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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No.	Press Mis.
Dated	18

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**Proceedings of the Madras Government, Public Works Department,
24th October 1864.**

**No. 425. Read the following Proceedings of the Madras Government in the Revenue
Department:—**

Requesting that Captain Fischer, Executive Engineer, Bellary, may be authorized to carry out his proposals for two deep borings for water in the localities indicated in his Memorandum, dated 9th July 1864. (Here enter 14th October 1864, No. 1,895.)

No. 426. ORDER THEREON, 24th October 1864, No. 3,045.

Communicated to the Superintending Engineer, 3rd Division, with a request that he will report the probable cost of the borings, and the source from which funds can be provided for the work.

(True Extract.)

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

To the Superintending Engineer, 3rd Division.
" Controller of Public Works Accounts,
" Revenue Department.

Exd. S. T. Augustin,

*Proceedings of the Madras Government, Revenue Department,
14th October 1884.*

No. 165. Read the following Proceedings of the Board of Revenue, dated 29th September 1864, No. 6,380.

Read the following letter from A. HATHAWAY, Esq., Collector of Bellary, to W. HUDLESTON, Esq., Secretary to the Board of Revenue, dated 16th September 1864, No. 161:—

I have the honor, in forwarding herewith a list indicating the particular localities in which the want of water has been heavily felt in recent years, as requested in paragraph 3 of the Proceedings of the Board of Revenue, No. 3,833, under date the 22nd June last, to enclose for the information of the Board, an original Memorandum (to be returned) on the subject, which the Executive Engineer, Captain Fischer, was kind enough to send me.

ENCLOSURE No. 1.

ABSTRACT.—Statement showing the localities in which the want of water has been mostly felt in the District of Bellary.

ENCLOSURE No. 2.

Memorandum from Captain F. FISCHER, R. E., to A. HATHAWAY, Esq., Collector of Bellary, dated 9th July 1864.

1. The undersigned has the honor to return, to the Collector of Bellary, the papers which accompanied the Proceedings of the Board of Revenue, No. 3,833, dated 22nd June 1864, and at the same time begs to submit the following observations on the subject of the water-supply of this District, more particularly with reference to procuring an additional supply of water by deep boring in suitable localities.

2. As far as its rivers are concerned, Bellary is a most fortunately situated District; it has been proved beyond a doubt that the Toongabudra river, during the monsoon season, is fully able to furnish, for purposes of irrigation, a much larger supply of water than is required for any area of land which can be economically commanded from it, and this without the construction of reservoirs; it therefore only remains to endeavour to supply those localities which cannot be reached by the Toongabudra river at all, and to point out others which may be irrigated by the river at one season of the year; but which are liable to suffer from drought at other seasons, and wherein it would be advisable to have deep wells supplied either from the rain-fall, or from a large artificially irrigated area.

3. The first place for experiment is the open plain above the Daroga tank about the village of Koorakoompah, and this is recommended for the following reasons:—

First.—The rain-fall on the hills bounding the valleys supplying this tank, is greater than in any other part of the District, as may be gathered from the Register kept for a number of years at the Hospital on the Ramandroog, with a good deal of accuracy.

Second.—The sides of the hills are exceedingly steep and, though covered with vegetation, it is believed a very large quantity of water always runs off them into the plain country, as an ordinary fall of rain immediately affects the channels supplying the tank, as also all the springs in their vicinity.

Third.—In addition to the rain-fall in this locality being so much more favorable than elsewhere, the hills during the monsoon seasons are frequently covered for days together with dense moist fogs, which evidently affords a good supply of water to all the springs and the vegetation.

Fourth.—The out-fall of the valley draining all these hills, and supplying the waters of the Daroga tank, has been most effectually closed by the bund of that reservoir, and which is perfectly water-tight; and as the tank does not discharge, by its calingulah, any surplus waters except in very favorable seasons of rain as far as our experience goes, it is concluded that the rain-fall which is not used by the vegetation, or supplied to the tank, must be absorbed in the lower parts of the valleys and there retained, and if properly sought for, a good supply of water would very probably be obtained; sufficient perhaps to supply the daily wants of the population in seasons of severe drought.

