

- (1) பக்கங்களின் எண்ணிக்கை 252
 (2) புதுக்கித் திருப்பிய நாள் 10/88
 (3) ஆதாரங்குறிப்பவர் சுருக்கொப்பம் byb

தமிழ்நாடு ஆவணக் காப்பகம்.

தமிழ்நாடு அரசு

அங்குலனி குறை

அரசாணை எண்.	<u>2292-2293</u>	அச்சகம்
மு. கோப்புத் தாள் எண்.		பலவகை
நாள் :	<u>10</u> <u>(30)</u> - 9 - 1886	<u>198</u>

புதிக்கலோ கண்டபடி கையாளலோ கூடாது

2282
10TH SEPTEMBER 1886, No. 2292 W., PUBLIC WORKS.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.

Public Works.

AD again—

G.O., dated 5th October 1883, Nos. 2794-95 W.
" " 13th June 1884, Nos. 1473-74 W.
" " 25th July 1884, No. 1814 W.

AD—also the following papers:—

G.O., dated 23rd February 1885, No. 427 W., Public Works.

AD—the following letter from Colonel H. L. PRENDERGAST, R.E., Superintending Engineer, V Circle, to the Chief Engineer, Public Works Department, dated Madras, 19th January 1885, No. 3900:—

I have the honor to forward Captain Romilly's report on the supply of water for the European troops at Bangalore, as called for in G.O., No. 1473 W., dated the 3th June 1884.

Captain Romilly has taken up thoroughly the investigation of the different schemes, and gives the cost of them in an abstract statement in appendix Y. There are added, at foot of the table, the annual maintenance charges for the three projects, B and C.

2. The object in view is to have really good water supplied to the barracks; and, in my opinion, this object can only be attained by distillation. By this process the water obtained from any source available is supposed to become perfectly pure; and will be most convenient to make use of the Halsur tank water, with condensers at the rock, new cisterns at the rock for drinking water, to be conveyed by new mains to the barracks, and with arrangements for pumping water direct from the Dhobies' Wells to the service cisterns at the barracks, to be used for other purposes than drinking.

This scheme is described in paragraphs 23 to 35 of Captain Romilly's report. The first cost of providing distilled water, Rs. 1,67,000, is a good deal less than that of pumping filtered water from Agaram tank, Rs. 2,90,000; but there will be a much higher annual expenditure, which, with interest and depreciation of stock, is estimated at Rs. 84,600.

3. The objections urged in the Military Department are entered in appendix R, and consist in condemning the use of the water in the Halsur tank, in deprecating the conveyance of ablution water through the same pipes as the drinking water, and in showing the danger of depending on a single condensing apparatus, with no source to fall back upon in case of accident.

These objections appear to me to be fully met by the proposals to have a separate main-pipe for the pure drinking water, to use the water of the Halsur tank only after condensation, and to have a double condensing apparatus, so that there will be no failure in the delivery of pure water, even if the machinery in use were to be disabled temporarily.

4. The engine now at work at the Dhobies' Wells is an expensive one in fuel. It is in good order, and is saleable. The rock engine is old and liable to break down. Hence it is desirable to get rid of the two old engines, and to provide a pair of new engines, each of 12-horse power, to be placed at the Dhobies' Wells, and to pump the water to the cisterns at the barracks.

To obviate the risk of a failure of water in the wells, it is proposed that there should be filter beds of sufficient capacity to allow of the tank water being filtered and pumped up to the service cisterns at the barracks.

The present small pure water cistern is not large enough to allow of sufficient water being pumped up; and it is proposed to utilize this cistern as an additional filter to let out water by gravitation to a new pure water cistern at the wells.

5. The condensing station is intended to be upon the Halsur rock; and it is expected that the Engine house on the rock will, with slight alterations, hold the condensing machinery; a plan of the building has in the mean time been sent to London, and the Normandy Company have been asked if there is sufficient accommodation.

A condenser producing nominally 9,000 gallons, but working up to 12,000 gallons, will in six days provide water sufficient for eight days' consumption; and it is proposed that there should be two complete condensers so as to provide against an accident happening to one.

Captain Romilly shows in paragraph 31 that it will be advantageous not to pump the condensed water over a stand-pipe at the rock but to place cisterns on the rock for the condensed water to gravitate to stand-cocks at the barracks. A lower pair of cisterns will each hold a day's supply for the Royal Horse Artillery, the Royal Artillery and the Cavalry, while an upper pair of cisterns will have command sufficient to give each a day's supply to the Infantry barracks.

The main pipes from the cisterns at different levels will be kept distinct for the delivery of water to the stand-cocks at the Agaram and at the Parade barracks. As a further precaution for maintaining the purity of the water, the estimate provides for iron water-carts, to take the place of the leathern buckets that are now in ordinary use for carrying water about the barracks.

6. The scheme would be more complete if the improvements to the Halsur tank were combined with it in part of the project C. The condition of the tank would be much improved by completely diverting the town drainage, filtering the northern drainage, and bringing in a fresh supply of water from a better gathering ground.

The additional cost through would be as given in paragraph 53:—

	RS.
New channel masonry works, compensation	26,130
Improvements to tank	33,730
Add for contingencies	2,990
Total	62,850

and as the condensing system is not affected by the natural quality of the water, the improvement of the Halsur tank will not be for the benefit of the British troops.

The advantages of a better supply of water would be felt chiefly by the civil population of Bangalore; but I fear the municipality would not consent to pay even a half share of the expenditure.

Order—dated 23rd February 1885, No. 427 W., Public Works.

The above papers will, in the first instance, be referred to the Sanitary Commissioner, Madras, for an expression of his opinions, and will then be forwarded for the remarks of His Excellency the Commander-in-Chief, who will be requested to return them to the Secretary to Government, Public Works Department, with a view to examination in detail and final orders by Government.

(True Extract.)

(Signed) J. SHAW-STEWART, Colonel, R.E.,
Secretary to Government, P.W.D.

From the Resident in Mysore, dated 14th March 1885, No. 2456/1280.

From Deputy Surgeon-General G. BIDIE, M.B., C.I.E., Sanitary Commissioner for Madras, to the Secretary to Government, Public Works Department, dated Madras, 15th April 1885, No. 414.

In returning the correspondence* regarding the Bangalore water-supply, referred under G.O., No. 427, of 23rd February 1885, I have the honor to submit the following remarks to the Right Honorable the Governor in Council.

- * 1. Report by Captain F. J. Romilly, R.E.
2. Letter from the Superintending Engineer, V Circle, No. 3900, dated 19th January 1885.
3. Note by Under Secretary to Government, Public Works Department, dated 19th February 1885.

2. In dealing with this question it appears to me that, in restricting inquiries to the requirements of the troops, a somewhat narrow view has been taken of the

necessities of the station. A large civil population has been allowed to settle down in the centre of the cantonment, and to outgrow the available water-supply and pollute its sources. These conditions are no doubt greatly to be regretted, but from a sanitary point of view they cannot be ignored. If the bazaar population be constantly exposed to epidemic and other disease from insanitary conditions, all our precautions to protect the health of the troops will be rendered more or less nugatory. I would therefore suggest that steps be taken to move the municipality of Bangalore to adopt some contemporaneous measure to secure for the inhabitants generally, independent of the troops, a sufficient supply of fairly good water. It appears to me that this might be obtained by adopting Colonel Mullins' scheme, with the additions proposed by Captain Romilly† for exclu-

† See paragraph 37 of his report, and clause 2, paragraph 51, of Colonel Mullins' report.

ding the whole of the foul sewage of the town from the Halsur tank, and for bringing into it the drainage of a tract of

open cultivated ground to the eastward of Bangalore. The supply thus obtained would not perhaps be unimpeachable, but it would be greatly superior to the existing one. The cost of these improvements is estimated at close on Rs. 30,000, which would not certainly be a heavy tax on a population of 81,810; and I have hopes that if the matter were placed fairly before the townspeople, they would not grudge so moderate an outlay for such an important purpose.

3. Of the schemes suggested by Colonel Mullins and worked out by Captain Romilly for securing an improved water-supply for the troops, it appears to me that the proposal to use condensed water is, all things considered, the best.

4. The Agaram tank, which is mentioned as a possible source, receives the drainage of four villages, and although the sewage of two of these could be diverted, that of the remaining two could not be excluded. The proximity of native villages to the reservoir would also be objectionable, as it is almost impossible, under such circumstances, to prevent bathing, washing of clothing and cattle, and other objectionable practices. Captain Romilly puts the whole case very clearly when he says "there can be no doubt that the Agaram tank water is liable to dangerous contamination, and if adopted as the future reservoir for the troops, it is urged that the source of supply must not be accepted as, or expected to be, pure." Looking also at the chemical analyses of the water, they are not, so far as such results give warning of danger, of a satisfactory nature.

5. As regards the scheme for improving the Halsur tank and utilising the existing system with certain additions and modifications, there can be no doubt that, although calculated to effect a great improvement in the quality of the water, it is not such as can be recommended where the health of a large body of European troops is concerned, as they are much more sensitive to the effects of water of inferior quality than natives appear to be.

6. As stated by Colonel Mullins, "it is nearly certain that water of perfectly satisfactory quality could be obtained at Bangalore only by distillations." It is proposed, therefore, to use Normandy's condensing apparatus, and to have, in case of a break-down, two sets, each capable of producing 9,000 gallons in 24 hours. The water for distillation is, according to Captain Romilly's modification of the scheme, to

be drawn from the Halsur tank, and supplied to the troops for drinking and cooking purposes through a distinct series of cisterns, pipes and stand-cocks, at the rate of 8 gallons per head daily. Water for other purposes is to be drawn from the Dhobies' Wells, which yield a tolerably pure supply, and distributed through a separate system of pipes. These arrangements seem to meet the wants of the case. As pointed out by His Excellency the Commander-in-Chief, it is no doubt undesirable to have two qualities of water, the one potable and the other doubtful, supplied to barracks; but it is to be hoped that, by a careful arrangement of stand-cocks and other precautions, the anticipated risks may be nullified. I have therefore no hesitation in recommending the adoption of the scheme for the supply of water by Normandy's apparatus.

From Brigadier-General R. C. STEWART, Quartermaster-General, to the Secretary to Government, Public Works Department, dated Ootacamund, 2nd May 1885, No. 970 B.

In returning the documents received with your No. 10 E., of 17th April 1885, on the subject of the water-supply for Bangalore, which were forwarded for the remarks of the Commander-in-Chief, I am desired to say that, after full consideration of the three schemes which are adverted to in the above papers, Sir Frederick Roberts prefers project B, or that for retaining the present system, and providing for a separate service of water for drinking and culinary purposes by condensation.

2. The difficulty of inducing people to make invariable use of pure water when another and less wholesome supply is equally at hand, renders objectionable any system which comprises two sources, but the difficulty of securing water of sufficient quantity and of adequate purity at Bangalore is so great that His Excellency thinks it best to accept project B, provided that at the same time the conservation of the Halsur tank will be taken in hand by Government and the catchment area increased.

3. The cost of these improvements, as stated by Dr. Bidie, would be about Rs. 30,000, and taking into consideration the benefit that would accrue therefrom to the civil population of Bangalore, it would, in the Commander-in-Chief's opinion, be reasonable to expect the municipality to bear the cost of them, or at all events of a portion of them. Should the municipality not be prepared to accept the obligation, then it is hoped that Government will bear the whole expense, for unless these improvements be carried out, the water of the Halsur tank can never be satisfactory.

From A. H. T. MARTINDALE, Esq., Assistant to the Resident in Mysore, to the Secretary to the Government of Madras, Public Works Department, dated Bangalore, 23rd May 1885, No. 477/236.

In continuation of this office letter, No. 2456/1280, dated 14th March 1885, I am directed to forward copy of letter, No. 236, dated 13th May 1885.

and Military Station of Bangalore, asking to be furnished with the plans of the recently selected gathering grounds in connection with the late Captain Romilly's scheme for the improvement of the Halsur tank.

2. I am to request that the plans in question may be forwarded to this office if they are available.

From Colonel J. SHAW-STEWART, R.E., Secretary to the Government of Madras, Public Works Department, to the Resident in Mysore, dated 2nd June 1885, No. 173 E.

With reference to your letter, No. 477/236, of 23rd ultimo, I have the honor to forward, for communication to the President of the Bangalore Municipality, the plans prepared by Captain Romilly for adding to the gathering grounds of the Halsur tank and improving the quality of its supply.

2. At the same time I am directed to forward copies of letters from the Quartermaster-General and the Sanitary Commissioner for Madras, in which are recorded the opinions of His Excellency the Commander-in-Chief and of the Sanitary Commissioner on the alternative schemes for improving the water-supply to the British troops at Bangalore.

3. You will observe therefrom that, whilst supporting the project for the distillation of the drinking water to be drawn, as at present, from the Halsur tank for the use of the garrison, both the Military and Sanitary authorities strongly advocate the contemporaneous adoption of the measures proposed in Captain Romilly's project C for adding to the supply available for the civil population of the cantonment, excluding foul sewage from the tank, and improving its conservancy.

4. The estimates for these improvements amount to Rs. 59,860 (not to Rs. 30,000 only as stated by Dr. Bidie), and I am to inquire whether, in view of the decided benefits that will be conferred thereby on the general public of Bangalore, the municipality are prepared to contribute towards the cost of same, and if so, to what extent.

From Major J. H. NEWILL, Assistant to the Resident in Mysore, to the Secretary to the Government of Madras, Public Works Department, dated Bangalore, 6th November 1885, No. 2172/70.

With reference to correspondence ending with your No. 173 E., dated June 2nd, 1885, I have the honor, under instructions from the Officiating Resident, to forward a copy of further papers, as noted on the margin, relative to adding to the gathering grounds of the Halsur tanks and to improving the quality of the water-supply.

1. Note, dated 6th July 1885, on the Halsur tanks, by Captain C. H. M. Kensington, R.E.
2. Letter, No. 943/44, dated 15th July 1885, to the President, Municipal Commission, Civil and Military Station.
3. Letter, No. 838, dated 27th July 1885, from the President, Municipal Commission, Civil and Military Station.
4. Letter, No. 1193/53, dated 3rd August 1885, to the President, Municipal Commission, Civil and Military Station.
5. Demi-official letter, dated 27th August 1885, from Mr. McLaughlin.
6. Letter, No. 1468/70, dated 3rd September 1885, to the President, Municipal Commission.
7. Notification by the President, No. 12, dated 11th September 1885.
8. Letter, No. 1173, dated 25th September 1885, from the President, Municipal Commission, with enclosures.

2. The municipal commissioners having agreed to deepening the Lower tank, and raising the waste weir at a cost of Rs. 10,000 and to the purchase of the Jevanhully tank, the work of excavation was begun early in August and was actively carried on till the heavy fall of rain in the latter part of September stopped it. In all some 34,000 cubic yards of earth have, at a cost of Rs. 5,546-11-4, been removed from the bed of the Lower tank to form an island and an embankment on the eastern side, which are now being laid out as ornamental grounds; 1,450 lineal yards of hedge have been planted; 8,000 square yards of embankment have been sectioned and turfed; two culverts have been lengthened, and some minor works have been completed. The constant rain of the last six weeks has so raised the level of the water in the Lower tank that it is impossible at present to undertake work on the weir. The necessary notification has been given for acquiring the Jevanhully tank. This, when it comes into the possession of the municipality, will constitute a valuable reservoir. The result of what has been done is to lessen, in the Lower tank, the area exposed to evaporation, and to increase the capacity. As the level in the Lower tank sinks, the Upper tank will be drawn upon to supply what is wanting, and so long as the water in the Jevanhully tank admits of so doing, the Upper tank will be similarly replenished from it.

3. With his letter, No. 3150, dated September 22nd, which forms an enclosure to No. 1173, dated September 25th, 1885, from the President of the Civil and Military Station to my address, Colonel Burton, the Executive Engineer of the Presidency

Division, who is also a municipal commissioner for Bangalore, and who has taken a great interest in the work of improving the Halsur tank, has forwarded estimates involving a total expenditure of Rs. 21,500. Of this sum, Rs. 5,546-11-4 had, as shown above, been spent up to the date of his letter from Municipal funds. In his letter, No. 838, dated July 27th, 1885, to my address, the President of the Civil and Military Station has communicated the expectation of the municipal commissioners that the Madras Government will bear its share in the undertaking. As the commissioners have contributed so generously, I trust that their action may now be liberally supported by His Excellency the Governor in Council, and I would express the hope that a similar sum of Rs. 10,000 may be put at our disposal to help in the completion of the work. Independently of that amount already subscribed by the commissioners, there will devolve on them the further cost of compensation for the Jevanhully tank and for raising the waste weir of the Lower Halsur tank. Hence the necessity for a large measure of assistance from outside.

4. The most important feature of Captain Romilly's scheme for improving the quality of the water in the Halsur tanks was to abandon the present catchment area on the west, which is mainly covered by the cantonment bazaar, and to substitute, as the gathering ground, a tract of high and sloping land to the east which belongs almost, if not entirely, to the Mysore Government. Mr. Girdlestone visited this locality some weeks ago, in company with Colonel LeMessurier, R.E., Colonel Burton, R.E., Major Bowen, R.E., Mr. McLaughlin, C.E., and Major Maltby. The last-named officer is the President of the Municipal Commission, Civil and Military Station of Bangalore. The general opinion was that the proposed area for catchment is larger, and that its soil is more holding in its nature than are the area and the soil of the reservoir constructed by Colonel Sankey on the Tumkur road for the use of Bangalore; that for the contour channels sharper gradients than those recommended by Captain Romilly are desirable so as to ensure the prompt and efficient passage into the Halsur tanks of even slight rainfall; that if the land were taken up its cleanliness would have to be secured, as in the case of the English War Officers' Fortification Act, by reserving to the municipal commissioners the right of clearing trees, of preventing the erection of new buildings or a change in existing levels, and of forbidding the construction of unauthorized water channels. Conservancy powers would also have to be obtained over villages now in the area. At present there is sewage forming on fields within the area. Were this practice deemed prejudicial (there was a difference of opinion on this subject amongst those who accompanied Mr. Girdlestone to the spot), the municipality's sale of sewage to this tract would need to be discontinued and disallowed.

5. There does not seem to the Officiating Resident any likelihood that the municipal commissioners would contribute towards the cost of the proposed new catchment area; and in the event of opposition, Mr. Girdlestone would not, under existing circumstances, feel justified in using his influence to overcome their objections. As at present advised, he himself is not prepared to acquiesce in the belief that the proposed scheme would result in water for the garrison much more pure than that now supplied. The municipal commissioners entertain grave doubts as to the value of contour channels for supplying reservoirs; and at any rate they have for the moment before their eyes the failure of Colonel Sankey's scheme on the Tumkur road, which depended to a large extent on this source of supply. They also urge that the water-supply, as it now exists, is acceptable to the townspeople and not unhealthy in its effects; and consequently that as their first care should be for the townspeople, they would not be justified in sharing an expenditure the necessity of which has not been proved to their satisfaction. From this it follows that if the Madras Government still regards this part of Captain Romilly's proposals as imperative, it will rest with itself to provide the funds required for its accomplishment. It seems desirable that if the scheme is undertaken, the supply from the western side should not be cut off till the success of the new undertaking has been fully established.

6. I am to take this opportunity of intimating that much attention has been paid of late to the question of purifying and maintaining pure in its passage to the Halsur tanks the water which runs thither from the western side. Within the gathering ground on the west there is much cultivated land. This it is practically impossible,

owing to the prohibitive cost of compensation, to throw out of cultivation. But scavenging is systematically carried out, and patrolling frequent in all places of public resort. It having been found that on the occasion of heavy rain in the cantonment bazaar the main drain overflowed into the main sewer, the dividing wall between them has been raised so as to prevent this evil. The nuisance caused by the pollution of ground in and about the tanneries and potteries has been stopped. New sites, beyond the limits of the catchment area, for small-pox and cholera camps, are being sought. The question of allowing the Hindu burial-ground to be still used has been referred for the opinions of the Officer Commanding the Division and of the chief Medical authorities in Bangalore. If their opinions are unfavorable, the Officiating Resident will use his influence to put an end to such use. For the protection of the Halsur tanks eight watchmen have been appointed at a cost to the municipality of Rs. 56 a month. Should there be any other practical safeguards which the Madras Government may wish to suggest in the interests of the troops, Mr. Girdlestone will gladly, on receiving details from you, give consideration to them.

From the Resident in Mysore, dated 17th November 1885, No. 2293/70.

From Colonel J. SHAW-STEWART, R.E., Secretary to the Government of Madras, Public Works Department, to the Resident in Mysore, dated 8th January 1886, No. 68 W.

In reply to your Assistant's letter, No. 2172-70, dated 6th November 1885, I am directed to state that, after full and careful consideration, and taking into account the recommendations made by Sir Frederick Roberts and the Sanitary Commissioner, the Government of Madras feel convinced that the most appropriate method of securing a pure water-supply for the troops and civil population of Bangalore is to adopt the proposals made by the late Captain Romilly as set forth in his project B, with the addition of the first seven of the estimates which compose project C.

