in this country. Although I have never been in India, yet I learn there is a considerable similarity between the general structure of the mountain ranges of India and those of Switzerland. In Switzerland, the use of water-power is far more extensive and varied than in England, and it has happened to me to have been engaged in works in Switzerland where I have seen many examples on a large scale of water-power performing exactly the kind of work to which you have applied it in India, only the work so done was of no value, and frequently the cause of great injury.

What you have done has been to conceive the original idea of guiding and directing the great wasteful expenditure of these mountain torrents and streams, in such a way as to perform the work wanted for the good of the country. Even if you had not practically tried your plans, I should have been perfectly prepared—from the operations I myself have seen in progress of the construction of large and very high embankments, and of enormous solidity, by the continual action of mountain torrents—to have believed at once in the feasibility of the proposal. But between a happy thought and a practical execution of it there is a wide gap, which you fortunately have been able to fill up by the actual construction of such works on a scale of practical utility.

Perhaps the best way of expressing my conviction of the usefulness of your method, is to state that I intend, immediately on my return to Switzerland, to examine the site of some large works to be constructed there, with the view of practically applying your process to their construction.

The points which I think give special value to your method, are—

1.—Extraordinary economy.

2.—The highest degree of stability and a degree of safety when executed, which human labor could scarcely be made to possess by any degree of care.

3.—The great rapidity of execution.
4.—Capability of being extended to a gigantic size.
5.—Special adaptation to the speedy introduction of works of irrigation in India.

Should you find that this expression of my sincere convictions can be of any assistance or encouragement to the undertaking and execution of those vast works of irrigation, which might produce such boundless good in India, and redound so much to the credit and wealth of England, you are perfectly at liberty to make use of them for that purpose.

No. 99. ORDER THEREON, 5th December 1867, No. 3,787.

IRRIGATION, No. 5.

1. Communicated to the Superintending Engineer of the 7th Division, who will put himself into communication with Mr. McIvor with a view to selecting, in conjunction with him, a suitable site on the head-waters of the Bowany river for the construction in the manner suggested by Mr. McIvor of an embankment not less than 100 feet in height to dam up the stream so as to form a reservoir. If a proper site can be found on the main stream of the Bowany, it is considered desirable that the embankment may be so placed as to serve at the same time for a passage across the valley for the road projected to connect the Neilgherry with the Koondah ranges of hills. That object is however a secondary one, the purpose of Government being to give Mr. McIvor's scheme a fair trial at a favorable site.

2. The site being agreed upon, Colonel Walker will obtain from Mr. McIvor and submit to Government a description of it, with Mr. McIvor's estimate of the probable cost of constructing the dam by the silting process. The Government, will then be prepared to take into consideration the propriety of authorizing its execution by Mr. McIvor.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

/True Copy/
Chas. A. Orr Coll. R.E.
Secretary to Govt

To the Superintending Engineer, 7th Division.
" Revenue department
No. 3158
Comm.d to the
Board of Rev.e to
the Comm.rs Neilgherry
Hills.

Exd. S. T. Augustin.

Revenue 1868. Oct.

No. 3914.

Proceedings of the
Govt. P. W. Dept.

Dated 5th Novr. /67.
Received 15th Novr. /68.

No. 3787.
Ch. 3158 - 18 Decr.

Passing orders on
Despatch from the
Secy of State for India
on the subject of roads
in the Neilgherry &
Koonoor Hills & off Mr
McIvor's offer to Contract
an embankment
across the Bowany
River.

Withdrawn

298 & 299