4. Into the geology of the Ramandroog hills, it is not proposed at present to enter beyond saying their features do not present the formation usually required as a condition favorable for an artesian well; but leaving this out of consideration for the present, it is submitted there is sufficient evidence adduced above to make it worth while to sanction the experiment if only as a means of adding to our knowledge of the subject, which, at the present moment, is very meagre; the expense of the proposed operations cannot be great, as they will be carried out by the Sappers now employed in Bellary, whence the necessary apparatus for boring can also be obtained.

5. The rain-fall on the Ramandroog for several years is as below:—

Years.	Inches.	Tenths.
1856	49	25
1857	43	20
1858	34	40
1859	45	65
1860	30	25
1861	47	90
1862	48	20
1863	29	90

It will be apparent from this table how very favorably this part of the District is situated from its rain-fall; the least quantity registered in any year is thirty inches, and the average rain-fall can certainly be taken at thirty-six inches, whereas, in other parts of the country, a rain-fall of eighteen inches in the year is considered very good, and in Bellary itself so small a quantity as nine inches has been recorded as the entire rain-fall for a year. In all the years given in the table above, in two only, as far as it is known to the undersigned, viz., 1856 and 1858, did the Daroga tank discharge over its surplus calingulah; in the former year, the rains were unusually abundant throughout, and in the latter, the fall in the month of October, after a long drought, was very heavy; here there is therefore evidence that in this valley, in ordinary years, the rain-fall in itself has no out-let to the sea; the average fall, as exhibited by the Registers, though nothing remarkably great for hill ranges in the tropics, is very good for its position in the midst of large plains far inland, and which may be looked upon as the extremity to which either monsoon is likely to reach.

6. Taking the average rain-fall in the valley at thirty-six inches, and allowing that one-third of this runs off by the natural drainages into the reservoir, whence it is evaporated or used for irrigation; that another third is supplied to the vegetation, there remains one-third or upwards of twelve inches of rain-fall over an area of 300 square miles of country from whence it is proposed to obtain a supply of water, as 300 square miles of country 900,000,000 square yards nearly and the available rain-fall is one-third of a yard, there is therefore a store of over 300,000,000 cubic yards of water, which it is proposed to endeavour to discover.

7. With a very limited knowledge of geology, it is impossible to enter into a description of the hills about here, to convey any idea of their features; apparently the rocks belong to the most remote periods, and have all been up-heaved, whilst the deposits in the valleys and plains are sedimentary, apparently the debris of the adjacent hills. In the beds of all the nullahs, sand and gravel are found interspersed with boulders, and along their banks the rich brown loam of the valleys can be discovered: by digging in these beds, or in any part of the plain country, water is readily obtained, but no attempts have been made to bore, or even to carry down any deep perforations; the water now so eagerly sought for is evidently mere surface drainage into the ground in favored spots and which is certain to fail in seasons of drought, and not at all connected with any deep springs or reservoirs in porous beds, such as it is believed do exist in these valleys.

8. Another locality in the neighbourhood of Bellary, in which it is proposed to try for water, is near Kupgull. About 15 miles due north of the Cantonment, just beyond the village, is the out-fall of a large valley receiving its waters principally from some hills to the south-west of the station. On the west, this valley is bounded by a ridge of high land, forming between Kodatany

and Kooragode, the water-shed of the Toongabudra and Pedda Huggry rivers; to the eastward of this valley, another ridge of high lands runs down from Bellary by Kupgull; between it and the Pedda Huggry river, and at the out-fall of the valley, its general direction is intersected by a range of hills running right across from the south-east to the north-west; between this range of hills, and the hills whence these streams take their rise, the whole country is spread out in vast plains of deep black cotton soil; about the foot of the hills a hard, red, gravelly soil is met with sloping towards the black cotton plains, and just above their junction water is usually found at a very moderate depth below the surface, and which is always affected more or less by the rain-fall, showing that the soil is porous and does absorb some moisture, and as the entire valley is enclosed by high lands except at the out-fall before mentioned, a well sunk in its lowest part would probably be successful in furnishing a fair supply of water.