2. The cost of project B is estimated at Rs. 1,67,000; and that portion of project C that it is proposed to carry out, at Rs. 59,860; or a total expenditure of Rs. 2,26,860. In this connection I am to say that the Government of Madras note that the municipal commissioners of Bangalore are unwilling to contribute any sum towards the cost of taking up a new catchment area to the east of the Halsur tank. But it is hoped that they will raise no objection to this much-needed improvement being carried out by Government. The two items to which the consent of the municipal commission is requisite are—

- (1) Diversion of the town drainage, and
- (7) New supply-channel and compensation,

and I am to solicit that the matter may be laid before the municipal commissioners as early as practicable, and that you will move the commissioners to accord their consent to the scheme.

3. In view of the heavy expenditure that will be incurred should it be finally decided to carry out the works above mentioned, the Government of Madras regret that they are unable to contribute towards the estimate of Rs. 21,500 for work in connection with the tank which the municipal commissioners have taken in hand; but the Government will be prepared to pay a moiety of the sum expended by the commission on works which will render any of the items from 1 to 7 of project C unnecessary.

4. Adverting to the concluding portion of paragraph 5 of your letter under reply, I am authorized to give the assurance that the Halsur tank supply from the western side shall not be cut off until the success of the new gathering ground to the east shall have been fully established.

5. The enclosures received with your letter are herewith returned, and in conclusion I am directed to solicit that the early consent of the Government of Mysore and of the municipal commissioners to the scheme for taking up a new catchment area to the east of the Halsur tank may be obtained and communicated, in view to the proposal being submitted for the final sanction of the Government of India.

G.O., dated 1st June 1886, No. 1386 W., Public Works.

Read—the following letter from Major E. A. FRASER, Assistant to the Resident in Mysore, to the Secretary to the Government of Madras, Public Works Department, dated Bangalore, 15th April 1886, No. 1022/705:—

With reference to letter, No. 329 C., dated 1st March 1886, from your office, requesting an early reply to letter, No. 68 W., of the 8th January 1886, regarding the proposed improvements to the Bangalore water-supply, I am directed to forward, for information, a copy of the correspondence noted on the margin which has passed on the subject.

ENCLOSURE.

From Major E. P. MALTBY, President, Municipal Commission, Civil and Military Station, Bangalore, to the Assistant to the Resident in Mysore, dated Bangalore, 9th March 1886, No. 2194.

I have the honor to acknowledge the receipt of your letter, No. 396/70, dated 23rd ultimo forwarding copies of letter, No. 2172/70, dated 6th November 1885, from the Assistant to the Resident, to the Secretary to the Government of Madras, Public Works Department, and letter, No. 68 W., dated 8th January 1886, to the Resident in Mysore.

2. In reply, I have to state that as the Government of Madras is willing to bear all the expense of bringing water into the Halsur tank by a new channel on the east, and as that Government gives an assurance that the bazaar drainage which now enters the tank from the west "shall not be cut off until the success of the new gathering ground to the east shall have been fully established," the municipal commissioners now raise no objection to the proposed improvement to the Halsur tank.

3. The commissioners were afraid that the present supply (which, indifferent as it is, is still better than none) would be cut off before it was proved that water could be brought in in sufficient quantity from the east.

4. Having now the assurance of the Madras Government that such shall not be done, they will be very glad to see the work put in hand.

From J. H. NEWILL, Esq., Assistant to the Resident in Mysore, to the Chief Secretary to the Dewan of Mysore, dated Bangalore, 7th April 1886, No. 902/705.

I am directed to forward a copy of the correspondence noted on the margin regarding improvements to the Halsur tank, and to express the hope of the Officiating Resident that the Government of His Highness the Maharaja will give the subject its most careful consideration and favor him with an early reply.

Read—the following letter from Major E. A. FRASER, Assistant to the Resident in Mysore, to the Secretary to the Government of Madras, Public Works Department, dated Bangalore, 22nd May 1886, No. 1430/705:—

In continuation of letter, No. 1022/705, dated 15th April 1886, from this office, regarding the proposed improvements to the Halsur tank, I am directed to forward a copy of letter, No. 1159/60, dated 28th idem, from the Chief Secretary to the Dewan of Mysore stating that every facility will be afforded by His Highness' Government in the matter of acquiring land for a new catchment area to the east of the tank.

2. I am to request that you will favor the Officiating Resident with an expression of your opinion on the considerations urged by the Durbar in paragraph 3 of its letter above quoted, with regard to certain rights proposed to be reserved to the municipal commissioners of the civil and military station for the purpose of securing the cleanliness of the Halsur tank.

ENCLOSURE.

From M.R.Ry. R. VIJAYENDRA RAO, Chief Secretary to the Dewan of Mysore, to the Assistant to the Resident in Mysore, dated Ootacamund, 28th April 1886, No. 1159/60.

I am directed to acknowledge the receipt of your letter, No. 902/705, of the 7th instant, on the subject of the Halsur tank improvements, and inviting the consideration of His Highness the Maharaja's Government thereto.

2. It would appear from the correspondence that the Government of Mysore has no direct concern with the project under reference, beyond that connected with the acquisition by the British Government of the land to be taken up for the proposed channel to the east of the Halsur tank, which channel will, for the greater part of its course, run through the territory of His Highness, and in regard to this I am desired by the Dewan to say that every facility will be afforded by His Highness' Government for the transfer of the land on reasonable terms.

3. I am to invite attention, however, to paragraph 4 of your letter, No. 2172/70, of 6th November 1885, to the Secretary to the Government of Madras, Public Works Department, where it is proposed to reserve to the cantonment municipal commissioners the rights of clearing trees over the catchment area drained by the channel, of preventing the erection of new buildings or "a change of existing levels," and of forbidding the construction of unauthorized water-channels. Further, conservancy powers over the villages in this area are to be vested in the commissioners and apparently the manuring of fields is to be prohibited. This proposal involving, as it does, the abrogation of immemorial occupancy rights may, the Dewan apprehends, complicate the question considerably; and I am to request the favor of a reconsideration of the necessity for conferring on the cantonment municipality powers to this extent over lands outside their jurisdiction. His Highness' Government fully recognizes the desirability of improving the water-supply of the Bangalore cantonment, and will gladly facilitate the furtherance of any scheme to that effect, but they desire to point out that interference with the rights of land-holders outside the municipal limits should, if possible, be avoided. Extensive powers, such as those indicated above, would probably necessitate the throwing out of cultivation of a large area of land, and the payment of compensation far in excess of what was contemplated by the projectors of this contour channel.

Read—the following letter from Major E. A. FRASER, Assistant to the Resident in Mysore, to the Secretary to the Government of Madras, Public Works Department, dated Bangalore, 21st May 1886, No. 1418/3495:—

I am directed to forward, for your information, a copy of the Officiating Resident's Minute on the water-supply of Bangalore.

ENCLOSURE.

Minute by the Officiating Resident on the Water-supply of Bangalore.

The object of various measures to which the attention of this Residency has been given during the past fourteen months has been to increase the water-supply of Bangalore and to improve the quality of the water.

2. To this end the bed of the Shoolay tank was deepened and the weir and the embankment which surrounds it were raised in the spring of 1885, the result being that an additional depth of two and a half feet was secured over the whole reservoir. The cost of the work was Rs. 7,200. There still remains the work of enlarging the catchment area of this tank and that at Hakitiman-halli, where more water is much required. The outlay on this account is estimated at Rs. 4,000, of which Rs. 1,000 have been entered in the present year's budget, and will be sanctioned, for a feeder on the side of Trinity Church.

3. During August and September 1885 about 35,000 cubic yards of earth were dug out from the bed of the Lower Halsur tank, on the northern and eastern sides, at a cost of about Rs. 5,600, and were formed into an island and an embankment on the eastern side, which are being laid out as ornamental grounds. In the conduct of all this work the help received from Colonel Burton, R.E.,

was very valuable. The total sum voted by the municipality of the civil and military station for the improvement of this tank is Rs. 10,000. Since the end of last September the progress of excavation, and the raising of the waste weir, which was a part of the general scheme, have been stopped, owing to the high level of water in the reservoir caused by the autumnal rain. It is very desirable that both works should be taken in hand again whenever circumstances admit. Here, as elsewhere, it is of great importance to increase the capacity of the reservoir. For want of a higher waste weir much water ran off and was lost last October.

4. In connection with this particular supply, the municipal commissioners have exercised a wise forethought in acquiring the Jevanhully tank. The cost of this has amounted to Rs. 6,675. The tank will serve as a valuable feeder to the Upper Halsur tank.

5. The result of what has been done at Halsur is to lessen in the Lower tank the area exposed to evaporation, and to increase the capacity. As the level in the Lower tank sinks, the Upper tank is drawn upon at once to supply the deficiency, and so long as there is water in the Jevanhully tank, the Upper tank will similarly be replenished from it. The chief loss of water, in an extensive but comparatively shallow reservoir, such as the Lower Halsur tank, is due to evaporation, not to consumption. The device of preventing evaporation by means of aquatic foliage has not proved satisfactory in India. Hence the necessity for meeting the difficulty by restriction of area and corresponding excavation.

6. The Madras Government has a separate project under consideration, whereby, at a cost of about 2½ lakhs of rupees, it would fill the Lower Halsur tank entirely from a new catchment area on the east side of the tank. The undertaking is prompted by the wish to afford the European soldiers, who are entirely dependent on the Halsur reservoir, purer water than it is believed can, with the best conditions, be secured under the present system. As the Madras Government is ready to bear all the expense, and as it has given an assurance that the rain drainage from the catchment bazaar, &c., which now enters the tank from the west, shall not be cut off till the success of the new gathering ground to the east shall have been fully established, the municipal commissioners of the civil and military station have raised no objection to the proposal. They are averse to sharing the cost, not only because it would be difficult to find the necessary funds, but also because they do not feel justified in making such a marked change, so long as the water-supply, as at present it exists, is acceptable to the townspeople and not unhealthy in its effects. The scheme is now before the Mysore Government, whose consent has been sought to the alienation of the land involved by it.

7. Much has been done of late to purify, and to maintain pure in its passage to the Halsur tanks, the water which runs thither from the western side. Within the gathering ground there is much cultivated land. This it is practically impossible, owing to the prohibitive cost of compensation, to throw out of cultivation. But scavenging is systematically carried out, and patrolling frequent in all places of public resort. For the protection of the tanks eight watchmen have been appointed at a cost to the municipality of Rs. 56 a month. It having been found that on the occasion of heavy rain in the cantonment bazaar the main drain overflowed into the main sewer, the dividing wall between them has been raised, so as to prevent this evil, and has satisfactorily withstood the test of the late sharp storms. The nuisance caused by the pollution of ground in and about the tanneries and potteries has been much diminished. New sites, beyond the limits of the catchment area, have been chosen for small-pox and cholera camps, with special regard to the accommodation of the homeless poor in time of scarcity or famine; for experience has proved that the inhabitants of the town are best treated for infectious and contagious diseases in their own houses. A new site has also been chosen for the Hindu burial-ground, which it is hoped that the Durbar will concede. In such case the present one will be closed with as little delay as possible.

8. The supply of water to Miller's tanks, which is the third of the three great systems on which the civil and military station depends, has been facilitated by the construction of a diversion sluice in Cunningham road to serve tank No. 3. The channel with which such diversion is connected is one of the principal feeders of the Sampangi tank, which lies for the most part outside the limits of assigned tract. Consequently, as the Durbar has direct interest in the matter, it has been suggested that it should be left to the Public Works Department Secretary of the Mysore Government and to the President of the Civil and Military Station to agree when the diversion sluice should be used, and that in case of difference, the Resident should settle the question. This arrangement I hope that the Durbar will acquiesce in.

9. Advantage would be gained, I believe, by deepening all three Miller's tanks, provided that the lower soil is tenacious enough to hold water, and provided that there is no risk of setting free malarious influences if the present bottom be disturbed. Such has not been the result of the excavations at Shoolay and Halsur. I also think favorably of a scheme advocated by Mr. J. W. Hayes, municipal commissioner, for the construction of another reservoir below, but in close vicinity to the Shoolay tank. The configuration of the ground is such that the undertaking is not likely to be very expensive. Mr. Hayes puts the cost at Rs. 15,000, irrespective of compensation for house-property. Population in this neighbourhood is numerous and apparently on the increase. Hence the desirability of intercepting and holding water which, as actually happened

last year, may otherwise run to waste. In the present year I am afraid there is no prospect of funds being available for this work. I am also strongly impressed with the necessity of taking water nearer to the houses of the inhabitants as soon as money can be spared. At present the distance to which poor persons have to go for water, specially those who live in the cantonment bazaar, is considerable. This improvement may perhaps be best effected by pumping from existing reservoirs through pipes into cisterns or open basins at convenient centres. In connection with it the establishment of drinking fountains and drinking troughs at places of general resort seems desirable.

10. Not long ago it was represented to me that the water level in the wells of the civil and military station has been steadily getting lower for some years past. The fall has been variously attributed to the increased growth of casuarinas, which have a great tendency to absorb moisture, to a diminution in the rainfall, and to other climatic influences. The subject is, I think, worthy of investigation. At present the information at disposal is too limited to warrant the assumption that the water level in general has sunk. Till this fact has been established it is premature to speculate on the causes which may be at work.

11. The construction of the low level sluice from Sankey's reservoir for the benefit of the city of Bangalore does not in my opinion imperil the interests of the civil and military station. Colonel Sankey's main object of continuously supplying the High Ground and neighbourhood with water having failed, and there being no present means or likelihood of achieving that object, it would be an act of selfishness to oppose the utilization of such water as can serve the city under circumstances when the high-level sluice cannot be worked. Apart from this consideration the city has a claim by reason of the catchment area of the Dharmabudi tank having been circumscribed by the formation of Sankey's reservoir. The distribution of the water can always be determined by the Resident and the Dewan in consultation. It was by mutual agreement that Miller's tanks were thus replenished last autumn in a season of exceptional drought. As no difficulty was then experienced, there is reason for anticipating as satisfactory results in cases of future necessity. There seems no likelihood of raising the level in Sankey's reservoir, except at inordinate expense, and with risk of taking from the supply of other tanks in the neighbourhood.

12. The importance of not allowing present sources of water-supply beyond the limits of the Assigned Tract to be interfered with for purposes of irrigation or otherwise has been recognised, and assurances have been given on the part of the Durbar that it will not allow such interference, and that practically now it stops such interference in all cases which are brought to its notice.

13. There has not been leisure, on the part either of myself or of the engineer officers who have favored me with their help and advice in the above-mentioned matters of more immediate importance, to go deeply into the larger consideration of making Bangalore independent of its present system of tanks and wells. Even the preliminary inquiries involved in such schemes as that of leading water from Nundidroog and of pumping from the Cauvery would necessitate the employment of specially qualified professional men at no slight expense. That the cost of either scheme would be very great is beyond doubt. Such cost could only be met by a water-rate on the population which would be unobjectionable, if it did not exceed the present cost of fetching water, but which otherwise might press on a community that believes municipal taxation to be already quite high enough. Geologists have hitherto declared against the practicability of Artesian boring. It may be that this process, when more perfected, may solve the difficulty. Such a measure would be less likely to be hampered by questions of compensation; it would be without the risk of intermediate interruption which is attendant on the other two schemes, and it might be comparatively inexpensive. The deep borings which are now being made at various points on the Kolar gold fields may show what volume of water is to be hoped for at specified levels under known conditions of intervening rock or other material, and may yield information on other important points. Meanwhile, I think that the municipalities of Bangalore will be wise in restricting themselves, as regards improvement, to the lines which they have been pursuing of late.

12th May 1886.

(Signed) C. E. R. GIRDLESTONE.

Note by the Secretary to Government, Public Works Department.

In February 1885 the three projects prepared by the late Captain Romilly, R.E., for improving the water-supply of Bangalore were referred to the Sanitary Commissioner for an expression of his opinion, and, in his No. 414, dated 15th April 1885, Dr. Bidie approved project B, which provided for drawing the supply from Halsur tank and distilling the water by means of condensing engines. His Excellency the Commander-in-Chief also expressed his preference for project B, "provided that, at

the same time, the conservation of the Halsur tank will be taken in hand by Government and the catchment area increased."

In order to carry out the foregoing proviso it was found necessary to adopt the first seven items of project C, in addition to project B; and the Resident in Mysore was informed, in January 1886, that the Government of Madras were convinced that that was the most appropriate method of securing a pure water-supply for Bangalore. Of the first seven items of project C, two required the previous assent of the Government of Mysore, which was accordingly solicited.

The items were—

- (1) Diversion of the town drainage.
- (2) New supply channel and compensation.

With regard to (1) it was proposed to divert the town drainage from the west of the Halsur tank, and to draw the supply in future from a new catchment area to the east of the tank.

The area of the proposed new catchment basin was 2.4 square miles, or 1536 acres; and the compensation provided for in the estimate was Rs. 2,680 for the contour channel and Rs. 2,635 for 52.7 acres of land thrown out of cultivation under the Kadarampolem tank.

Further information regarding the items referred to will be found in paragraphs 41—43 of Captain Romilly's report, copy of which is attached.

In requesting the approval of the Bangalore Municipal Commissioners and the Government of Mysore to the two items above referred to, the Government of Madras gave the assurance that the supply from the catchment on the west should not be cut off until the success of the new gathering ground to the east had been fully established; and, on this assurance and on the understanding that the British Government paid all expenses, the Municipal Commissioners, in March last, stated that they had no objection to the proposed improvements.

In a communication, dated 28th April 1886, to the Resident in Mysore, the Government of Mysore state that every facility will be afforded for the transfer, on reasonable terms, of the land required for the new catchment area; but invite attention to a letter from the Resident, dated 6th November last, in which it was stated that, in the event of the new catchment area being taken up, its cleanliness would have to be secured, as in the case of the English War Officer's Fortification Act, by reserving to the Municipal Commissioners the right of clearing trees, of preventing the erection of new buildings or a change in existing levels, and of forbidding the construction of unauthorised water channels. The Resident further expressed his opinion that conservancy powers would have to be obtained over villages situated within the catchment area, and that, if it were deemed prejudicial, sewage forming on fields within the area should be stopped.

The Mysore Government now represent that the prohibition of manuring of fields would involve the abrogation of immemorial occupancy rights, and might, it is feared, complicate the whole question considerably; they request that the necessity for conferring on the cantonment municipality powers to the extent indicated above over lands outside their jurisdiction may be reconsidered; and add that, while the Mysore Government will gladly facilitate any scheme for improving the water-supply of Bangalore, interference with the rights of land-holders outside the municipal limits should, if possible, be avoided. Extensive powers, such as those indicated above, would probably necessitate the throwing out of cultivation of a large area of land, and the payment of compensation far in excess of what was originally contemplated.

The question now to be decided is whether the proposed new gathering ground, lying to the east of the Halsur tank, may be added to the drainage area of the tank without taking any special precautions for securing its thorough conservancy. The only alternative appears to be to acquire possession of the land which forms the proposed new gathering ground, and to throw it permanently out of cultivation; but it is to be observed that this alternative course would involve very heavy additional expenditure.

31st May 1886.

(Signed) J. SHAW-STEWART, Colonel, R.E.,
Secretary to Govt., P.W.D.

Order—dated 1st June 1886, No. 1386 W., Public Works.

These papers, with the note thereon which has been drawn up in this department, will, in the first instance, be referred to Surgeon-General Bidie, who, with advertence to his letter, dated 15th April 1885, No. 414 (written as Sanitary Commissioner), will be requested to favor the Government with his opinion on the point which has lately been raised.

2. The papers will then be forwarded to the Quartermaster-General,* who will be requested to obtain the opinion of His Excellency the Commander-in-Chief, and to return the papers to the Secretary to Government in the Public Works Department.

(True Extract.)

(Signed) J. SHAW-STEWART, Colonel, R.E.,
Secretary to Govt., P.W.D.

From G. BIDIE, Esq., M.B., C.I.E., Acting Surgeon-General with the Government of Madras, to the Chief Secretary to Government, dated Ootacamund, 23rd June 1886, No. O/191.

In returning the papers referred to me under G.O., No. 924 C, of 8th June 1886, I have the honor to submit the following remarks on certain points connected with the proposals for the improvement of the water-supply of Bangalore.

2. The chief point on which my opinion is invited is, "whether the proposed new gathering ground, lying to the east of the Halsur tank, may be added to the drainage area of the tank without taking any special precautions for securing its thorough conservancy."

3. From a sanitary point of view it is no doubt desirable that the gathering ground should be thoroughly conserved, but as that end could only be attained by throwing the whole of the land out of cultivation, I am not prepared to advocate such a measure, inasmuch as the water prior to delivery to the troops is to be purified by storage in a reservoir and distillation.

4. I have not inspected the proposed new gathering ground, which is said to embrace an area of 2.4 square miles; but from Colonel Mullins' report (paragraph 34) learn that the soil is of a "light sandy character," for the most part under dry cultivation, and extensively manured with more or less filthy material collected from the barracks, the station, and the bazaars. Such land will undoubtedly contaminate the surface wash more or less, the amount of impurity depending to a considerable extent on the weight of the showers and the season at which they fall. A heavy shower, occurring shortly after tillage and the application of manure, would carry off a considerable amount of organic matter; but on the crops attaining some size, the surface water would be comparatively clean, as growing vegetation rapidly disposes of nitrogenous matter in the soil, and any of it on the surface not got rid of in this way would speedily be converted into nitrates (inorganic matter).

5. As a precautionary measure, however, I would suggest that arrangements be made for the exclusion from the tank of foul water resulting from heavy showers falling immediately after the manuring of the gathering grounds.

6. If this be done, the only other precautions that seem necessary are—

- (a) The prohibition of any extension of the present cultivated land within the gathering grounds.
- (b) The institution of some arrangement with the Mysore Government for the surface conservancy of the villages that exist on the protected area, and for the prevention of the erection of any more buildings except in substitution of those already existing.
- (c) That offensive trades—such as tanning—be forbidden on the gathering ground.

7. As already stated, I make these suggestions clearly on the understanding that the water is to be purified prior to use by a Normandy's condensing apparatus; and have only to add, that the supply obtained from the proposed new gathering ground ought to be much purer than that now deposited in the Halsur tank from the densely populated and filthy town of Bangalore.

No. 318 D.

Forwarded, with advertence to G.O., No. 1386 W., dated 1st June 1886, to the Quartermaster-General, for favor of His Excellency the Commander-in-Chief's opinion.

2. Copy of a minute, dated 12th May 1886, on the water-supply of Bangalore, by Mr. Girdlestone, is enclosed for information.

Ootacamund,
30th June 1886.

(Signed) J. SHAW-STEWART, Colonel, R.E.,
Secretary to Govt., P.W.D.

From Colonel E. FAUNCE, Officiating Quartermaster-General, to the Secretary to Government, Public Works Department, dated Ootacamund, 24th August 1886, No. 2797 B.

In returning the papers received with G.O., No. 318 D., dated 30th June 1886, relative to the improvement of the water-supply at Bangalore, I have the honor, by order, to state that, although the Commander-in-Chief would prefer the alternative measure of thoroughly conserving the new gathering ground to the east of the Halsur tank, by throwing the whole of the land permanently out of cultivation (similar arrangements being made as regards the old gathering ground of the north feeder) yet, as the cost of these measures would apparently be prohibitive, and great difficulty would arise in acquiring the necessary land, His Excellency accepts the scheme as proposed, viz., that the town drainage having been diverted, a new gathering ground lying to the east of the tank be added to the drainage area of the Halsur tank, the precautionary measures in connection with the entire gathering grounds suggested by Dr. Bidie (in paragraphs 5 and 6 of his letter, No. O/191, dated 23rd June 1886) being fully adopted.

2. I am to request that, if convenient, a printed copy of the correspondence now returned may be forwarded for record in this office.

Order—dated 10th September 1886, No. 2292 W., Public Works.

Frequent outbreaks of enteric fever among the troops at Bangalore having led to strong representations respecting the quality of the water and the sufficiency of the water-supply available for the use of the troops and of the cantonment bazaar at that station, this Government, after careful consideration of the subject, arrived, in October 1883, * at the conclusion that the best means of providing the troops and town with wholesome water would be to extend and complete the scheme known as the Ooparhalli project, which had been originated, in 1868, by Major-General Sankey, R.E., C.B., when Chief Engineer of Mysore.

2. With that object, Colonel J. Mullins, R.E., was placed on special duty to investigate the subject; and, on the 31st March 1884, that officer submitted a report in which the whole subject of the water-supply of Bangalore was exhaustively treated. The results of Colonel Mullins' inquiries were summed up by the Chief Engineer in his note printed with proceedings, No. 1473 W., dated 13th June 1884, as follows:—

- (1) The Ooparhalli project is incapable of supplying the station or troops.
- (2) The Halsur tanks are not capable of being made a satisfactory source of supply for the troops.

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- (3) Wells may be sunk which would yield a sufficient supply for the troops for drinking and cooking purposes, but the quality of the water must remain doubtful.
- (4) The Agaram tank offers a new source of supply of suitable water, having an ample and sufficiently clear catchment basin.
- (5) Water of unexceptional quality is probably obtainable at Bangalore only by distillation.

3. In their order, No. 1473 W., dated 13th June 1884, the Government recorded their opinion that the Agaram tank scheme offered the most promising solution of the question of the water-supply to the Bangalore garrison, and directed the late Captain Romilly, R.E., to elaborate the scheme, and to prepare the requisite plans and estimates. In the following month,* orders

* G.O., No. 1814 W., dated 25th July 1884. were issued to Captain Romilly to include in his investigations the alternative scheme suggested by Colonel Mullins for condensing a supply of water from the dhobies' wells, sufficient to meet the requirements of the troops for drinking and cooking purposes, leaving the water required for other purposes to be pumped from the Halsur tank. Captain Romilly was further ordered to investigate the question of taking in an area of additional gathering ground to the eastward of the Halsur tank, and to include in his estimate for the Agaram tank scheme all compensation for land rendered necessary thereby.

4. With his letter, No. 3900, dated 19th January 1885, the Superintending Engineer, V Circle, submitted Captain Romilly's report, accompanied by three alternative estimates. The first, A, provided for the supply of water to the barracks from the Agaram tank, and amounted to Rs. 2,90,000; the annual cost of maintenance being Rs. 44,385. The second, B, provided for drawing the supply from the Halsur tank and distilling the water by means of condensing engines, and amounted to Rs. 1,67,000; the annual cost of maintenance being Rs. 84,600. The third, C, provided for certain improvements to the existing source of supply, and the augmentation of the supply by taking up a new gathering ground. The cost was Rs. 1,33,000, and the annual maintenance charges, Rs. 27,000.

5. This report having been referred to the Sanitary Commissioner, and to His Excellency the Commander-in-Chief, for opinion, the former officer condemned project A, and concurred in Captain Romilly's views that the Agaram tank-water was liable to dangerous contamination; and, if adopted as the future reservoir for the troops, the source of supply could not be accepted as pure. Dr. Bidie approved project B as the only means of insuring a supply of pure water for the use of the troops. His Excellency the Commander-in-Chief also expressed his preference for project B, "provided that, at the same time, the conservation of the Halsur tank will be taken in hand by Government, and the catchment area increased." His Excellency was of opinion that, as the civil population of Mysore would benefit by the improvements, the municipality should bear a portion of the cost; but he expressed a hope that, if the municipality were not prepared to do so, the Government would carry out the improvements and bear the whole expense.

6. In June 1885, the Resident in Mysore was addressed on the subject. The plans and estimates prepared by Captain Romilly were forwarded with the remark that, whilst supporting the project for the distillation of the drinking-water drawn from the tank for the use of the garrison, both the military and sanitary authorities strongly advocated the contemporaneous adoption of Captain Romilly's proposals for adding to the supply available for the civil population; for excluding foul sewage from the tank; and for improving its conservancy. These improvements comprised the first seven items of Captain Romilly's project C, estimated to cost Rs. 59,860; and the Resident was asked whether the Bangalore municipality were prepared to contribute towards the cost, and, if so, to what extent.

7. In his reply, dated 15th November 1885, the Resident intimated that the municipality had already incurred considerable expense on works undertaken by themselves in improving the Halsur tank; and, with respect to Captain Romilly's proposal to

substitute a tract of high and sloping ground to the east of the tank for the existing catchment area on the west, Mr. Girdlestone did not think the Commissioners would bear any portion of the outlay involved, inasmuch as the necessity for the change had not been demonstrated to their satisfaction. The Resident intimated clearly that, if the Madras Government still considered the change imperative, it would rest with this Government to provide funds to the full amount required for its accomplishment. On an assurance from this Government that the supply from the catchment on the west shall not be cut off, until the success of the new gathering ground to the east has been fully established, the municipality have given their assent to the proposal to divert the town drainage from the tank. The Government of His Highness the Maharaja also have intimated their willingness to afford every facility for the transfer, on reasonable terms, of the land required for the new catchment area. While doing this, the Mysore Government pointed out that complications would arise, and the cost of compensation would be greatly enhanced, if attempts were made to thoroughly conserve the new gathering ground, and throw it permanently out of cultivation. With reference to this point, the Government have received the opinion of Surgeon-General Bidie (who, as Sanitary Commissioner, previously reported on the water-supply question) that, if certain precautionary measures be taken, the prohibition of cultivation in the new catchment area need not be insisted upon; and His Excellency the Commander-in-Chief, in view of the great outlay which would be involved if this Government determined to acquire the whole of the gathering ground, has accepted the position.

8. His Excellency the Governor in Council considers that the question has now arrived at a stage when the Government of India may be addressed. That Government will accordingly be asked to sanction Captain Romilly's project B, with the addition of the first seven items of project C, involving a total estimated outlay from Imperial funds of Rs. 2,26,860.

9. The measures suggested by the Surgeon-General, in paragraphs 5 and 6 of his letter of 23rd June 1886, will receive consideration hereafter, should the Government of India sanction the proposals now to be submitted.

10. The following letter will be addressed to the Government of India:—

(Here enter No. 2293 W., dated 10th September 1886.)

(True Extract.)

(Signed) J. O. HASTED, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Military Department.
" Superintending Engineer, V Circle.
" Examiner, Public Works Accounts.
" Public Department.

Exd. E. Fernandez.
Spare Copies

BUILDINGS AND ROADS.
Publ CIVIL WORKS.

Govt. of 1886 Madras.
PUBLIC WORKS.

Dated September, 10th.

Recd.

Encl.

G.O., 10th Sept. 1886, No. 2292 W.

SEPTEMBER.

Bangalore Water-Supply

Proposals for improving the — for troops,
to be submitted for the sanction of the Gov-
ernment of India.

10TH SEPTEMBER 1886, No. 2293 W., PUBLIC WORKS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

LETTER—from

COLONEL J. O. HASTED, R.E.,

Secretary to the Government of Madras,

Public Works Department,

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,

MILITARY DEPARTMENT.

SIR,

I am directed to forward, for the consideration of the Government of India, copies of the proceedings of this Government marginally noted, relative to the proposals for improving the water-supply of the troops at Bangalore.

No. 2794 W., dated 5th October 1883.
" 2795 W., " 5th " "
" 1473 W., " 13th June 1884.
" 1474 W., " 13th " "
" 1814 W., " 25th July "
" 2292 W., " 10th Sept. 1886.
with Captain Romilly's report annexed.

2. The history of the question and its present position are stated in the last quoted proceedings of this date; and it will be seen that the sanction of the

Government of India is required to a total estimated outlay, from Imperial Military Funds, of Rs. 2,26,860.

3. It will further be seen from the correspondence, that the question of improving the water-supply of Bangalore has been the subject of exhaustive inquiry by this Government, who are convinced that the only feasible means of giving the garrison a pure water-supply, at a reasonable cost, is by adopting Captain Romilly's project B, estimated to cost Rs. 1,67,000, with the addition of the first seven items of project C, estimated to cost Rs. 59,860. The annual cost of maintenance of project B is estimated at Rs. 84,600.

4. The Army Sanitary Commission in England have frequently noticed the high rate of mortality from enteric fever among the troops at Bangalore, and have urged a consideration of the question of improving the water-supply; and I am to forward, for the information of the Government of India, copies of the two last reports of that body, printed with the proceedings of this Government, in the Military Department, marginally noted.

No. 4290, dated 5th August 1885.
" 4761 " 9th " "

4. I am therefore to express the hope of His Excellency the Governor in Council that the Government of India will take this subject into early consideration, and sanction the proposed expenditure of Rs. 2,26,860. Also, that the Government of India will be pleased to make a substantial grant for inclusion in the budget for 1887-88, in view to the early commencement of the work.

I have the honor to be,
Sir,
Your most obedient servant,

Colonel, R.E.,
Secretary to Govt., P.W.D.

FORT ST. GEORGE,
10th September 1886.

BUILDINGS AND ROADS.
CIVIL WORKS.

Gobt. of (1886) Madras.

PUBLIC WORKS.

Dated September, 10th.

Recd.

Encl.

10th Sept. 1886, No. 2293 W.

SEPTEMBER.

Bangalore Water-Supply

Proposals for improving the — for troops,
submitted for the sanction of the Govern-
ment of India.

MINUTE, BY THE OFFICIATING RESIDENT, ON THE WATER
SUPPLY OF BANGALORE.

The object of various measures to which the attention of this Residency has been given during the past fourteen months has been to increase the water supply of Bangalore and to improve the quality of the water.

2. To this end the bed of the Shoolay Tank was deepened and the weir and the embankment which surrounds it were raised in the spring of 1885, the result being that an additional depth of two and a half feet was secured over the whole reservoir. The cost of the work was Rs. 7,200. There still remains the work of enlarging the catchment area of this Tank and that at Hakitimanhalli, where more water is much required. The outlay on this account is estimated at Rs. 4,000, of which Rs. 1,000 have been entered in the present year's budget, and will be sanctioned, for a feeder on the side of Trinity Church.

3. During August and September 1885 about 35,000 cubic yards of earth were dug out from the bed of the Lower Ulsur Tank, on the northern and eastern sides, at a cost of about Rs. 5,600, and were formed into an island and an embankment on the eastern side, which are being laid out as ornamental grounds. In the conduct of all this work the help received from Colonel Barton, R. E., was very valuable. The total sum voted by the Municipality of the Civil and Military Station for the improvement of this Tank is Rs. 10,000. Since the end of last September the progress of excavation, and the raising of the waste weir, which was a part of the general scheme, have been stopped, owing to the high level of water in the reservoir caused by the autumnal rain. It is very desirable that both works should be taken in hand again whenever circumstances admit. Here as elsewhere it is of great importance to increase the capacity of the reservoir. For want of a higher waste weir much water ran off and was lost last October.

4. In connection with this particular supply, the Municipal Commissioners have exercised a wise forethought in acquiring the Jeevanhalli Tank. The cost of this has amounted to Rs. 6,675. The Tank will serve as a valuable feeder to the Upper Ulsur Tank.

5. The result of what has been done at Ulsur is to lessen in the Lower Tank the area exposed to evaporation, and to increase the capacity. As the level in the Lower Tank sinks, the Upper Tank is drawn upon at once to supply the deficiency, and so long as there is water in the Jeevanhalli Tank, the Upper Tank will similarly be replenished from it. The chief loss of water, in an extensive but comparatively shallow reservoir, such as the Lower Ulsur Tank, is due to evaporation, not to consumption. The device of preventing evaporation by means of aquatic foliage has not proved satisfactory in India. Hence the necessity for meeting the difficulty by restriction of area and corresponding excavation.

6. The Madras Government has a separate project under consideration, whereby, at a cost of about 2½ lacs of rupees, it would fill the Lower Ulsur Tank entirely from a new catchment area on the east side of the Tank. The undertaking is prompted by the wish to afford the European soldiers, who are entirely dependent on the Ulsur reservoir, purer water than it is believed can, with the best conditions, be secured under the present system. As the Madras Government is ready to bear all the expense, and as it has given an assurance that the rain drainage from the cantonment bazaar &c., which now enters the Tank from the west, shall not be cut off till the success of the new gathering ground to the east shall have been fully established, the Municipal Commissioners of the Civil and Military Station have raised no objection to the proposal. They are averse to sharing the cost, not only because it would be difficult to find the necessary funds, but also because they do not feel justified in making such a marked change, so long as the water supply, as at present it exists, is acceptable to the townspeople and not unhealthy in its effects. The scheme is now before the Mysore Government, whose consent has been sought to the alienation of the land involved by it.

7. Much has been done of late to purify, and to maintain pure in its passage to the Ulsur Tanks, the water which runs thither from the western side. Within the

gathering ground there is much cultivated land. This it is practically impossible, owing to the prohibitive cost of compensation, to throw out of cultivation. But scavenging is systematically carried out, and patrolling frequent in all places of public resort. For the protection of the Tanks eight watchmen have been appointed at a cost to the Municipality of Rs. 56 a month. It having been found that on the occasion of heavy rain in the Cantonment bazaar the main drain overflowed into the main sewer, the dividing wall between them has been raised, so as to prevent this evil, and has satisfactorily withstood the test of the late sharp storms. The nuisance caused by the pollution of ground in and about the tanneries and potteries has been much diminished. New sites, beyond the limits of the catchment area, have been chosen for small pox and cholera camps, with special regard to the accommodation of the homeless poor in time of scarcity or famine; for experience has proved that the inhabitants of the town are best treated for infectious and contagious diseases in their own houses. A new site has also been chosen for the Hindu Burial Ground, which it is hoped that the Durbar will concede. In such case the present one will be closed with as little delay as possible.

8. The supply of water to Miller's Tanks, which is the third of the three great systems on which the Civil and Military Station depends, has been facilitated by the construction of a diversion sluice in Cunningham Road to serve Tank No. 3. The channel with which such diversion is connected is one of the principal feeders of the Sampangi Tank, which lies for the most part outside the limits of the Assigned Tract. Consequently, as the Durbar has a direct interest in the matter, it has been suggested that it should be left to the Public Works Department Secretary of the Mysore Government and to the President of the Civil and Military Station to agree when the diversion sluice should be used, and that in case of difference the Resident should settle the question. This arrangement I hope that the Durbar will acquiesce in.

9. Advantage would be gained, I believe, by deepening all three Miller's Tanks, provided that the lower soil is tenacious enough to hold water, and provided that there is no risk of setting free malarious influences if the present bottom be disturbed. Such has not been the result of the excavations at Shoolay and Ulsur. I also think favourably of a scheme advocated by Mr. J. W. Hayes, Municipal Commissioner, for the construction of another Reservoir below, but in close vicinity to the Shoolay Tank. The configuration of the ground is such that the undertaking is not likely to be very expensive. Mr. Hayes puts the cost at Rs. 15,000, irrespective of compensation for house property. Population in this neighbourhood is numerous and apparently on the increase. Hence the desirability of intercepting and holding water which, as actually happened last year, may otherwise run to waste. In the present year I am afraid there is no prospect of funds being available for this work. I am also strongly impressed with the necessity of taking water nearer to the houses of the inhabitants as soon as money can be spared. At present the distance to which poor persons have to go for water, specially those who live in the Cantonment Bazaar, is considerable. This improvement may perhaps be best effected by pumping from existing reservoirs through pipes into cisterns or open basins at convenient centres. In connection with it the establishment of drinking fountains and drinking troughs at places of general resort seems desirable.

10. Not long ago it was represented to me that the water level in the wells of the Civil and Military Station has been steadily getting lower for some years past. The fall has been variously attributed to the increased growth of casuarinas, which have a great tendency to absorb moisture, to a diminution in the rain fall, and to other climatic influences. The subject is, I think, worthy of investigation. At present the information at disposal is too limited to warrant the assumption that the water level in general has sunk. Till this fact has been established it is premature to speculate on the causes which may be at work.

11. The construction of the low level sluice from Sankey's reservoir for the benefit of the City of Bangalore does not in my opinion imperil the interests of the Civil and Military Station. Colonel Sankey's main object of continuously supplying the High Ground and neighbourhood with water having failed, and there being no present means or likelihood of achieving that object, it would be an act of selfishness to oppose the utilization of such water as can serve the City under circumstances when

the high level sluice cannot be worked. Apart from this consideration the city has a claim by reason of the catchment area of the Dharmabudi Tank having been circumscribed by the formation of Sankey's reservoir. The distribution of the water can always be determined by the Resident and the Dewan in consultation. It was by mutual agreement that Miller's Tanks were thus replenished last autumn in a season of exceptional drought. As no difficulty was then experienced there is reason for anticipating as satisfactory results in cases of future necessity. There seems no likelihood of raising the level in Sankey's reservoir, except at inordinate expense, and with risk of taking from the supply of other tanks in the neighbourhood.

12. The importance of not allowing present sources of water supply beyond the limits of the Assigned Tract to be interfered with for purposes of irrigation or otherwise has been recognized, and assurances have been given on the part of the Durbar that it will not allow such interference and that practically now it stops such interference in all cases which are brought to its notice.

13. There has not been leisure, on the part either of myself or of the Engineer officers who have favoured me with their help and advice in the above mentioned matters of more immediate importance, to go deeply into the larger consideration of making Bangalore independent of its present system of tanks and wells. Even the preliminary enquiries involved in such schemes as that of leading water from Nundidroog and of pumping from the Caverry would necessitate the employment of specially qualified professional men at no slight expense. That the cost of either scheme would be very great is beyond doubt. Such cost could only be met by a water rate on the population which would be unobjectionable, if it did not exceed the present cost of fetching water, but which otherwise might press on a community that believes municipal taxation to be already quite high enough. Geologists have hitherto declared against the practicability of Artesian boring. It may be that this process, when more perfected, may solve the difficulty. Such a measure would be less likely to be hampered by questions of compensation; it would be without the risk of intermediate interruption which is attendant on the other two schemes, and it might be comparatively inexpensive. The deep borings which are now being made at various points on the Kolar Gold Fields may show what volume of water is to be hoped for at specified levels under known conditions of intervening rock or other material, and may yield information on other important points. Meanwhile I think that the Municipalities of Bangalore will be wise in restricting themselves, as regards improvement, to the lines which they have been pursuing of late.

MAY 12TH 1886.