9. It is proposed to sink a deep well in the fork of these valleys immediately above the out-fall; the area of country drained by these valleys is about 240 square miles, or 720,000,000 square yards; the rain-fall in it, as registered at Bellary, has been as much as twenty-four inches in the year and as small as nine inches; if three inches of rain is therefore absorbed by the land, it is probably as much as we can rely upon whence to expect to obtain a supply of water; this would give a store of 180 millions cubic yards. In this valley, about Bellary, where wells have been sunk in favorable sites, an abundant supply of water has been found at no very great depth from the surface, but all these wells are entirely dependent on the rain-fall, and fail fast in the hot weather.

10. The valley here indicated is one of those which will be irrigated from the Toongabudra river as soon as the works now commencing are carried out to completion, so that a well in its midst will always be a reservoir of water, and almost independent of the rains at all seasons of the year.

11. In other parts of the District there are many places where spring channels now exist, in which deep borings might be tried to secure a permanent flow of the waters, and thus save a great deal of time and labor at present employed in clearing out, daily, the heads of these. Among isolated masses of hills, as near Adonie, there are springs which might be opened up with advantage by boring, and other places could be mentioned for similar works, but with the means available, perhaps in the two large valleys pointed out in this report, the work would be found to be as much as could be undertaken at present.

12. As regards evaporation, it is as well to remark that, during the monsoon seasons, it appears from Registers kept at Bombay, this is far less than at any other time of the year, a marked diminution in the rate taking place at once so soon as the monsoon sets in; thus, in Beardmore's tables, page 335, the mean daily evaporation and rain-fall are given for the several months in the year as below:—

	Jan.	Feb.	Mar.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Mean daily...												
Evaporation, inches...	240	250	283	255	322	174	103	135	151	217	266	270
Rain-fall, inches...	292	...	...	...	005	788	990	356	382	038	008	007

From this it would appear that, in the rainy seasons, the evaporation is less than one-half of what it is in the other months, whence, it is inferred, that in the large plains of Bellary, more moisture is absorbed by the land than is usually supposed.

13. The hills about Gooty, and towards Kurnool, differ in character from those about Bellary or the Ramandroog; they have very little vegetation on them, are exceeding steep rising almost abruptly, and the plains between them are by no means so extensive as in the valleys indicated in this paper, and in which it is proposed to sink deep borings to obtain a water supply without much reference to artesian wells, which are not likely to be met with in any part of this District.

(Signed) F. FISCHER, Captain, R. E.

1. Ordered to be communicated to Mr. Oldham with original enclosure No. 1 for his information, and for any remarks he may wish to offer.

Proceedings of the Madras Government, Revenue Department,
14th October 1864.

2. Ordered also to be submitted to Government with the Board's request that Captain Fischer may be authorized to carry out his proposals for two deep borings for water in the localities indicated in his interesting Memorandum.

3. The Board understand that the means are available on the spot.

No. 166.

ORDER THEREON, 14th October 1864, No. 1,895.

Miscellaneous.

Referred to the Public Works Department, in view to the suggestion in paragraph 2 of the Board's Proceedings being carried out.

(True Extract.)

C. J. Master
Deputy Secretary to Government.

To the Public Works Department,
,, the Board of Revenue.

Exd. T. O'Connor.

7th
No. 3045.
Communicated to
the Superintending Engineer 3rd
Division, with a request that he
will report the probable cost
of the borings and the
sources from which funds
can be provided for
the work.

Sheppard
21st Oct 1864

To the Superintending Engineer
3rd Division
Controller of P.W. Works
Revenue Department

X087

25th October

9th Vols. Departe
Pro. of Govt for Oct.

N^o 4575

Pro. of Govt in the
Revenue Departe

Dated 14 Oct/64
Received 18 Oct/64

N^o 1895

Fisher Requesting that
Capt. Engr. Bellamy, may be
authorized to carry out his
proposals for two deep borings
for water in the localities
indicated in his Memo. of
9th July 1864-

N^o 425-426

With an order.

N^o 3015-24th Oct. 1864.

Shirley 22.5.1864