C. E. R. GIRDLESTONE.

N^o 3900

Superintendent's Office
5th Circle - Madras
19 January 1885

From

The Superintending Engineer
5th Circle.
To The Chief Engineer
D. W.

Sir

Encl.
1. Copy of Report
and 102 Encl.
enclosures as
per List
attached.

I have the honor to forward
Captain Romilly's Report on
the supply of water for the Euro-
pean troops at Bangalore, as
called for in G. O. N^o 1473 D
dated the 13th June 1884.

Captain Romilly has taken
up thoroughly the investigation of
the different schemes, and gives
the cost of them in an abstract
Statement in appendix G. There
are added, at foot of the table,
the annual maintenance charges
for the three Projects A, B & C.

2. The object in view is to
have really good water
supplied

Supplied to the Barracks, and
in my opinion, this object can
only be attained by distillation.

By this process, the water ob-
-tained from any source avail-
-able, is supposed to become per-
-fectly pure: and it will be
most convenient to make use of
the Halsur tank water, with
condensers at the Rock, new
cisterns at the Rock for drink-
-ing water, to be conveyed by
new mains to the Barracks: and
with arrangements for pumping
water direct from the Dhobies
wells to the Service cisterns at
the Barracks, to be used for
other purposes than drinking.

This scheme is described in paras
23 to 35 of Captain Romilly's Re-
-port.

The first cost of providing dis-
-tilled water, Rupees 167,000, is
at good deal less than that

of

of pumping filtered water from
Agaram Tank: Rs. 290,000: but
there will be a much higher annual
expenditure, which with interest
and depreciation of stock is
estimated at Rupees 84,600.

3. The objections urged in
the Military Department, pre-
-sented in Appendix R; and con-
-sist in, condemning the use of the
water in the Halsur tank, in
deprecating the conveyance of
pollution water through the
same pipes as the drinking water,
and in shewing the danger
of depending on a single con-
-densing apparatus, with no
source to fall back upon, in
case of accident.

These objections appear to
me to be fully met, by the
proposals to have a separate
main pipe for the pure drink-
-ing water; to use the water

of

of the Halsur tank, only after condensation; and to have a double condensing apparatus, so that there will be no failure in the delivery of pure water, even if the machinery in use were to be disabled temporarily.

4. The Engine now at work at the Dhobis Wells, is an 4-horse power one, in fuel. It is in good order, and is saleable. The Rock Engine is old and liable to break down.

Hence it is desirable to get rid of the two old Engines; and to provide a pair of new Engines each of 12 horse power, to be placed at the Dhobis Wells, and to pump the water to the cisterns at the Barracks.

To obviate the risk of a failure of water in the wells, it is proposed

proposed, that there should be filter beds of sufficient capacity to allow of the tank water being filtered and pumped up to the Service Cisterns at the Barracks.

The present small pure water cistern is not large enough to allow of sufficient water being pumped up; and it is proposed to utilize this cistern as a partial filter, to let out water by gravitation to a new pure water cistern at the wells.

5. The condensing station is intended to be, upon the Halsur rock; and it is expected that the Engine House on the rock, will, with slight alterations, hold the condensing machinery - a plan of the building has in the mean time been sent to London, and the Normandy Company have been asked

asked - if there is sufficient ac-
commodation.

A Condenser producing nominally
9000 gallons, but working up to
12,000 gallons, will in 6 days provide
water sufficient for 8 days con-
sumption; and it is proposed
that there should be two complete
condensers, so as to provide against
an accident happening to one.

Captain Pomilly shews in para 31,
that it will be advantageous, not
to pump the condensed water over
a stand pipe at the rock: but
to place cisterns on the rock for the
condensed water to gravitate to
stand cocks at the Barracks.
A lower pair of cisterns, will each
hold a day's supply for the
Royal Horse Artillery, the Royal
Artillery & the Cavalry. while an
upper pair of cisterns, will have
a command sufficient to give each
a days supply to the Infantry
Barracks.

The main pipes from the ¹²⁵ Cisterns
at different levels, will be kept dis-
tinct, for the delivery of water to
the stand cocks at the Agriam,
and at the Parade Barracks.

As a further precaution for main-
-taining the purity of the water,
the Estimate provides for iron water
parts, to take the place of the
leather buckets that are now in
ordinary use for carrying water
about the Barracks.

6. The Scheme would be
more complete, if the improvements
to the Halsur tank were combined
with it, in part of the Project.
The condition of the tank would
be much improved by completely
diverting the town drainage,
filtering the Northern drainage,
and bringing in a fresh supply
of water from a better gathering
ground -

The additional cost tho' would
be

See, page 53 in para 53

New Channel masonry works	}	26,130
Compensation		
Improvements to Tank.		33,730
add for contingencies.		2,990
Total Rs.		62,850

and as the condensing system is not affected by the natural quality of the water: the improvement of the Haldur Tank will not be for the benefit of the British troops.

The advantages of a better supply of water, would be felt chiefly by the civil population of Bangalore; but I fear the Municipality would not consent to pay even a half share of the expenditure.

I have the honor to be

Yours Most Obedt Servt

Wm. B. B. R. E.

Superintending Engineer
5 Circle

From

THE SUPERINTENDING ENGINEER,
5TH. CIRCLE,

To

THE

Chief Engineer
D. P. D.



Dated 19th January 1885.
Recd.

ENCLOSURES.

N^o 173 E of Jan 23rd 1885

No. 3900.

Water Supply
for European
Troops at
Bangalore.

Forwards with
Plans & Estimates &
Capt. Romilly's Report
on — & advocating his
opinion thereon.

Ans 19/2/85

Proceedings of the Madras Government

under date the 23rd Feb 85

Read the following:—

Bangalore Water Supply

Report by Captain. J. J. Romilly M. B. N. — of
Letter from the Suptg. Engr. Circle " — 3900 of 19th Jan 85
Note by the Under Secy: M. D. " — of 19th Feb 85

Agan - dated 23rd Feb 85, N^o 173 E of Jan 23rd 1885

The above papers

will, in the first instance,
be referred to the Sanitary
Commissioner, Madras, for
an expression of his
opinions - and will then
be forwarded for the

Vide 102-17-6-85

remarks of His Excellency
the Commander-in-Chief,
who will be requested
to return them to the
Secretary to Government
P.W. Department, with a
view to examination
in detail and final
orders by Government.

B. No. 424. W. 23rd July

J-314

23.2.85

To
The Sanitary Commr. Mysore
with papers.
Mysore. Sept: 25/85

1a
2/3

No. 286
H. L.

Municipal Commissioner's office.
Civil and Military Station
Bangalore, 13th May 1885.
Despatched 15th do

To
The Assistant to the
Resident in Mysore.

Sir,
I have the honor to return the
papers and plans as per margin received

Letter No. 126 of 29 th Oct. 1884 from the Ex. Engineer on special duty.	with your letter No. 322/12, dated 8 th instant in connection
1. Memorandum by the late Captain Romilly on improvements to the water tanks of 25 th October 1884.	with late Captain Romilly's scheme for the improvement of the water tanks,
1. Plan of water tanks.	and to observe that copies thereof are available in this office.
1. Rough sketch of proposed arrangements for drawing off water from the water tanks.	

To enable me to bring the subject again
before the Municipal Commissioners
for re-consideration of their former resolution

I

I am desirous to obtain plans of the recently selected gathering grounds to the East of Ulsoor Tanks, and had applied to the Executive Engineer, Presidency Division for the same who first informed me that they were at Coimbatore and he would send for them, early on the 28th April 1883, he informed me that he was unable to obtain the plans, and suggested my applying to the Assistant to the Resident for the same with whom he states late Capt. Romilly was in communication on the subject. I have therefore to request you will be so good as to procure the same if possible, from the Chief Engineer.
Madras. D. P. H.

I have to
(signed) J. M. Smith.
President, Munt. Comm.
Cantonment, Bangalore.

Copy

P.H. Issues
Registrar.

J.D.

2/6/85

* 1 Report by Captain F. J. Romilly R.E.

2 Letter from the Deputy Engineer V. Cook No 3900 dated 19 January 1885

3 Note by Under Secretary B. Fort. P.W.D. dated 19 February 1885.

No 414

Office of Sanitary Commissioner
Madras 15 April 1885

From

Deputy Surge General G. Biddle M.B.C.S.
Sanitary Commissioner for Madras

To

The Secretary to Government
Public Works Department.

Sir

In returning the correspondence regard-
ing the Bangalore water supply, referred under
G.O No 627 of 23rd Febry 1885, I have the honor
to submit the following remarks to the Right
Honorable The Governor in Council.

2. In dealing with this question it
appears to me that in restricting enquiries to the
requirements of troops, a somewhat narrow view
has been taken of the necessities of the station.
A large civil population has been allowed to
settle down in the Centre of the Cantonment,
to out-grow the available water supply and
pollute its sources. These conditions are no doubt
greatly to be regretted, but from a sanitary point
of view they cannot be ignored. If the bazaar
population

population be constantly exposed to epidemics and other disease from insanitary conditions, all our precautions to protect the health of the troops will be rendered more or less nugatory. I would therefore suggest that steps be taken to move the Municipality of Bangalore to adopt some contemporaneous measure to secure for the inhabitants generally, independent of the troops, a sufficient supply of fairly good water. It appears to me that this might be obtained by adopting Col. Mullins' scheme with the additions proposed by Captain Romilly* for excluding the whole of the foul sewage of the town from the Halsur tank, and for bringing into it the drainage of a tract of open cultivated ground to the eastward of Bangalore. The supply thus obtained would not perhaps be unimpeachable, but it would be greatly superior to the existing one. The cost of these improvements is estimated at close on Rs. 30,000 which would not certainly be a heavy tax on a population of 81,810, and I have hopes that if the matter were placed fairly before the towns-people, they would not grudge so moderate an outlay for such an important purpose.

3. Of the schemes suggested by Col. Mullins and

* see para 37 of his report and clause 2 para 51 of Colonel Mullins' Report.

22/22 10
and worked out by Captain Romilly for securing an improved water supply for the troops, it appears to me that the proposal to use condensed water is, all things considered, the best.

4. The Ageram tank, which is mentioned as a possible source, receives the drainage of 4 villages and although the sewage of 2 of these could be diverted that of the remaining two could not be excluded. The proximity of native villages to the reservoir would also be objectionable, as it is almost impossible under such circumstances to prevent bathing, washing of clothing and cattle, and other objectionable practices. Captain Romilly puts the whole case very clearly when he says "there can be no doubt that the Ageram tank water is liable to dangerous contamination, and if adopted as the future reservoir for the troops, it is urged that the source of supply must not be accepted as, or expected to be, pure". Looking also at the chemical analyses of the water they are not, so far as such results give warning of danger, of a satisfactory nature.

5. As regards the scheme for improving the Halsur tank and utilising the existing system with certain additions and modifications, there

There can be no doubt that although calculated to effect a great improvement in the quality of the water, it is not such as can be recommended where the health of a large body of European troops is concerned, as they are much more sensitive to the effects of water of inferior quality, than natives appear to be.

b. As stated by Col. Mullins "it is nearly certain that water of perfectly satisfactory quality could be obtained at Bangalore only by distillation". It is proposed therefore to use Normandy's Condensing apparatus, and to have, in case of a break-down, two sets each capable of producing 9000 gallons in 24 hours. The water for distillation is, according to Captain Romilly's modification of the scheme, to be drawn from the Halsur tank, and supplied to the troops for drinking and cooking purposes through a distinct series of cisterns, pipes and stand-cocks at the rate of 3 gallons per head daily. Water for other purposes is to be drawn from the wells, which yield a tolerably pure supply, and distributed through a separate system of pipes. These arrangements seem to meet the wants of the case. As pointed out by his Excellency the Commander-in-Chief it is no doubt undesirable to

to have two qualities of water, the one potable and the other doubtful supplied to Barracks, but it is to be hoped that by a careful arrangement of stand-cocks and other precautions, the anticipated risks may be nullified. I have therefore no hesitation in recommending the adoption of the scheme for the supply of water by Normandy's apparatus.

I have the honor to be, Sir
Your most Obedient Servant.

Leslie
M.B.C.I.C.
Sanitary Commissioner for Madras.

P. W. Department

From By Order: 8419
By Surg General G. Bida M.C.C.E.
Sanitary Commissioner for Madras

To
The Secretary to Government
P. W. Department

Date 15 }
Despd. - } April 1885
Recd }

No 173 Encl June 2 1885
No 414

Encl 1 packet

Subject.
Submits remarks on the
Bangalore water Supply
Project.

Water Supply
Bangalore.

QUARTERMASTER-GENERAL'S OFFICE,
Ootacamund,

2 May 1885

No 97013

From

THE QUARTERMASTER-GENERAL.

To

THE Secretary to Government
Public Works Department.

SIR,

In returning the documents received with your no: 108 of 17th April 1885, on the subject of the Water supply for Bangalore, which were forwarded for the remarks of the Commander-in-Chief, I am desired to say that after full consideration of the three schemes which are adverted to in the above papers, Sir Fredrick Roberts prefers project B or that for retaining the present system, and providing for a separate service of water for drinking and culinary purposes by condensation.

2. The difficulty of inducing people

people to make invariable use of pure water when another and less wholesome supply is equally at hand, renders objectionable any system which comprises two sources, but the difficulty of securing water of sufficient quantity and of adequate purity at Bangalore is so great that His Excellency thinks it best to accept project B provided that at the same time the conservation of the Ulsoor tank will be taken in hand by Government and the catchment area increased.

3. The cost of these improvements as stated by Mr. Bidie would be about Rs 30,000, and taking into consideration the benefit that would accrue therefrom to the Civil population of Bangalore it would, in the Commander-in-Chief's opinion be reasonable to expect the Municipality

20 4/16
-cipality to bear the cost of them, or at all events of a portion of them. Should the municipality not be prepared to accept the obligation, then it is hoped that Government will bear the whole expense, for unless these improvements be carried out the water of the Ulsoor tank can never be satisfactory.

I have the honor to be

Sir,

Your obedient servant

Respectfully
Bd. Gmb.

Quartermaster General

—
—
—

1885.

No. 4117

From

THE QUARTERMASTER-GENERAL,

To

THE Secretary to Government
Public Works and

No. 970B

Dated

2nd

Recd.

8

May

No. 173 Ed/ June 2nd 1885

ENCLOSURES. 6

Returns with remarks
papers having reference to
the Bangalore Water supply
project.

To be
forwarded
to the
Secretary
to Government
Public Works and
Infrastructure
Department
Bangalore
4/5/85
W.

No. 477/236

N

15

Office of the Resident in Mysore,
Bangalore, 23rd May 1885.

From

A. H. J. Martindale, Esqre.

Assistant to the Resident
in Mysore.

To

The Secretary to the Government
of Madras, Public Works Department,

Sir,

In continuation of this office letter
No. 2456 dated 14th March 1885, I am
directed to forward copy of letter No. and
date as per margin from the President,
Municipal Commission, Civil and
Military Station of Bangalore, asking
to be furnished with the plans of the
recently selected gathering grounds
in connection with the late Captain
Romilly's scheme for the improvement
of the Ulsoor Tank.

2. I am to request that the plans in
question may be forwarded to this Office
if they are available.

I have the honor to be,
Sir,

Your most obedient servant,

A. Martindale

Assistant to the Resident

No. 286 dated 13th May 1885

No. 4117 with
J. S. 26-5-85

Recd 4671

HP

(19)

Recd 26/5/85

HP

Recd

22/5/85

No 173 of June 2nd 1885

Recd 26/5/85

HP

No 173 of June 2nd 1885 J. W. Dept

To,

116

The Resident in
Mysore.

Sir,

With reference to your letter
No 477 of 23rd ^{ultimo} instant, I have the
honour to forward, for communication
to the President of the Bangalore
Municipality, the plans prepared
by Capt. Routly for adding
to the gathering grounds of the
Halsur Tank and improving
the quality of its supply.

At the same time, I am
directed to forward copies of
letters from the Quartermaster
General and the Sanitary
Commissioner for Madras, in
which are recorded the opinions

Plans will be sent
from Madras office

of H.E. the Commander in Chief
and of the Sanitary Commissioner
on the alternative schemes for
improving the water supply to
the British troops at Bangalore.

You will observe therefrom
that, whilst supporting the
project for the distillation of
the drinking water to be
drawn, as at present, from the
Aalur Tank for the use of
the garrison, both the military
and sanitary authorities strongly
advocate the contemporaneous
adoption of the measures proposed
in Capt. Romilly's Project C-
for adding to the supply
available for the civil population
of the cantonment, excluding
local sewage from the Tank,
and improving its conservancy.

27
h 17
The estimates for these
improvements amount to Rs. 59,860
(not to Rs. 30,000 only as stated
by Dr. Bidie), and I am
to inquire whether, in view of
the decided benefits that will
be conferred thereby on the
general public of Bangalore,
the Municipality are prepared
to contribute towards the cost
of same, and if so, to what
extent.

W.
1.6.85

Sept 2/6.

Plans D and T
and abstract
despatched from
Madras on the
5th June 1865.
Wido Slip attached.

N^o 11473 Wd/13.6.84.
N^o 11474 Wd/15.7.84.
N^o 11475 Wd/13.2.85.

N^o 173 E d/ June 2nd 1885

N^o 2172 Rec: 7. 3 18

Office of the Resident in Mysore.

Dated Bangalore. 6th November 1885.

From.

Major J. B. Newell.

Assistant to the Resident
in Mysore.

To.

Colonel Shaw Stewart, R.E.

Secretary to the Govt. of Madras
Public Works Department.

Sir,

With reference to correspondence ending
with your N^o 173 E. dated June 2nd, 1885,

1. Note dated 6th July 1885 on the Alwar Tanks by Captain C. H. M. Remington. R.E.
2. Letter N^o 943, dated 15th July 1885 to the President, Municipal Commⁿ. & in station.
3. - do - N^o 838 dated 27th July 1885 from - do -
4. - do - N^o 1173, dated 3rd August 1885 to - do -
5. D.O. Letter dated 27th August 1885 from Mr. Mac Laughlin.
6. Letter N^o 1468-70, dated 3rd September 1885 to the President, Municipal Commission.
7. Notification by the Resident, No. 12, dated 11th Sept 1885.
8. Letter N^o 1173, dated 25th September 1885 from the President, Municipal Commⁿ with enclosures.

* plan will follow

I have the honour, under
instructions from the offi-
ciating Resident, to for-
ward a copy of further
papers, as noted on the
margin, relative to
adding to the gathering
grounds of the Alwar tanks and to improving
the quality of the water supply.

2. The Municipal Commissioners having agreed to deepening the Lower Tank, and raising the waste weir at a cost of Rs 10,000— and to the purchase of the Jevanbully Tanks, the work of excavation was begun early in August and was actively carried on till the heavy fall of rain in the latter part of September stopped it. In all some 34,000 Cubic yards of earth have, at a cost of Rs 5,546-11-4, been removed from the bed of the Lower Tank to form an island and an embankment on the eastern side, which are now being laid out as ornamental grounds: 1450 lineal yards of hedge have been planted: 8000 square yards of embankment have been sectioned and turfed. 2 Culverts have been lengthened and some minor works have been completed. The constant rain of the last six weeks has so raised the level of the water in the Lower Tanks that it is impossible at present to undertake work on the weir. The necessary notification has been given for acquiring the Jevanbully Tanks. This, when it comes into the possession of the Municipality, will constitute

3) 119
a valuable reservoir. The result of what has been done is to lessen, in the Lower Tanks, the area exposed to evaporation, and to increase the Capacity. As the level in the Lower Tanks sinks, the Upper Tanks will be drawn upon to supply what is wanting and so long as the water in the Jevanbully Tanks admits of so doing the Upper Tanks will be similarly replenished from it.

3. With his letter N^o 3150, dated September 22nd which forms an enclosure to N^o 1173, dated September 25th, 1885 from the President of the Civil and Military Station to my address, Colonel Burton, the Executive Engineer of the Presidency Division, who is also a Municipal Commissioner for Bangalore and who has taken a great interest in the work of improving the Lower Tanks, has forwarded Estimates involving a total expenditure of Rs 21,500. of this sum Rs 5,546-11-4 had, as shown above, been spent up to the date of his letter from Municipal Funds. In his letter N^o 888 dated July 27th, 1885, to my address, the President of the Civil and

Civil and Military

Military station has communicated the expectation of the Municipal Commissioners that the Madras Government will bear its share in the undertaking. As the Commissioners have contributed so generously, I trust that their action may now be liberally supported by His Excellency the Governor in Council, and I would express the hope that a similar sum of Rs. 10,000/- may be put at our disposal to help in the completion of the works. Independently of that amount already subscribed by the Commissioners there will devolve on them the further cost of compensation for the Jevanbally Tanks and for raising the waste weir of the Lower Ulsur Tanks. Hence the necessity for a large measure of assistance from outside.

4. The most important feature of Captain Romilly's scheme for improving the quality of the water in the Ulsur Tanks was to abandon the present Catchment area on the west, which is mainly covered by the Cantonment bazaar, and to substitute as the gathering ground a tract of high and sloping land to

to the East which belongs almost, if not entirely, to the Mysore Government. Mr. Girdlestone visited this locality some weeks ago, in company with Colonel Le Messurier, Colonel Burton, R.E., Major Bower, R.E., Mr. McLaughlin, C.E., and Major Maltby. The last named officer is the President of the ^{Municipal Commission} Civil and Military station of Bangalore. The general opinion was that the proposed area for catchment is larger, and that its soil is more holding in its nature than are the area and the soil of the Reservoir constructed by Colonel Lankey on the Chinkur Road for the use of Bangalore: that for the Cantour channels sharper gradients than those recommended by Captain Romilly are desirable, so as to ensure the prompt and efficient passage into the Ulsur Tanks of even slight rainfall: that if the land were taken up its cleanliness would have to be secured, as in the case of the English War officers' Fortification Act, by reserving to the Municipal Commissioners the right of clearing trees, of preventing the
erection

erection of new buildings or a change in existing levels, and of forbidding the construction of unauthorized water channels. Conservancy powers would also have to be obtained over villages now in the area. ^{At present there is sewage farming on fields within the area.} Were this practice deemed prejudicial (there was a difference of opinion on this subject amongst those who accompanied Mr. Girdlestone to the spot) the Municipality's sale of sewage to this tract would need to be discontinued and disallowed.

5. There does not seem to the officiating Resident any likelihood that the Municipal Commissioners would contribute towards the cost of the proposed new Catchment area; and in the event of opposition, Mr. Girdlestone would not under existing circumstances feel justified in using his influence to overcome their objections. As at present advised, he himself is not prepared to acquiesce in the belief that the proposed scheme would result in water for the garrison much more pure than that now

37 p 21
now supplied. The Municipal Commissioners entertain grave doubts as to the value of contour channels for supplying reservoirs; and at any rate they have for the moment before their eyes the failure of Colonel Sauter's scheme on the Puntkur Road, which depended to a large extent on this source of supply. They also urge that the water supply, as it now exists, is acceptable to the townspeople and not unhealthy in its effects; and consequently that as their first care should be for the townspeople they would not be justified in sharing an expenditure, the necessity of which has not been proved to their satisfaction. From this it follows that if the Madras Government still regards this part of Captain Romilly's proposals as imperative it will rest with itself to provide ^{the} funds required for its accomplishment. It seems desirable that if the scheme is undertaken the supply from the Western side should not be cut off till the success of the new undertaking has been fully established.

6. I am to take this opportunity of intimating that much attention has been paid of late to the question of purifying and maintaining pure in its passage to the Ulsoor Tanks the water which runs thither from the Western side. Within the gathering ground on the west, there is much cultivated land. This it is practically impossible, owing to the prohibitive cost of compensation, to throw out of cultivation. But scavenging is systematically carried out, and patrolling frequent in all places of public resort. It having been found that on the occasion of heavy rain in the Cantonment Bazaar the main drain overflowed into the main sewer, the dividing wall between them has been raised so as to prevent this evil. The nuisance caused by the pollution of ground in and about the tanneries and potteries has been stopped. New sites, beyond the limits of the Catchment area, for small-pox and cholera camps are being sought. The question of allowing the Hindu burial ground

to

3) 1022
to be still used has been referred for the opinions of the officer commanding the Division and of the chief medical authorities in Bangalore. If their opinions are unfavourable, the officiating Resident will use his influence to put an end to such use. For the protection of the Ulsoor Tanks eight watchmen have been appointed at a cost to the Municipality of Rs. 56/- a month. Should there be any other practical safeguards which the Madras Government may wish to suggest in the interests of the troops, Mr. Girdlestone will gladly, on receiving details from you, give consideration to them.

I have the honour to be
Sir,

Your most obedient servant,

J. H. Reilly

Assistant to the Resident.

JH

9709



Recd 9/11/85.
2 18 (3/4 hrs)

Recd 6/1/86 R 7 1.86
Circ 15.12.85 R 2/1/86

N^o 2293/70.

Office of the Resident in Mysore
Dated Bangalore 17th November 1885.

From.

Major J. H. Newill
Assistant to the Resident
in Mysore.

To.

The Secretary to the,
Government of Madras
Public Works Department.

Sir,

I am directed by the Officiating
Resident to acknowledge the receipt
of your letter No: 2512 D. dated 5th Instant
to his address and to refer you to letter
No: 2172 dated 6th Idem from this Office.

I have the honour to be,

Sir,

Your most obedient servant,

J. H. Newill

Assistant to the Resident.

9709
1
C. H. W.
12/11
The Gathering grounds
of the Mysore Palace.

Sir

Recd. 6/1/86.

supply for the troops and civil population of Bangalore is to adopt the proposals made by the late Capt. Romilly as set forth in his Project B, with the addition of the first seven of the estimates which compose Project C.

2 The cost of Project B is estimated at Rs 1,67,000; and that portion of Project C, that it is proposed to carry out, at Rs 59,860; or a total expenditure of Rs 2,26,860.

8 p 26
In this connection, I am to say that the Government of Madras note that the Municipal Commissioners of Bangalore are unwilling to contribute any sum towards the cost of taking up a new catchment area to the east of the Halsur tank - But it is hoped that they will raise no objection to this much needed improvement being carried out by Government. The two items to which the consent of the

Municipal Commission
is requisite are,

(1) Diversion of the
town drainage and
(2) New supply channel
and compensation, and
I am to solicit that
the matter may be
laid before the
Municipal Commissioners
as early as practicable,
and that you will
move the Commissioners
to accord their consent
to the scheme.

3 In view of the
heavy expenditure that
will be incurred should

it be finally decided to
carry out the works
above mentioned, the
Government of Madras
regret that they are
unable to contribute
towards the estimate of
Rs 21,500 for work in
connection with the
Tank which the
Municipal Commissioners
have taken in hand,
but the Government
will be prepared to
pay a moiety of the
sum expended by the
Commission on works
which will render any

of the items from 1 to 7
of Project C. unnecessary

4 Adverting to the
concluding portion of
para 5 of your letter
under reply, I am
authorised to give you
the assurance that the
Halsew Tank supply
from the western side
shall not be cut off
until the success of
the new gathering is
ground to the east
shall have been
fully established.

Q 28
5 The enclosures
received with your
letter are herewith
returned, and in con-
-clusion I am directed
to solicit that the early
consent of the Government
of Mysore and of the
Municipal Commissioners
to the scheme for taking
up a new catchment area
to the east of the ^{Halsew} Tank
may be obtained and
communicated, in view
to the proposal being
submitted for the
final sanction of the

Government of India.

Li
7/1/86

W
7.1.86

Despatch
9/1/86

Printed
With One Report
regarding the Water
Supply for European
Troops at Bangalore

N^o 68 Wd of Jan 8. 1886

Enc
11/1
2/3
7.1.86

No. 1022 En. 2
705

FROM

MAJOR E. A. FRASER,

ASSISTANT TO THE RESIDENT IN MYSORE.

TO

The Secretary to the Government
of Madras, Public Works Department

Dated, Bangalore, 15th April 1886.

SIR,

With reference to letter, no:
829C dated 1st March 1886, from your
Office, requesting an early reply to
letter, no: 68 W. of the 8th January 1886,
regarding the proposed improvements
to the Bangalore Water Supply, I am

* Letter no: 2194 dated 9th March
1886, from the President, Munici-
pal Commission & in station
of Bangalore.
Letter no: 902 dated 7th April
1886, to the Chief Secretary to
the Dewan of Mysore.

directed to forward for
information a copy of
the correspondence noted
on the margin which has
passed on the subject.

I have the honour to be,
Sir,

Your most obedient servant,
E. A. Fraser
Assistant to the Resident.

no 1736. 2-6-85
B. 684. 8-1-86
no 879 C. 1-3-86
830

July 1968
105/80

16/4/86
21

1807 C of 14-5-86

17/4/86
19.4.86

1205/86

048. 55/5

Resubmitted to B. 6. 5-86
C. 17. 4-86

43
No. 2194.

Office of the Municipal Commission
Civil and Military Station,
Bangalore 9th March 1886

From,
The President,
Municipal Commission
Civil and Military Station
Bangalore.

To,
The Assistant to the
Resident in Mysore,
Bangalore.

Sir,
I have the honour to acknow-
ledge the receipt of your letter no. 396-70
dated 23rd ultimo forwarding copies
of letter no. 2172-70 dated 6th November
1885, from the Assistant to the Resident,
to the Secretary to the Government of
Madras P. W. D and letter no. 68 W
dated 8th January 1886 to the Resident
in Mysore.

In reply I have to state
that as the Government of Madras is
willing to bear all the expense of
bringing

of bringing water into the Ulsoor Tank
by a new Channel on the East, and
as that Government gives an assurance
that the Bazaar drainage which
now enters the Tank from the West
"shall not be cut off until the success
of the new gathering ground to the
East shall have been fully esta-
blished," the Municipal Commissioners
now raise no objection to the proposed
improvement to the Ulsoor Tank.

The Commissioners were afraid
that the present supply (which, in-
different as it is still better than none)
would be cut off before it was proved
that water could be brought in in
sufficient quantity from the East.

Having now the assurance of
the Madras Government that such
shall not be done, they will be very
glad to see the work put in hand.

I have &c
(Signed) E. P. Maltby
President Municipal
Commission, Civil and
Military Station

N^o

N^o 902
700

48

32

Office of the Resident in Mysore.
Bangalore 7th April 1886.

To,

The Chief Secretary to the
Deewan of Mysore.

Sir,

I am directed to forward
a copy of the correspondence noted on

* 2172 dated 6th November 1885
70
to the Secretary to the Govt of
Madras, P.W.D with enclosures
(to be returned)
No. 68 to dated 2nd Jan'y 1886.
from to to

N^o 2194 dated 9th March 1886
from the President M.C. Com.
Civil and Mil'y Station Bangalore.

the margin regarding
improvements to the
Ulsoor Tank, and to
express the hope of the
Officiating Resident that
the Government of His
Highness the Maharaja
will give the subject its

most careful consideration and favour
him with an early reply.

I have &c
Signed J. H. Hewitt
Asst. to the Resident.

"Copies"

A. Clarke.
Registrar.

cm

4)
h 33
No. $\frac{1430}{705}$

FROM

MAJOR E. A. FRASER,

ASSISTANT TO THE RESIDENT IN MYSORE.

TO

The Secy. to the Government of Madras,
Public Works Department.

Dated, Bangalore, 22nd May 1886.

SIR,

In continuation of letter No. $\frac{1022}{705}$
dated 15th April 1886, from this Office, regarding
the proposed improvements to the Ursur Tank,
I am directed to forward a copy of letter
No. $\frac{1157}{60}$ dated 28th idem from the Chief Secretary
to the Dewan of Mysore stating that every
facility will be afforded by His Highness's
Government in the matter of acquiring land
for a new catchment area to the east of
the Tank.

2

I am to request that you will favour
the Offg. Resident with an expression of your
opinion on the considerations urged by the
Durbar in paragraph 3 of its letter above
quoted, with regard to certain rights pro-
posed to be reserved to the Municipal Commissioners
of

of the Civil and Military Station for the purpose of securing the cleanliness of the Water Tank.

I have the honour to be,

Sir,

Your most obedient servant,

J. A. Fraser

Asst. to the Resident.

M. L.

No 1807 C. 14.5.88

" 173 B. 2.6.88

" 829 C. 1-3.86
830 C.

27
P.M. 39/2
7024/88
1000

157

Rev 25/5/86

Encl

Pub 1206/86
3

Aug 11/9/5.

C. 2678/86 231-588

No 1159
60

Office of the Dewan of Mysore
Dated Ootacamund 28th April/86.

To

The Assistant to the Resident
in Mysore.

Sir,

I am directed to acknowledge the receipt of your letter No. 902 of the 7th Instant on the subject of the Ulsoor Tank improvement, and inviting the consideration of His Highness the Maharaja's Government thereto.

2 It would appear from the correspondence, that the Government of Mysore has no direct concern with the project under reference, beyond that connected with the acquisition by the British Government of the land to be taken up for the proposed channel to the east of the Ulsoor Tank, which channel will, for the greater part of its course, run through the territory of His Highness and in regard to this, I am desired by the Dewan to say that every facility will be afforded by His Highness' Government for the transfer of the land on reasonable terms.

3.

I am to invite attention however,
to

to para 4 of your letter No. 2172 of 6th November 85
to the Secretary to the Government of Madras,
Public Works Department, where it is proposed
to reserve to the Cantonment Municipal
Commissioners, the rights of deciding trees
over the catchment area drained by the
channel, of preventing the erection of new
buildings or "a change of existing levels"
and of forbidding the construction of un-
authorized water channels. Further, con-
servancy powers over the villages in this
area are to be vested in the Commissioners
and apparently, the manuring of fields is
to be prohibited. This proposal involving, as
it does, the abrogation of immemorial
occupancy rights may, the Dewan apprehends,
complicate the question considerably; and I
am to request the favour of a reconsideration
of the necessity for conferring on the Canton-
ment Municipality, powers to this extent
over lands outside their jurisdiction. His
Highness' Government fully recognizes the
desirability of improving the water supply
of the Bangalore Cantonment; and will
gladly facilitate the furtherance of any
scheme.

88 7/11/85
scheme to that effect, but they desire to point
out that interference with the rights of land
holders outside the Municipal limits should
if possible, be avoided. Extensive powers,
such as those indicated above, would probably
necessitate the throwing out of cultivation of
a large area of land, and the payment of
compensation far in excess of what was
contemplated by the projectors of this contour
channel.

I have &c
(sd) R. Vijayendra Rao
Chief Secretary

"Copy"

By Order
Registrar.

1885

87
1437
No. $\frac{1418}{3495}$

FROM

MAJOR E. A. FRASER,

ASSISTANT TO THE RESIDENT IN MYSORE.

TO

The Secretary to the Government
of Madras. P. W. Department.

Dated, Bangalore, 21st May 1886.

SIR,

I am directed to forward
for your information a copy of
the Offg. Resident's Minute on
the water supply of Bangalore.

I have the honour to be,

Sir,

Your most obedient Servt.,

E. A. Fraser

Assistant to the Resident.

W. A.

MINUTE, BY THE OFFICIATING RESIDENT, ON THE WATER
SUPPLY OF BANGALORE.

The object of various measures to which the attention of this Residency has been given during the past fourteen months has been to increase the water supply of Bangalore and to improve the quality of the water.

2. To this end the bed of the Shoolay Tank was deepened and the weir and the embankment which surrounds it were raised in the spring of 1885, the result being that an additional depth of two and a half feet was secured over the whole reservoir. The cost of the work was Rs. 7,200. There still remains the work of enlarging the catchment area of this Tank and that at Hakitimanhalli, where more water is much required. The outlay on this account is estimated at Rs. 4,000, of which Rs. 1,000 have been entered in the present year's budget, and will be sanctioned, for a feeder on the side of Trinity Church.

3. During August and September 1885 about 35,000 cubic yards of earth were dug out from the bed of the Lower Ulsur Tank, on the northern and eastern sides, at a cost of about Rs. 5,600, and were formed into an island and an embankment on the eastern side, which are being laid out as ornamental grounds. In the conduct of all this work the help received from Colonel Burton, R. N., was very valuable. The total sum voted by the Municipality of the Civil and Military Station for the improvement of this Tank is Rs. 10,000. Since the end of last September the progress of excavation, and the raising of the waste weir, which was a part of the general scheme, have been stopped, owing to the high level of water in the reservoir caused by the autumnal rain. It is very desirable that both works should be taken in hand again whenever circumstances admit. Here as elsewhere it is of great importance to increase the capacity of the reservoir. For want of a higher waste weir much water ran off and was lost last October.

4. In connection with this particular supply, the Municipal Commissioners have exercised a wise forethought in acquiring the Jeevanhalli Tank. The cost of this has amounted to Rs. 6,675. The Tank will serve as a valuable feeder to the Upper Ulsur Tank.

5. The result of what has been done at Ulsur is to lessen in the Lower Tank the area exposed to evaporation, and to increase the capacity. As the level in the Lower Tank sinks, the Upper Tank is drawn upon at once to supply the deficiency, and so long as there is water in the Jeevanhalli Tank, the Upper Tank will similarly be replenished from it. The chief loss of water, in an extensive but comparatively shallow reservoir, such as the Lower Ulsur Tank, is due to evaporation, not to consumption. The device of preventing evaporation by means of aquatic foliage has not proved satisfactory in India. Hence the necessity for meeting the difficulty by restriction of area and corresponding excavation.

6. The Madras Government has a separate project under consideration, whereby, at a cost of about 2½ lacs of rupees, it would fill the Lower Ulsur Tank entirely from a new catchment area on the east side of the Tank. The undertaking is prompted by the wish to afford the European soldiers, who are entirely dependent on the Ulsur reservoir, purer water than it is believed can, with the best conditions, be secured under the present system. As the Madras Government is ready to bear all the expense, and as it has given an assurance that the rain drainage from the cantonment bazaar &c., which now enters the Tank from the west, shall not be cut off till the success of the new gathering ground to the east shall have been fully established, the Municipal Commissioners of the Civil and Military Station have raised no objection to the proposal. They are averse to sharing the cost, not only because it would be difficult to find the necessary funds, but also because they do not feel justified in making such a marked change, so long as the water supply, as at present it exists, is acceptable to the townspeople and not unhealthy in its effects. The scheme is now before the Mysore Government, whose consent has been sought to the alienation of the land involved by it.

7. Much has been done of late to purify, and to maintain pure in its passage to the Ulsur Tanks, the water which runs thither from the western side. Within the

gathering ground there is much cultivated land. This it is practically impossible, owing to the prohibitive cost of compensation, to throw out of cultivation. But scavenging is systematically carried out, and patrolling frequent in all places of public resort. For the protection of the Tanks eight watchmen have been appointed at a cost to the Municipality of Rs. 56 a month. It having been found that on the occasion of heavy rain in the Cantonment bazaar the main drain overflowed into the main sewer, the dividing wall between them has been raised, so as to prevent this evil, and has satisfactorily withstood the test of the late sharp storms. The nuisance caused by the pollution of ground in and about the tanneries and potteries has been much diminished. New sites, beyond the limits of the catchment area, have been chosen for small pox and cholera camps, with special regard to the accommodation of the homeless poor in time of scarcity or famine; for experience has proved that the inhabitants of the town are best treated for infectious and contagious diseases in their own houses. A new site has also been chosen for the Hindu Burial Ground, which it is hoped that the Durbar will concede. In such case the present one will be closed with as little delay as possible.

8. The supply of water to Miller's Tanks, which is the third of the three great systems on which the Civil and Military Station depends, has been facilitated by the construction of a diversion sluice in Cunningham Road to serve Tank No. 3. The channel with which such diversion is connected is one of the principal feeders of the Sampangi Tank, which lies for the most part outside the limits of the Assigned Tract. Consequently, as the Durbar has a direct interest in the matter, it has been suggested that it should be left to the Public Works Department Secretary of the Mysore Government and to the President of the Civil and Military Station to agree when the diversion sluice should be used, and that in case of difference the Resident should settle the question. This arrangement I hope that the Durbar will acquiesce in.

9. Advantage would be gained, I believe, by deepening all three Miller's Tanks provided that the lower soil is tenacious enough to hold water, and provided there is no risk of setting free malarious influences if the present bottom be disturbed. Such has not been the result of the excavations at Shoolay and Ulsur. I also think favourably of a scheme advocated by Mr. J. W. Hayes, Municipal Commissioner, for the construction of another Reservoir below, but in close vicinity to the Shoolay Tank. The configuration of the ground is such that the undertaking is not likely to be very expensive. Mr. Hayes puts the cost at Rs. 15,000, irrespective of compensation for house property. Population in this neighbourhood is numerous and apparently on the increase. Hence the desirability of intercepting and holding water which, as actually happened last year, may otherwise run to waste. In the present year I am afraid there is no prospect of funds being available for this work. I am also strongly impressed with the necessity of taking water nearer to the houses of the inhabitants as soon as money can be spared. At present the distance to which poor persons have to go for water, specially those who live in the Cantonment Bazaar, is considerable. This improvement may perhaps be best effected by pumping from existing reservoirs through pipes into cisterns or open basins at convenient centres. In connection with it the establishment of drinking fountains and drinking troughs at places of general resort seems desirable.

10. Not long ago it was represented to me that the water level in the wells of the Civil and Military Station has been steadily getting lower for some years past. The fall has been variously attributed to the increased growth of casuarinas, which have a great tendency to absorb moisture, to a diminution in the rain fall, and to other climatic influences. The subject is, I think, worthy of investigation. At present the information at disposal is too limited to warrant the assumption that the water level in general has sunk. Till this fact has been established it is premature to speculate on the causes which may be at work.

11. The construction of the low level sluice from Sankey's reservoir for the benefit of the City of Bangalore does not in my opinion imperil the interests of the Civil and Military Station. Colonel Sankey's main object of continuously supplying the High Ground and neighbourhood with water having failed, and there being no present means or likelihood of achieving that object, it would be an act of selfishness to oppose the utilization of such water as can serve the City under circumstances when

the high level sluice cannot be worked. Apart from this consideration the city has a claim by reason of the catchment area of the Dharmabudi Tank having been circumscribed by the formation of Sankey's reservoir. The distribution of the water can always be determined by the Resident and the Dewan in consultation. It was by mutual agreement that Miller's Tanks were thus replenished last autumn in a season of exceptional drought. As no difficulty was then experienced there is reason for anticipating as satisfactory results in cases of future necessity. There seems no likelihood of raising the level in Sankey's reservoir, except at inordinate expense, and with risk of taking from the supply of other tanks in the neighbourhood.

12. The importance of not allowing present sources of water supply beyond the limits of the Assigned Tract to be interfered with for purposes of irrigation or otherwise has been recognized, and assurances have been given on the part of the Durbar that it will not allow such interference and that practically now it stops such interference in all cases which are brought to its notice.

13. There has not been leisure, on the part either of myself or of the Engineer officers who have favoured me with their help and advice in the above mentioned matters of more immediate importance, to go deeply into the larger consideration of making Bangalore independent of its present system of tanks and wells. Even the preliminary enquiries involved in such schemes as that of leading water from Nundidroog and of pumping from the Caverry would necessitate the employment of specially qualified professional men at no slight expense. That the cost of either scheme would be very great is beyond doubt. Such cost could only be met by a water rate on the population which would be unobjectionable, if it did not exceed the present cost of fetching water, but which otherwise might press on a community that believes municipal taxation to be already quite high enough. Geologists have hitherto declared against the practicability of Artesian boring. It may be that this process, when more perfected, may solve the difficulty. Such a measure would be less likely to be hampered by questions of compensation; it would be without the risk of intermediate interruption which is attendant on the other two schemes, and it might be comparatively inexpensive. The deep borings which are now being made at various points on the Kolar Gold Fields may show what volume of water is to be hoped for at specified levels under known conditions of intervening rock or other material, and may yield information on other important points. Meanwhile I think that the Municipalities of Bangalore will be wise in restricting themselves, as regards improvement, to the lines which they have been pursuing of late.

MAY 12TH 1886.

C. E. R. GIRDLESTONE.

In February 1885 the three Projects prepared by the late Captain Rumbly A. for improving the water supply of Bangalore were referred to the Sanitary Commissioners for an expression of his opinion, and in his CP 414 of 15 April 1885, Dr. Bidie approved project B, which provided for drawing the supply from Uluru Tank and distilling the water by means of condensing engines. H. E. the Commander in Chief also expressed his preference for project B, provided that "at the same time the conservation of the Uluru tank will be taken in hand by Govt. and the catchment area increased."

In order to carry out the foregoing provisions it was found necessary to adopt the first seven items of project C in addition to project B; and the Resident in Mysore was informed in Jan'y. 1886 that the Govt. of Madras were convinced that that was the most appropriate method of securing a pure water supply for Bangalore.

Of the first seven items of project C, two required the previous assent of the Govt. of Mysore, which was accordingly solicited.

The items were
 (1) Diversion of the town drainage,
 (2) New supply channel and compensation.

done

With regard to it was proposed
to divert the lower drainage
from the west of the Ulwar tank,
and to draw the supply in the
future from a new catchment
area to the east of the tank.

The area of the proposed new
catchment basin was 2.6 square
miles or 1656 acres; and the
compensation provided for
in the estimate was Rs. 2680 for
the contour channel and Rs. 2680
for 52 acres of land thrown
out of cultivation under the
Madras irrigation tank.

In requesting the approval
of the Bangalore Municipal
Commissioners and the Govt.
of Mysore to the two items above
referred to, the Govt. of Madras
gave the assurance that the
supply from the catchment
on the west should not be cut
off until the success of the new
gathering ground to the east
had been fully established,
and on this assurance and on
the understanding that the
British Govt. paid all expenses,
the Municipal Commissioners
in March last stated that
they had no objection to the
proposed improvements.

In a communication
of 29 April 1896 to the Resident
in Mysore, the Govt. of Mysore
stated that every facility will
be afforded for the transfer
on reasonable terms of the
land required for the new
catchment area, but invited
attention to a letter from the
Resident of 6 November last
in which it was stated
that in the event of the new
catchment

Smith's information regarding
the items referred to will be
found in paras 41-43 of
Captain Romilly's report,
copy of which is attached.

catchment area being taken
up, its cleanliness would have
to be secured as in the case
of the English War Office's
fortification Act by reserving
to the Municipal Commissioners
the right of clearing trees, of
preventing the erection of new
buildings or a change in ex-
isting walls and of forbidding
the construction of unauthor-
ised water channels. The
Resident was further ^{expressed his} of
opinion that conservation of
powers would have to be
obtained over villages situated
within the catchment area,
and that, if it ^{were} deemed
prejudicial, sewage forcing
on fields within the area
should be stopped.

^{and} represent The Mysore Govt. say
that the prohibition of
mowing of fields would
involve the abrogation of im-
memorial occupancies rights,
and might, it is feared, com-
plicate the whole question
considerably. - i -

^{and} ~~But the same~~ ^{they} request that the ne-
cessity for conferring on the
Cantonsment Municipality,
powers to the extent indicated
above over lands outside
their jurisdiction may
be reconsidered. - i -

^{and add that, while} ~~But the same~~ ^{that} the Mysore
Govt. will gladly facilitate
any scheme for improving
the water supply of Bangalore,
but

51
~~but it must be pointed out~~
~~that that interference with~~
the rights of land holders -
outside the municipal limits
should, if possible, be avoided.
Extensive powers such as
those indicated above would
probably necessitate the
throwing out of cultivation
of a large area of land
and the payment of com-
pensation far in excess of
what was originally con-
templated.

The question now to be decided
is whether the proposed new gathering
ground, lying to the east of the
Halsor tank, may be added to
the drainage area of the tank,
without taking any special
precautions for securing its
thorough conservation. The
only alternative appears to be
to acquire possession of the land
which forms the proposed new
gathering ground, and to throw
it permanently out of cultivation;
- but it is to be observed that
this alternative course would
involve a very heavy additional
expenditure.

W
345.86

21/5/86

684 P. 1. 86.
1778. 24. 5. 86.
029. 30 C. 1. 3. 86.
1007 C. 14. 5. 86.
173 E. 2. 6. 85

B. No. 1386 W. d/ 1st June 1886

No. 1386 W.

PUBLIC WORKS DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

1st June 1886
Read the following

as to the
from the Resident in Mysore. A. L. No. $\frac{1028}{705}$ of 15 April 1886.

from ——— do ——— A. L. No. $\frac{1030}{705}$ of 22 May 1886.

Enclosed for the Resident in Mysore. A. L. No. 1386 W. d/ 1st June 1886.

These papers,
with the note thereon
which has been drawn
up in this Department,
will, in the first instance
be referred to Mr. J. B. Bidie,
who, with advantage,
in his letter of 15 April 1886,
No. 414 (written as Secretary
Commissioner) will be
requested to favor the Govt.
with his opinion on the
point which has lately
been raised.

The papers will then
be forwarded to the Quarter
Master General, who will
be requested to obtain
the opinion of A. L. the
Commander-in-Chief,
and

* vide his No. 970 B of
2 May 1885.

and to return the papers
to the Secy. to Govt in the
P.W. Department.

91/5/86

31.5.86

B. No. 1386 W. d/1 25 June 1886

1/6/86

To the Surgeon General &
with the Govt of Madras.
(Thos the Public Deptt)
with copy of Capt. Bouillet's report
the Military Department.
Reference - vide this Office
no 830 C d/1 1 March 1886.
Desks
1/6/86

OFFICE OF SURGEON-GENERAL
WITH THE GOVERNMENT OF MADRAS,

Fort St. George, 23 June 1886.

No. 919
From G. Bidie Esqre M.D., C.I.E.,
ag
THE SURGEON-GENERAL WITH THE

GOVERNMENT OF MADRAS,

Fort St. George,

To THE Chief Secretary
to Government
Public Department.

Sir,

In returning the papers referred to me under
G.O. N. 924 C of 8 June 1886, I have the honor to
submit the following remarks on certain points
connected with the proposals for the improvement
of the water supply of Bangalore.

2. The Chief point on which my opinion is
invited is, "whether the proposed new gathering
ground lying to the east of the Ulsur tank,
may be added to the drainage area of the
tank, without taking any special precautions
for securing its thorough conservancy."

3. From a sanitary point of view it is
no doubt desirable that the gathering ground
should be thoroughly conserved, but as that
end could only be attained by throwing the
whole of the land out of cultivation, I am not
prepared to advocate such a measure, inasmuch
as the water prior to delivery to the troops is to be
purified by storage in a reservoir and
distillation.

4 I have not inspected the proposed new gathering ground which is said to embrace an area of 2.4 square miles, but from Col Mullin's report (para 34) learn that the soil is of a "light sandy character," for the most part under dry cultivation, and extensively manured with more or less filthy material collected from the barracks, the station and the bazaars. Such land will undoubtedly contaminate the surface wash more or less, the amount of impurity depending to a considerable extent on the weight of the showers and the season at which they fall. A heavy shower occurring shortly after tillage and the application of manure, would carry off a considerable amount of organic matter, but on the crops attaining some size, the surface water would be comparatively clean, as growing vegetation rapidly disposes of nitrogenous matter in the soil, and any of it on the surface not got rid of in this way, would speedily be converted into nitrates (inorganic matter).

5/ As a precautionary measure, however, I would suggest that arrangements be made for the exclusion from the tanks of foul water resulting from heavy showers falling immediately after the manuring of the gathering grounds.

5 h. 6.9
6 If this be done the only other precautions that seem necessary are:

- a The prohibition of any extension of the present cultivated land within the gathering grounds:
- b The institution of some arrangement with the Mysore Government for the surface conveyance of the villages that exist on the protected area, and for the prevention of the erection of any more buildings except in substitution of those already existing:
- c That offensive trades - such as tanning - be forbidden on the gathering ground.

7. As already stated, I make these suggestions clearly on the understanding, that the water is to be purified prior to use by a Normandy's condensing apparatus; and have only to add, that the supply obtained from the proposed new gathering ground ought to be much purer than that now deposited in the Uluru tank from the densely populated and filthy town of Bangalore.

I have the honor to be
Sir,

Your most obedient servant

L. S. S.

Acting Surgeon General
with the Government of Madras.

Ootacamund, June 30. 1886.

N^o 318 D.

Forwarded with advisement
to G.O. N^o 1386 W dated 1st June 1886
to the Quarter Master General, for
favour of His Excellency, the
Commander-in-Chief's opinion.

2. Copy of a minutes dated
12th May 1886, on the water
supply of Bangalore, by
Mr. Girdlestone, is enclosed
for information.

W. M. M. M. M.

Col. R. E.

Secretary to Govt. P. W. D.

To

The Quarter Master General
(through the Military dept.)
with papers in original, requested
O.S. 147/6 to be returned.

CURRENT NO. 249

1886 DEPARTMENT.

5093

From G. Bidie Esq. M. B., C. S. E.
By THE SURGEON-GENERAL WITH THE

GOVERNMENT OF MADRAS,

Ootacamund.

No. 7191

Dated 23rd
Recd. 24

No.

SUBJECT.

Reporting on certain points
connected with the proposals for
improving the water supply of
Bangalore.

N^o 1026

Transferred to
the Public Works Dept.

(By Order)
Lt. Col. R. E.

Ag. Under Secretary

Ootacamund
June 26

Forwarded

Chro' Military Department

QUARTER MASTER GENERAL'S OFFICE,

Ootacamund,

24th August 1886

No. 2797 B.

From

THE QUARTER MASTER GENERAL,

To

THE Secretary to Government
Public Works Department

SIR,

In returning the papers received with
O. G. N^o 318 D, dated 30th June 1886, relative
to the improvement of the water supply at
Bangalore, I have the honor, by order, to
state, that, although the Commander-in-
Chief would prefer the alternative measure
of thoroughly conserving the new gathering
ground to the east of the Halsur tank,
by throwing the whole of the land per-
manently out of cultivation (similar
arrangements being made as regards the
old gathering ground of the north feeder)
yet, as the cost of these measures would
apparently be prohibitive, and great difficulty
would arise in acquiring the necessary
land, His Excellency accepts the scheme
as proposed viz. that the town drainage,
having been diverted, a new gathering
ground lying to the east of the tank
be added to the drainage area of the
Halsur

Handwritten text at top of page, possibly a title or reference.

Halour tank, the precautionary measures in connection with the entire gathering grounds, suggested by Doctor Bidie, (in paras 5 and 6 of his letter No. 9/191, dated 23rd June 1886) being fully adopted.

2 I am to request, that, if convenient, a printed copy of the correspondence now returned may be forwarded for record in this Office.

I have the honor to be,
Sir,
Your obedient servant.

F. Hume

Colonel,
Offg. Quartermaster General.

N. 5751

Forwarded

(Signed)

A. H. H. H.
Secretary to Govt.
25 Aug 1886

60w. D. 1. 86.
 173 E. 2. 6. 05
 310 D. 30. 6. 06.
 1306 W. 1. 6. 06.
 177 D. 26. 5. 06.
 1814 W. 25. 7. 04
 1474 W. 13. 6. 04
 1473 W. 13. 6. 04
 2795 W. 15. 10. 03.
 2794 W. }
 2139 W. 20. 8. 06.
 2063 W. 4. 9. 05
 1972 W. 25. 8. 05
 19. 24 W. 19. 0. 05
 2029 - 30 C. 1. 3. 06
 2007 C. 14. 5. 06.

188 P.W.C. No. 7055 ✓

From

THE QUARTER MASTER GENERAL,

To

THE Secretary to Government
 Public Works Deptt.



No. 1797 B.

Dated 24th
 Received

August
 10. 9. 06.

ENCLOSURES. 79

Regarding water supply
 at Bangalore.

Oct. 13. 08.

P.W. Department

Note.

In February 1885, the three Projects prepared by the late Captain Ransley for improving the water supply of Bangalore were referred to the Sanitary Commissioner for an expression of his opinion; and, in his No. 416 of 15th April 1885, Dr. Redie approved project B, which provided for drawing the supply from Uleas Tank and distilling the water by means of condensing engines. H. C. the Commander in Chief also expressed his preference for project B, provided that "at the same time the conservation of the Uleas tank will be taken in hand by Government and the catchment area increased."

In order to carry out the foregoing provision, it was found necessary to adopt the first seven items of project C in addition to project B; and the Resident in Mysore was informed in January 1886 that the Government of Madras were convinced that that was the most appropriate method of securing a pure water supply for Bangalore.

Of the first seven items of project C, two required the previous assent of the Government of Mysore, which was accordingly solicited

No

Two items were—

- (1) Diversion of the town drainage.
- (2) New supply channel and compensation.

With regard to (1), it was proposed to divert the town drainage from the west of the Ulant bank, and to draw the supply in future from a new catchment area to the east of the bank.

The area of the proposed new catchment basin was 2.4 square miles or 1536 acres; the items referred to will be found in paras 41-43 of Capt. Romilly's report, copy of which is attached. Compensation provided for in the estimate was Rs. 2680 for the contour channel and Rs. 2635 for 62.7 acres of land taken out of cultivation under the Hadarumpu bank.

In requesting the approval of the Bangalore Municipal Commissioners and the Government of Mysore to the two items above referred to, the Government of Madras gave the assurance that the supply from the catchment on the west should not be cut off until the sweep of the new gathering ground to the east had been fully established; and on this assurance and on the understanding that the British Government ^{would pay} all expenses, the Municipal Commissioners in March last stated that they had

no objection to the proposed improvements.

In a communication of 28th April 1896 to the Resident in Mysore, the Govt. of Mysore state that every facility will be afforded for the transfer on reasonable terms of the land required for the new catchment area; but invite attention to a letter from the Resident of 6th November last in which it was stated that, in the event of the new catchment area being taken up, its charlinep would have to be secured, as in the case of the English War Officer's Fortification Act, by reserving to the Municipal Commissioners the right of clearing trees, of preventing the erection of new building or a change in existing levels, and of forbidding the construction of unauthorised water channels. The Resident further expressed his opinion that concessorary powers would have to be obtained over villages situated within the catchment area, and that, if it were deemed prejudicial, sewage farming on fields within the area should be stopped.

The Mysore Government now represent that the prohibition of manuring of fields would involve the abrogation of immemorial occupancy rights, and might, it is feared, complicate the whole question.

question considerably; they request that the necessity for conferring on the Cantonment municipality, powers to the extent indicated above over lands outside their jurisdiction may be reconsidered; and add that, while the Mysore Govt. will gladly facilitate any scheme for improving the water supply of Bangalore, interference with the rights of land holders outside the municipal limits should, if possible, be avoided. Extensive powers such as those indicated above would probably necessitate the throwing out of cultivation of a large area of land, and the payment of compensation far in excess of what was originally contemplated.

The question now to be decided is whether the proposed new gathering ground, lying to the east of the Ulseur tank, may be added to the drainage area of the tank, without taking any special precautions for securing its thorough consecration. The only alternative appears to be to acquire possession of the land which forms the proposed new gathering ground, and to throw it permanently out of cultivation; but it is to be observed that this alternative course would involve very heavy additional expenditure.

Feb 22/85

Wm. H. M. M.
Colonel R. E.
P. D.

N^o 2456
1200.

63
Office of the Resident in Mysore
Bangalore 14th March 1885.

From.

A. H. J. Martindale Esquire
Assistant to the Resident
in Mysore.

To.

The Secretary to the
Government of Madras.
Department Public Works.
Bangalore Project Division

Sir.

I am directed to acknowledge the receipt of Captain Romilly's letter N^o 146 dated 29th October 1884, forwarding a Memo and Plan in connection with a scheme for the improvement of the Ulseur tank.

2. In reply, I am now directed to transmit for the information of His Excellency the Governor in Council a copy of a letter addressed by the Resident to the President, Municipal Commission, Civil and Military Station on the subject together with a copy of the Boards' Proceedings thereon. It will be observed that the proposal to adopt Captain Romilly's scheme in its entirety, was negatived in favour of counter-proposal introduced by one of

N^o 1864 dated

17th October 1884.

From President

N^o 2282 dated

16th February 1885

From D^o N^o 2331 of

21st February 1885.

of the Municipal Commissioners.

3. With regard to the Board's proposals, the Resident apprehends that the Madras Government will not consent to carry out the works required to add the estimated $2\frac{1}{2}$ square miles of new catchment area with no security as to the completion of the other part of the plan except the Board's conditional agreement is contained in the resolutions now passed.

4. The majority of the Board evidently distrust the correctness of Captain Romilly's opinion to the effect that the new catchment area of 2.4 square miles (which he says can be increased to over 3 square miles if necessary) will give as much or more water than the 1.9 square miles of the Western or Bazaar catchment area to be cut off. The Resident does not consider that Messrs Smith and Campbell gave any adequate reasons for distrusting Captain Romilly's opinion, the grounds of which he explained in his note of the 25th October 1884, which had been laid before the Board. But estimates of the kind are no doubt sometimes found to be unreliable as was the case in Colonel Sankey's scheme, and unless the officer in charge of the project has any other arguments which he desires

should be placed before the Board, Mr Lyall does not think that any advantage would be gained by his addressing the members again at present on the subject.

5. It occurs to the Resident that it might be possible, to take up part of the tank for the separate use of the Military, if it was practicable to separate that part of the tank near the Dhobies' wells by a Bund from the rest of the tank, and to supply the new tank so created by the catchment area to the East only. The rest of the tank, which would draw its supply from the Northern and Western catchment area, could then be left to the use of the general Public.

I have the honor to be
Sir,

Your Most Obedient Servant
A. Martindale

Assistant to the Resident
J.D.

W

Mh 24/9

(19)



17/3/85

No 173 Ed/ June 23/85

4.6.70 1874 W. 25.7.84
 43.70 1274 W. 23.2.83
 4.6.80 1173 W. 13.6.84

19-3-85

65
 List of Enclosures to accompany letter No. 390th dated 19th January 1885 from the Superintending Engineer - 5 Circle to the Chief Engineer P. W. Department.

Project A.

1. Survey of Cantonment with additions from the Topographical Survey and other Sources.
2. Portion of Mysore Topographical Survey Sheet No. 63.
3. Plan of pumping Station with arrangements.
4. Survey showing the catchment basin of Agaram Tank.
5. Survey and levels of Agaram tank and levels of wells near there.
6. Plan and Section of 11 Vents pulvert and Waste weir of Agaram tank.
7. Plan of new weir of Agaram tank.
8. Longitudinal & cross sections of Agaram tank.
9. Cross sections of Agaram tank bed.
10. Plans & Sections of Settling beds of Agaram Tank.
11. Plan and Sections of Engine house.
12. Plan of Filter of Agaram pumping station.
13. Plan of pure water basin.
14. Plan of Stand pipe at pumping station.
15. Details of No. ——— No. ———
16. Plan of Engineer's Quarters with out houses.
17. No. of Engine Drivers Quarters Store room & office.
18. Survey of catchment basin of upper part of the drainage lying to the S. E. of the Battery Barracks, the position of existing wells along the line of this drainage & level shown to the Agaram tank.

19. Plan showing lines of piping from Agaram tank to Barrack Cisterns & from condensing Stations at Ulsoor to Barracks. *Sheet 1*
- 35A Plan of proposed iron roof to Cisterns at Agaram Barracks. *Sheet 2*

- 35B D. of Ulsoor Barracks *Sheet 3*
 One General Abstract
 14 Detailed and Abstract Estimates

Project B

20. Sketch plan of main & drinking water pipes.
 21. Section on line of drinking water main.
 22. Alterations to existing Engine house at the rock to adapt it for accommodation of a double set of Normandys Condensers.
 23. Two complete sets of Normandys improved patent treble distilling machinery.
 24. Detailed plans of Tower and Cisterns for condensed drinking water.
 25. Shobai Wells pumping Station *Sheet 1 & 2*
 26. Alterations to existing Engine house at Shobai Wells.
 27. Plans and Sections of water tank.
 One General Abstract Estimate.
 11 Detailed & Abstract Estimates

Project C

28. Survey showing the Northern water shed of the Ulsoor tank and the additional gathering ground to the Eastward.
 29. Longitudinal Section of new Supply Channel for the Ulsoor Tank.
 30. Cross Sections of — D^o — D^o — D^o —
 31. — D^o — D^o — D^o — D^o — D^o

32. Plan of 3 Culverts for Village roads in 2^d and 3^d Mills and Siphon at 1 mile & 1065 feet.
33. Masonry Works of new supply channel and culvert on cross road from Khorpetah at 2007 feet.

34. Plan of Ulsoor lower tank showing the alignment of proposed bund excluding the western feeder from the tank — the position of the new weir and the direction in which the drainage of the N.W. feeder would be diverted into the western feeder.

35. Alteration to Upper tank waste weir to convert it into a Flapper.
 One General Abstract Estimate.
 14 Detailed and Abstract Estimates.

List of plans connected with Colonel Mullins Report on Bangalore Water Supply.

- 22 Plans.
 1 Bundle of papers.
 102

Chander
 Colly. R.E.
 Superintendent Engineer
 Bangalore

Government of Madras.

CURRENT NO. 2206

PUBLIC WORKS DEPARTMENT.

Read the following

From the Asst. to the Resident in
Mysore, C.O. $\frac{1022}{705}$ of 15th April 1886

From the Asst. to the Resident in
Mysore, C.O. $\frac{1430}{705}$ of 22nd May 1886.

Order thereon C.O. 1386 of 1st June 1886.

These papers, with the note
thereon which has been drawn up in
this Department, will, in the first
instance be referred to Surgeon General
Bidie, who, with reference to his letter
of 15th April 1885, C.O. 416 (written as Sanitary
Commissioner) will be requested to favor
the Government with his opinion on the
point which has lately been raised.

The papers will then be for-
warded to the Quarter Master General,
who will be requested to obtain the opinion
of A. C. the Commander-in-Chief, and
to return the papers to the Secretary

to

*
vide his C.O. 970 of
22nd May 1886

to Government in the P. W. Department -

(Am. Extract)

Wm. W. Brown ^{Col.} Lt. Col.

Sig. to Govt. P. W. D.

To The Surgeon General
with the Govt. of head as
(thus the Public Dept. with copy of
Captain Rorvill's report).

The Military Department

Reference - vide this office no 830 C
of 1st March 1886.

Wm

800/119
Public

IT NO 2205/11

1886.

Public Works Department.

No.

1386 W

Dated

1st June/86

Despatched

Received

26/6

Encl

Four

SUBJECT.

Regarding the proposed
improvements to the
Bangalore water
supply.

N-924C.

Forwarded

Copy

8th June/86

By: Under Secy.

The Surge-General with the
Govt. of Madras

N-1864. En. 2. Plans & 1. Memo.
Office of the Resident in Mysore
Bangalore. 17th December 1884.

To

The President, Municipal Commission.
Civil and Military Station
Bangalore

Sir,

I am directed to forward the ac-
companying copy of letter N-146 dated
29th October last from Captain Remilly,
Executive Engineer on special duty and
the original Memo therein referred to, regard-
ing the improvement of the Wsaur tanks,
and to state that Mr. Lyall requests you
will move the Board to reconsider their
resolution rejecting Captain Remilly's scheme,
and giving preliminary approval to Mr.
Govindray Mood's amendment.

2. The Resident ventures to think
that there is reason to doubt whether
the subject has been as yet considered with
perfect calmness: those members who
represent the civil inhabitants of the station,

appear

appear to have been irritated by the recollection
of the project for appropriation of the Tank by
the Military authorities to the exclusion of the
civil population, and to have regarded
Captain Romilly's proposals with suspicion;
the project of appropriation referred to was how-
ever formed by the Military authorities at
Madras Army Head Quarters in ignorance
of many important facts and circumstances
and when they were properly informed, they
at once agreed that the Tank was not one
which could under the Land Acquisition
Act or otherwise, be properly appropriated for
Military purposes to the exclusion of the civil
population. This being the case, all irritation
and jealousy ought in Mr Lyall's opinion,
to be set aside, for, the interests of the Military
and the civil population are really identical.
Moreover the Municipal Board of the civil
and military station ought in the opinion
of the Resident, to consider all Military
interests in Bangalore of the highest
importance, for as a fact, the whole place
owes its growth and importance to the
formation

20
formation of the Military Cantonment.
the large town, which is now the great source
of pollution to the Tank, was waste land,
when the Cantonment was first formed,
and the fact that Government in the
Military Department, has also spent large
sums of money in clearing and repairing
the Tank, should also be remembered.

Mr Lyall desires me to ask the Board,
to reconsider its resolution (1) because he is
convinced that without a diversion band
from the Western feeder no scheme will be
satisfactory. Mr Campbell's plans for the
improvement of the main drain, may
do good, but they will fail to give the neces-
sary security (2) If a scheme which will
satisfy the Military authorities is adopted,
the Madras Government in the Military
Department will be prepared to spend large
sums in improving the character of the
water in the Tank, and the civil population
will share in the benefit. If a scheme
which they do not approve, is adopted, they
will

will make other arrangements for water supply
to the Troops. and the result will be that the
whole cost of improvements of the ulsom
tanks will fall upon the Municipality. —
It is probable that some members of the
Board are not convinced that any
improvements are required, but Mr. Hyall
thinks that most of the members will
admit that with its present Catchment
area it must be a source of serious danger
to the public health and (3) Bathing and
washing in the tanks are already forbidden,
and the Resident thinks there can be
no doubt that it is necessary also to
prevent Cattle being driven in. Mr. Hyall
does not therefore see what the civil
population would lose by the substitution
of wells for the open ghats. Water is at
present taken out only at the places where
Captain Romilly proposes to place wells.

If, however, there is any danger of the
water in the wells becoming stagnant,
the Resident thinks some compromise might
easily be arranged. The Municipality might
perhaps arrange to have in addition to the
wells puckha reservoirs into which water
should

71
should be pumped, and from which it
should be drawn off by pipes being allotted
to particular castes. Mr. Hyall does not
imagine that the Military authorities would
have any objection to any additional ar-
rangements of the kind which could be
made at the cost of the Municipality. —

I have &c.

(Signed) H. Wylie.

Assistant to the Resident.

Copy.

P. H. James

Registrar.

J. D.

122282, { 1. Extract.
1. Memo.
2. Plans.

Office of the Municipal Commission
Civil and Military Station.
Bangalore, 15th February 1885.

From

The President, Municipal Commission,
Civil and Military Station.
Bangalore.

To

The Assistant to the
Resident in Mysore.

Sir,

Referring to your letter No. ¹⁸⁶⁴/₁₁₇, dated
17th December 1884. Communicating the ob-
servations of the Resident on Captain Romilly's
Scheme for the improvement of the Alwar Tanks,
I have the honor to submit for such orders, as
the Resident may consider necessary, an
Extract from the Proceedings of the
Municipal Commission dated 31st ultimo,
para 3 on the subject. —

The enclosures received with your
letter under acknowledgment are herewith
returned. —

I have &c.

(Signed) H. M. S. Magrath
President, Municipal Commission.
C & M Station, Bangalore.

Extract from the Proceedings of the Municipal Commission, Civil and Military Station, Bangalore, dated 31st January 1885.

Conservancy of Ulsur Tanks.

3. Read - Letter No. 1864, dated 17th December 1884 from the Assistant to the Resident, communicating the remarks of the Resident on Captain Romilly's Scheme for the better conservancy of the Ulsur Tanks.

Amendment. - That Captain Romilly's scheme be fully accepted and that the drainage from the West, be conserved by the Municipality in a fresh reservoir.

10 against and 5 for.

For the amendment

J. W. Hayes Esquire Senior

E. Hamilton Esquire

Colonel Simey

J. A. Gow Esquire

Mohamed Subhan Subh Esq. H.B.

Against the amendment.

R. P. Campbell Esquire

A. Goundarajoo Mood Esq. R.B.

Abdul Hussain Saib Esq. K.B.

A. R. Subaswamy Mood Esq. R.B.

V. Gungathura Chetty Esq. R.B.

Abdul Kader H. H. Subh Esq. H.B.

A. Mc Smith Esquire

St. John Buchanan Esq.

N. Kurrum Chetty Esq. R.B.

A. Venkataswamy Mood Esq. R.B.

Mr. Campbell proposed the following Resolution.

1. That the Commissioners accept the plan of the new catchment from a source East by - Bimmamangalam by a new channel to enter the lower Ulsur Tanks by the vent culvert on Kensington road provided the yield of water thereby is ensured to be equivalent to the supply lost by the proposed diversion of the existing West Supply Channel, and that the Scheme for diversion of that supply channel be not carried, till the Scheme by the proposed supply channel from the East has been effectually insured, and the equivalent supply of water has been found to compensate the loss, and not to be from impure drainage.

2. That in the event of such being fully compensated, the Commissioners will not object to a fresh weir being constructed by the side of the existing one, or North of it, with its crest one foot above that weir.

3. That the Commissioners willingly consent to the weir between the upper and lower tanks being converted into a filter to

purify

purify the supply passing into the former by the Northern feeders which receives impure drainage from the Tannary villages.

4. That all expenses on the above account be undergone by the Military.

5. That the Lower Ulwar Tank after receiving its pure supply of water, be conveyed with all its sources of supply under section 163 to 165 of Regulations, 1883, by, and at the cost of, the Municipal Commissioners, and the Lower Tank be enclosed by proper fencing, and under such supervision as will ensure its cleanliness by them.

6. That any arrangements which will commend itself giving the general public the same facilities which they now enjoy, and have done from the time immemorial, will be accepted by the Municipal Commissioners, but arrangements which do not provide equal facilities should not be met from Municipal Funds.

10 for and against

"True Extract."

(Signed) H. M. S. Magrath
President, Municipal Commission

16-2-85

"copy"

H. S. Jones

No 2331. 71. Gen 79

Office of the Municipal Commission
Civil and Military Station

Bangalore 21st February 1885
Despatched 23rd

From

The President, Municipal Commission
Civil and Military Station
Bangalore.

To

The Assistant to the
Resident in Mysore.
Bangalore.

Sir,

I have the honor, under the provisions of section 19. Municipal Regulations, to submit herewith a Copy of the Proceedings of the Ordinary Meeting held by the Municipal Commissioners Civil and Military Station, Bangalore, on the 31st January 1885.

I have &c.

(Signed) H. M. S. Magrath
President Municipal Commⁿ
Civil & Military Station, Bangalore.

H.M.S.

Conservancy of the Ulsoor Tank.

3. Read — Letter No. ¹⁸⁶⁴/₁₁₇, dated 17th December 1884 from the Assistant to the Resident, communicating the remarks of the Resident on Captain Romilly's scheme for the better conservancy of the Ulsoor Tank. —

Mr. Smith remarked that some members of the Board thought they had not quite understood the scheme before, so they had gone carefully into the matter again and read the following Minute: —

The station of Bangalore is mainly dependent for its water supply on several tanks in which the annual rain-fall is stored, the chief of these Reservoirs is the Ulsoor Tank, which covers an area of 125 acres and has a capacity of about 260 millions Gallons. —

This tank up to the year 1874, received the natural drainage of about 2000 acres, which with the storm water brought down by the Sumpunghee feeder more than sufficed to keep the tank full and supply all the requirements of the station, this drainage area may be roughly divided into

(1) The Western or New Market Catchment
of

of 600 acres, supplemented by 1,000 acres of the Sumpungly feeder.

(2) The Eastern or Knoxpelt Catchment of 300 acres, and.

(3) The Northern or Baderbully Catchment of 1000 acres.

In 1874 Colonel Sankar's scheme for the supply of water to Bangalore from the Muntapum reservoir was initiated, and the drainage of 390 acres of the Northern Catchment of the Ulwar Tank was diverted, as well as the whole supply from the Sumpungly feeder, resulting in the complete drying up of the Sumpungly tanks and the partial failure of the Ulwar Tank which has never been full since, with the exception of a short period in August and October 1880 when 24 inches of rain or nearly a whole year's supply, fell in a few days and filled the tanks to overflowing. During the famine year 1877, a portion of this Catchment (about 90 acres) was restored, but by for the more valuable portion consisting of the hard baked and grass-less Muntapum hill, which according to Colonel Sankar.

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Sankar also shed less than 10 inch of the rain, fall, was still cut off, and the consequence is, that for the last ten years the water in the Ulwar Tank has, with the solitary exception mentioned above, been always several feet below sill of Rods.

4. In 1879, the military authorities on the representation of Colonel MacLeod diverted the drainage of the Eastern Catchment by means of a culvert across the old Madras Road near the village of Knoxpelt (still in existence) and alleging as the reason, that the water from this Catchment area was insignificant and that the little that did come down was so contaminated with night soil owing to the natives of Knoxpelt using the bed of the feeder as a latrine in preference to the sheds built by the Municipality that the water in the tank was only fouled by allowing this drainage to enter, the drainage of about 100 acres of the Eastern Catchment still enter the tank from this direction.

5. At present the Ulwar Tank is dependent on its Western or New Market Catchment for its principal supply, the Northern drainage being

being received into the Subsidiary Reservoir
of Constructed as a Famine Relief Work in
1877. the hard metalled road and tiled
houses which make up the greater portion of
the New Market Catchment, renders it an
admirable water shed, as but little of the
rainfall is absorbed, while ploughed and
cultivated lands according to Colonel
Mullins absorb nearly $\frac{7}{10}$ of the rain-
fall, this is proved by an inspection of the
register kept by the Inspector of the Main
drain who reports a rise of water in the
Ulsur Tank, which is fed by this drain
where none was observed in the Subsidiary
Reservoir. In September last, nearly 80 millions
gallons of water were brought into the Ulsur
Tank by the New Market Catchment while the
subsidiary Reservoir with its large catch-
ment only received 30 million gallons, it
will be seen how important the New
Market Catchment is to the Ulsur Tank,
in fact, were this drainage cut off or
diverted, this Reservoir would soon be in
the same state as the Sumpunghy tanks
now is, quite dry.

6. Captain Romilly states that the
drainage

71
drainage of the New Market Catchment must
be so contaminated with sewage as to render
it unfit for use, this does not appear to be borne
out by experience as the drainage of this area has
always found its way into the Ulsur Tank yet,
such authorities as Dr. Nicholson and Dr. Bidie
have repeatedly pronounced the water in the
tanks as useable, and far purer than that
of any other tanks in Bangalore, a sample
of Ulsur water was tested by Dr. Bidie
last March (i.e.) several months after it
had received any contaminated water
from the main drain, and he pronounced
it as unfit for use. A second sample was
tested in August last, after the heavy
rains had flushed the drains and brought
in a supply of contaminated water into
the Tank and was pronounced as useable,
that a certain amount of contamination
from sewage does take place, is allowed,
but that any serious danger need be ap-
prehended from this source, is doubtful,
judging from the experience of past years.
This Catchment is so well defined, and is
already

already so closely built on, that no larger amount of sewage need be expected from this source and with the improvements in Sanitation now being carried out in the Conservancy Department and the additions to the main sewer embraced in Mr. Campbell's resolution, it is believed that the drainage from this source, will be far purer than that from any other existing Catchment.

7. Next in importance to the New Market Catchment, is the Northern or Bader-hully Catchment which supplies the subsidiary Reservoir. We believe that the drainage of this area is far fouler than that from the New Market. All along the ^{banks} of the feeder, are highly cultivated gardens, on which are deposited heaps of Manure and solid sewage collected from the town, the heavy rains must necessarily wash out the solvent portion and carry it into the feeder, and hence into the tank, the Tanneries are also here situated and

and further, the Military authorities have now located their Cholera and small-pox Camp on the very banks of the feeder, so that, far more danger is apprehended from this source than from the main drain, which receives the constant attention of a special agency and is from its very position better able of being controlled.

8. Captain Romilly says that much storm water is lost by the overflow of the Kady, and points to the year 1880 when the Kady was discharging for 80 days, we have pointed out that this was exceptional, and due to the abnormal quantity of rain in the months of August and October 1880. when nearly 24 inches were registered. Since that time the water has always been several feet below Kady. Any scheme for increasing the Capacity of the tank we would gladly consent to, but Captain Romilly's project, if carried out, would materially diminish its Capacity, the diversion land and drinking

Drinking basins, as shown in original plan, would cut off about 25 acres, or 15% of the existing area of the tank, an addition of 9 inches (the safe margin adopted at the suggestion of Colonel Buxton at a recent meeting) would increase the capacity by 10%, so that, if both projects were carried out, there would really be a loss of one tenth of the present capacity of the tank.

9. It will be seen from the above, that our reason for rejecting Captain Romilly's scheme was not from any feeling of irritation at the efforts of the Military to obtain the Ulster Tanks for their exclusive use, but because we believed that that project, if carried out would be prejudicial to the whole community, civil as well as Military, in that

(1) Too much stress was laid on the fact of the water from the New Market Catchment being impregnated with sewage, and the injury to public health, likely to result therefrom, when the experience of years, and the analysis of

Dr.

Dr. Nicholson and Bidie went to prove that no great danger need be apprehended from this source.

(2) That so long as such sources of pollution, as the direct drainage of the Tanneries, sewage gardens, cholera and small-pox Camps, and an unprotected feeder used as a latrine was allowed to find its way into the Ulster Tank, the rate-payers could not in reason be asked to give up the practice of dipping their lotas into the tank, to obtain a supply of water for fear of polluting the great bulk of water within the reservoir for this practice.

(3) That under existing circumstances the New Market Drainage is essential to the Ulster Tank and that without it the tank would dry up.

10. If Captain Romilly will undertake to bring in an equivalent supply of water from the Eastern side of Ulster we will gladly consent to his diverting the new market drainage, but as there appears to

be

be doubts regarding its feasibility we would urge that no diversion take place till an equal supply is actually brought in from the other sources as we would not be doing our duty in giving up the substance for a shadow.

Mr. Smith added that that was what several of the Commissioners thought, if they could get good water from the Eastern side of the tank they would be happy to agree to it, till then, they would object to the proposed cutting off of the New Market Feeder. —

The President then asked Mr. Campbell if he had any thing to say, and he replied, that the conviction in his mind had always been that water could not be procured from the Eastern side of the tank. Mr. Campbell read the following Minute. —

The wording of the Board's resolution unfortunately leaves impression of invitation in their minds when it was passed

8
passed, with the view taken by the British Resident that without a diversion bund from the Western feeder no scheme will be satisfactory, the Board ought to concur, but it would be well now to consider 1st whether some storage of water before it reaches the mouth of the existing feeder cannot be secured for washing purposes in the Cantonment as advocated by Mr. Mahomed Salih and 2nd if the diversion cannot take place by the west of Compensation road and to cross under compensation road by a culvert into the existing Waste weir of the Ulsoor Tank at its entrance south West corner or to round off that corner by the main sewer so that the discharge of the remainder of the supply come by the main channel and what is left of the sewage now utilized for agricultural purposes should find its way into the Dumbloor Tanks.

Of the first of these, our Executive Engineer

Engineer will advise us: on the second it will be obvious that if we can, we should avoid any decrease in the area of the tank and that if we can, we should avoid any decrease in the area of the tank and that it will ensure against any chance of pollution, if the bund is not constructed in the Tank itself; it has before been recorded that the Capacity of the Ulseur Tank suffered at the hands of the military in 1872, and if a diversion of the supply - channel is to take place, let it be done by the mouth of that channel, not however within, but beyond the Tank area. -

The Board has already accepted the raising of the existing weir and if even a fresh waste weir be constructed near the present outfall at north of the main sewer with its crest above that of the existing Waste-weir I do not think the Board can reasonably object. The conviction of the Board

8)
as recorded by the water supply Committee para 26, was "that no Engineer has directed his investigation to the chain of existing tanks to the East of Bangalore from which to draw his supply, these have certainly the disadvantage of lying lower down the valley but the fact that it is impossible to supply Bangalore without lifting the water must have impressed itself on every one who has studied the various schemes

To Captain Remilly's project founded it is believed, on Colonel Mallin's scheme, to compensate for the loss of the polluted water which is to run off to Dumbur tanks, the drainage of cleaner Catchment and source to the East by Birnamungalam, by a new channel to enter the Ulseur Tank at a vent culvert on Kensington Road, the Board will gladly accede if it can successfully give an equal supply, but the contrary convictions given in para 26 of the Water Committee's report makes them doubtful of its success. -

He admits that the impure supply of the North feeder cannot be diverted from the North or Upper Tank and he proposes to obviate such impurity by a filter proposed to be constructed between the upper and lower tank. I am sure

the board will not object to such proposal. The proposal for conservancy, and against cattle trespass by fencing, the Board have admittedly reorganised, by expressing their desire to undertake it; but the watering places for the public which are proposed will have to be modified, there is no provision for supply to the East, when wells in Ulsur and Khorpetta run dry in the hot months, or for the five houses in Kensington road, and the arrangements contemplated is for the general public to draw water from wells to be constructed on the side of the Tank in places marked on the plan, such an arrangement will not be acceptable to the public, but any measures giving them facilities which they now enjoy and have done from time immemorial that can commend itself to the Board, will be accepted. Whatever decision the Board may arrive at, now the Division Commissioners of Ulsur feel it incumbent to advise the following Resolution.

(1) That the Commissioners accept the plan of the new Catchment from a source East by Beinnamangalam by a new channel to enter the lower Ulsur Tank by the next culvert over

Kensington

- Kensington^{road} provided the yield of water thereby is insured to be equivalent to the supply lost by the proposed diversion of the existing West supply channel and that the scheme for diversion of that supply channel be not carried till the scheme by the proposed supply channel from the East has been effectually insured and the equivalent supply of water has been found to compensate the loss and not to be from impure drainage.
2. That in event of such being fully compensated the Commissioners will not object to a fresh weir being constructed by the side of the existing one, or north of it with its crest one foot above that weir.
 3. That the Commissioners willingly consent to the weir between the upper and lower tanks being converted into a filter to purify the supply passing into the former by the Northern feeder which receives impure drainage from the Tannery villages.
 4. That all expenses on the above account be undergone by the Military.
 5. That the Lower Ulsur Tank after receiving its pure supply of water be conserved with

with all its sources of supply under 163 to 165.
of Regulations 1883 by and at the cost of the
Municipal Commissioners and the Lower
Tank be enclosed by proper fencing and under
such supervision as will ensure its cleanli-
ness by them—

6. That any arrangements which will
commend itself giving the general public the
same facilities which they now enjoy, and
have done from the time immemorial
will be accepted by the Municipal Commissioners
but arrangements which do not provide
equal facilities should not be met from
Municipal Funds.—

Mr. Govindaraju Mood: seconded Mr.
Campbell's propositions—

Mr. Gow was of opinion that the
Board should not interfere with the
President's recommendation.

The President remarked that water
could not be brought from the Eastern
side of the Alwar Tank unless the Board
agreed to the proposals of the Military.—

Mr. Campbell observed that Major
Maltby would have protested against the
cutting away of the New Market Catchment.

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In reply to a question from the President
Mr. Smith said that he had surveyed the
whole of the water-shed in question, and
furnished accurate figures to the Board.
Mr. J. W. Hayes thought that the Board
should compliment Mr. Smith for the valuable
data he had laid before them, and his
allusions to the past history of the Alwar
Tank. Mr. Campbell's remarks. Mr. Hayes
said were equally good. Messrs. Smith and
Campbell wanted the Military to commit
themselves to a promise that they would
ensure the supply of water from the
Eastern side, before allowing them to
divert the Cantonment Catchment. The
Board has before them a letter from the
President in which he politely acquainted
the Commissioners with the fact that
he considered that the best thing they could
do, was to allow the Military to consume
the Tank and carry out their intentions.
Mr. Hayes remarked that the Board must
give the Military authorities the credit of
having taken great trouble before ar-
riving at conclusions, they were not the
kind of people to spend Government money
purposely and foolishly but would not

sculpture to spend largely on bringing more water into the Alsur Tank. Mr Campbell, however, the speaker remarked, went part of the way to meet the opposite side in the discussion, but he insisted that the supply of water from the Eastern side should be insured before the Board sanctioned the diversion of the New Market Catchment. Mr. Hayes thought, that a fair and reasonable compromise might be arrived at, to meet the views equally of the Resident, the Military authorities and the Commissioners, the scheme for the Conservancy of the Alsur Tank under discussion was not put forward by Captain Romilly alone, but it had been considered by three competent Military Engineers, they wished to divert the water of the Cantonment Catchment by putting up a bund to the west of the tanks taking this water away, to Domalpur that seemed the question of contention. Mr Hayes proposed that the Military be allowed to put up their proposed bund, on one important condition and

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and that was, that they should supply water as promised for the public in wells or Water-sheds, the latter being preferred by natives, the surplus water not used by the Military being conserved in the area bounded off on the Compensation Road side. Let the money which the Military would have to spend on diverting the course of the Western Catchment to Domalpur be handed over to the Municipality towards defraying the cost of constructing the tank by compensation road.

Mr. Campbell remarked that there was very little difference between his and Captain Romilly's scheme. Mr Campbell's proposal was that the tanks for the public use should be on the Bazaar side of the Alsur Tank.

Mr. Hayes pointed out that all the surplus water that Captain Romilly did not let into the Military Tank, the Municipality could deal with and conserve as they pleased, this would meet the views of the Resident, the Military and the Municipality. -

Mr. Campbell held that the tank could not be interfered with without the orders of the Mysore Government, if its use was to be disturbed in any way, the Ulwar tank was the property of the Mysore Government and as a portion of the tract, assigned to the British Government, was entrusted to the Municipal Commission of the Civil and Military station, it would therefore be a breach of trust on the part of the Board if they parted with the tank.

The President observed that, if the Board could get the Military to clear and consume the tank at their own cost, would it not be an advantage, it was not in any way parting with a trust.

Mr. Smith said that there was one point mentioned by Mr. Hayes, on which he would like to say a few words. Mr. Hayes spoke of the professional opinion given regarding the Conservancy of the Ulwar Tank, Colonel Sankey made the same or greater promises as Captain Romilly, now made, in 1874, he promised to bring water to the very doors of the Bangalore public, and on this understanding devoted the

the water courses of the Sumpunghy and Ulwar tank with the result that the former was perfectly dry and the latter was falling off, and Colonel Sankey's water works' scheme proved a failure. Last year Colonel Mullins came to Bangalore by order of the Madras Government and after remaining some eight or ten months elaborated a scheme for the supply of water to the Military from Agram. The preparation of this scheme cost some two thousand rupees. It was then handed over to Captain Romilly to carry out, but that officer pronounced it impracticable. This showed that there were differences of opinion amongst Engineers themselves. There were Colonel Sankey, Colonel Mullins, Captain Romilly and Captain Braekel all running counter to each other. Mr. Smith remarked that the Board had no objection to Captain Romilly's scheme so long as they could make sure that they could get the water.

Mr. Hayes said that he did not want to lose one drop of water from the Ulwar Tank, the Board would consume the

the public supply themselves. The objection was raised that the Western bund should not be put up, before it was practically demonstrated that a supply could be got from the Eastern side of the tanks. But Mr Hayes urged that the military should first be made to construct the bund, or they might ~~by~~ back out of it afterwards. The Board should compromise. As unprofessional men, they should yield to professional men like Captain Romilly.

Mr Campbell observed that he would willingly yield if every facilities were afforded to the public for obtaining water from the tanks, and if he could be sure they would get it.

Mr Hayes put forward the following amendment to Mr Campbell's resolution.

That Captain Romilly's scheme be fully accepted and that the drainage from the West be conserved by the Municipality in a fresh reservoir.

There

There were 5 votes for and 10 against the amendment which was accordingly lost. The following Commissioners voted in favor of the amendment Messrs Hayes, Hewetson, Gow, Mahomed Saliah and Colonel Swinley.

Mr Campbell's Resolution was then put to the vote and Carried. —

Copy.

J.H.S.
14th Mar. 85

J.H.S. comes.
Registrar

87.
P. W. Dept.

FOR ORDERS

On the 31st March 1884,
Colonel J. Mullins R.E., who
had been placed on special
duty in connection with the
question, submitted his report
on the water supply of Bangalore.
The subject was ~~most~~
exhaustively treated in
the report, and the results
were summed up by the
Chief Engineer in his note
dated 23rd May 1884 as

follows:-

- (1) The Corporal's property is incapable of supplying the station or the troops.
- (2) The Stalour tanks are not capable of being made a satisfactory source of supply for the troops.
- (3) Wells may be sunk which would yield a sufficient supply for the troops for drinking and cooking purposes, but the quality of the water must remain doubtful.
- (4) The Agaram tank offers a new source of supply of suitable water having an ample and sufficiently clean catchment basin.
- (5) Water of exceptional quality is probably

85
obtainable at Bangalore only by distillation.

In their order N^o 1473 W dated 13th June 1884, the Govt recorded their opinion that the Agaram tank scheme offered the most promising solution of the question of water supply to the Bangalore garrison, and directed that the late Capt. Romilly R.E. should elaborate the scheme and prepare the requisite plans and estimates. In the following month orders were issued to Capt. Romilly to include in his investigations the alternative scheme suggested by Col. Mullins for condensing a supply of water from the dhobies well sufficient to meet the requirements

GO N^o 814 W d/25.7.84.

of the troops for drinking and cooking purposes, leaving the water required for other purposes to be pumped from the Kalam tank. Capt.

Ronilly was further ordered to investigate the question of taking in an area of additional gathering ground to the eastward of the Kalam tank, and to include in his estimate for the Agaram tank scheme all compensation for land rendered necessary thereby.

With his No 3900 dated 19th January 1885, the Supt Engineer I Circle submitted Capt Ronilly's report, accompanied by three alternative

89
estimates. The first, A, provided for the supply of water to the barracks from the Agaram tank, and amounted to Rs 2,90,000, the annual cost of maintenance being Rs 44,385. The second, B, provided for drawing the supply from the Kalam tank and distilling the water by means of condensing engines, and amounted to Rs 1,67,000, the annual cost of maintenance being Rs 84,600/-. The third, C, provided for certain improvements to the existing source of supply and the augmentation of the supply by taking up a

new gathering ground. The cost was £133,000, and the annual maintenance £27,000.

To this paper is attached a note prepared by Major Bowen R.E., the then Dy. Chief Engineer, regarding the three estimates. In the concluding para he suggested that, before the engineering details of the several schemes were scrutinised, the papers should go to H.E. the Commander-in-Chief and the Sanitary Commissioner for an expression of their opinion. In accordance with the instructions of the Hon. Member, the papers

N^o 127 Wd/23.2.85.

9
were referred to the Sanitary Commissioner for his opinion, and retransmission to Gt through H.E. the Commander-in-Chief.

The Sanitary Commissioner condemned project A, and concurred in Capt. Romilly's remark that there could be no doubt that the Agaram tank water was liable to dangerous contamination, and if adopted as the future reservoir for the troops the source of supply must not be accepted as, or expected to be, pure. Lt. Bidie approved project B as the only means of securing a supply of pure water.

a for the use of the troops.
c The papers were then
d forwarded to Mr. the Commr.
e in Chief, who expressed his
f preference for project B
g provided that at the same
h time the conservation of the
i "Haleur tank will be taken
j in hand by Govt and the
k "catchment area increased."
l Mr. Gulleney was of opinion
m that, as the civil population
n of Bangalore would benefit
o by the improvements, the
p Municipality should bear
q the cost or a portion of it;
r but H. E. hoped that, if
s the Municipality were not
t prepared to do so, the Govt
u would carry out the improvements

Nº 173 Ed/2º June 1885

9)
and bear the whole expenses.
In June 1885 the Resident
in Mysore was addressed on
the subject. The plans and
estimates prepared by Capt
Romilly were forwarded with
the remark that, whilst
supporting the project for
the distillation of the drinking
water drawn from the tank
for the use of the garrison,
both the military and
sanitary authorities strongly
advocated the contemporaneous
adoption of Capt Romilly's
project for adding to the
supply available for the
civil population, for excluding
foul sewage from the tank,

and for improving its conservancy.

These improvements were estimated to cost Rs 59,860, and the Resident was asked whether the Bangalore Municipality were prepared to contribute towards the cost, and if so, to what extent.

In his reply No 2172 of 70 of 5th November 1885, the Resident intimates that the Municipal Commissioners having agreed to deepen the lower tank and raise the waste weir at a cost of Rs 10,000, work was begun early in August last and carried on till stopped by the rains, when

the expenditure amounted to Rs 5,547. The Commissioners had further taken the necessary steps for acquiring the Jevanthully Tank for use as a reservoir. In September last, Col. Burton submitted estimates (copies of which the Resident forwards) amounting to Rs 21,500, for the improvements necessary to the Halsur Tank. Of this sum, as shown above, the Commissioners were willing to contribute Rs 10,000 (more than half of which has already been expended,) and the Resident expresses a hope that their action will be liberally supported by the Govt of Madras.

by a grant of Rs 10,000.

In regard to Capt. Romilly's proposal to substitute a tract of high and sloping ground to the east of the Malseur Tank for the present catchment area on the west, Mr.

Girdlestone does not think the Commissioners would hear any portion of the outlay involved, and states clearly that, if the Madras Govt. still considers the change imperative, funds must be provided to the full amount required for its accomplishment.

It will be seen from the foregoing that not only have the Bangalore

Municipality entirely set aside each and all of Capt. Romilly's projects, but they have had an estimate of their own prepared by Col. Burton (as a member of the Municipal Commission) and have carried out a portion of the work. Instead of saying whether they will contribute towards the cost of items 1 to 6 of Capt. Romilly's project C, they ask Govt. to contribute towards their estimate of Rs 21,500 for work which did not receive the approval of the Govt. The Municipality declines to contribute towards items

No. 7 of project C, the taking
 in of a new catchment
 area to the east of the
 Hales tank, and there is
 no reason why the Gvt should
 contribute towards the
 Municipality's estimate
 now to the cost of the
 purchase of the Jesambully
 tank. The Gvt may
 however undertake to
 pay half the money expended
 by the Municipality on
 works which will render
 any of the items from 1 to
 7 of project C unnecessary.

It is now proposed
 to submit the papers to the
 Gvt of studies with the
 necessary letters to the
 authorities. The

This should be done
 as soon as the arrange-
 ments noted below
 have been made
 with the Municipal
 authorities. The

Supply the water from
 Hales tank & I think
 improvement of existing
 works is possible.

outlay is trifling in com-
 parison with the cost
 of working but not in
 commensurate with
 the object in view - viz
 the health of the troops.

Circulate
 30/12

The first thing is to communicate
 with the Bangalore authorities. If
 they are reasonable we can then address
 India. Project A is out of the
 Project B is supported by the
 Sanitary Commission but I do not
 understand on what authority we
 are accepting 1507 of Project C. It is

following works be carried
 out at the expense of Gvt.

Project B.... Rs 1,67,000

The first seven
 items of Project C } Rs 59,860

Rupees 2,26,860

Project B will entail an
 annual charge for maintenance
 of Rs 54,600.

It is quite clear however
 that items 1 and 7 of Project
 C cannot be carried out
 without the consent of the
 Bangalore Municipality.

They are, (1) Diversion of tank
 drainage, and (2) New Supply
 Channel and compensation.

Items (5) and (6) - Watering
 places to Hales tank - and
 fencing - are included in

the estimate of Rs 21,500 -
prepared by Colonel Burton
for the Municipality, but
they are to be carried out
in a different manner to
that proposed by Capt. Romilly.

A complete copy of
Capt. Romilly's report on the
water supply of Bangalore
accompanies this note for
orders. It contains full
details of the three projects,
with estimates in detail and
all connected information.

The Secretary has
the honour to circulate
the file of papers which
accompanies this note for

unnecessary to return
this mass of papers
but this point should
be made clear in a
separate note addressed
to me before anything is
done Mr.

Dec 31/85

I have now read
the separate note.
Proceed as proposed
Mr.

Jan 6/86

95
the orders of the Honble
Member

15/12/85

W.

15/12/85

15/12/85

Read the following:—

Letter from the S. E. V Circle No 3900 of
January 19th 1885

FOR ORDERS.

Bangalore water supply.

The papers laid,
better go. (The Secretary
Commissioner's first
then with his re-
marks to H. E. The
Cm. C. H. V.

19/2

The Superintending
Engineer, V Circle, has for-
warded three alternative
estimates for the water
supply of the troops at
Bangalore, together with
a clear and exhaustive
Report on the subject by
Captain Rowilly.

2. The first Estimate,
A, provides for supplying
the Barracks from an
altogether

FOR ORDERS.

Altogether new source, the Azaram Tank, which was selected by Col. Mullins as being the only available existing reservoir from which a sufficient and comparatively pure supply can be obtained. The cost of improving the Tank, paying compensation for land to be submerged, erecting the necessary works and machinery, etc., amounts to Rs 2,90,000, and annual maintenance will be Rs 44,305.

3. The second Estimate, B, provides for drawing the supply as at present from the Balour Tank, utilising the existing works, with certain additions and modifications, and distilling the water by means of

97
of Condensing Engines. The cost of this scheme will be Rs 167,000, and annual maintenance Rs 84,600.

4. The third Estimate, C, provides for utilising the present Tank and works, with certain additions and improvements, and augmenting the supply by taking up a new gathering ground, thereby minimising the impurity of the drainage but distilled water for drinking is not included. The cost will be Rs 133,000, and the annual maintenance Rs 27,000.

5. Of the annual maintenance be, for purpose of comparison of cost, Capitalised at 4½ per cent, we have the following:-

$$\text{Project A} = \text{Rs } 2,90,000 + 9,86,333 = 12,76,333$$

$$\text{Project B} = \text{Rs } 167,000 + 18,80,000 = 20,47,000$$

$$\text{Project C} = \text{Rs } 133,000 + 6,00,000 = 7,33,000$$

(As regards actual outlay to be incurred, a deduction of Rs 6,00,000 must be made in each case, that being the Capitalised value of Rs 27,000 the cost of maintenance at present).

From this it will be seen that Project C is the cheapest of all, and Project B the most expensive.

§6. The Superintending Engineer recommends Project B, and it seems clear that the adoption of this scheme is the only way of securing a water supply absolutely above suspicion, and settling this much vexed question at rest for ever.

In regard of this project, (B), the Military Authorities have been under some misapprehension, and have opposed the continuance of any system based, as this is, on the

Halour Tank ^{Q8} as the source of supply. They have pointed out that the water drawn off from the tank for all purposes must reach the barracks by the same means and through the same pipes as the pure water, and ^{that} the difficulty of preventing men and families from using the impure water would be insurmountable. Further, ^{that} it would be extremely dangerous to rely on a single condensing apparatus, there being no pure source to fall back upon in case of accident (vide appendix R to Captain Romilly's Report). With reference to the first and third of those objections, it is sufficient to remark that it is not intended to

intended to use the same
pipes for the distilled
and the ordinary water,
as two separate and
independent lines of mains
will be laid down;— and that
two condensers, each capable
of producing 9000 gallons
daily, are to be provided.

And, as regards the difficulties
in connection with the distri-
bution, no danger need,
it is thought, be apprehended,
if proper precautions be taken,
as detailed in para 21 of
Captain Romilly's report.

§ 7. It may ^{be suggested} ~~be suggested~~
~~and~~ that, in order to remove
all possible objections on
the part of the Military
authorities, it would be
better to establish the
Agaram Tank as the
primary source of supply,
and to erect condensers

in connection therewith just
as is proposed for Halcour.
Against this suggestion
it may be urged that the
cost would be prohibitive,
being probably nearly equal
to A+B, and ^{that} no particular
advantage would arise
from it, inasmuch as,
however foul the source, the
condensers will produce
absolutely pure water, and
it is therefore immaterial
whether the water is
distilled or drawn in
the first instance, from the
Agaram or from the
Halcour Tank.

§ 8. The engineering
details of the several
schemes have not yet
been closely scrutinized,
and it is suggested that,
before

before this is done, the
papers should go to
His Excellency the Commander
in Chief and to the
Sanitary Commissioner
for expressions of their
opinions, on receipt of
which the estimates can
be finally checked and
formal orders on the subject
taken.

C. Thorne.

Major R. E.

Under Secretary to Govt.

P. W. Dept.

19th Feby/83

Exd. J. W.

The Hon. J. C. Sullivan
For Orders

17-507/15

(1)

Enc. 19/2/85

N^o 1473 Wd/13.6.84.
"1814 Wd/25.7.84
"173 Ed/2.6.85

M^r Hon H. E. Griffiths
M^r Hon C. G. Mason
His Excellency the Governor

Bangalore Water Supply



Note for orders

Recd 6/1/86
Circ: 15.12.85 R 2/1/86

102
In reply to His
Excellency the Governor's
note dated 31st December 85
the Secretary has the
honour to explain that the
reason for accepting items
1 to 7 of Project C in
addition to Project B is
that Sir Frederick
Roberts approved Project
B "provided that at the
same time the conservation
of the Halsur tank
will be taken in hand
by Government and the
catchment area increased

The Sanitary Commissioners
also advocated the adoption
of the scheme "with the
additions proposed by
Capt. Romilly for excluding
the whole of the foul
sewage of the town from
the Malabar Tank and
for bringing into it the
drainage of a tract
of open cultivated ground
to the eastward of
Bangalore."

This involves the diversion
of a portion of the town
drainage (item No. 1) at
a cost of Rs 20,130/- . A
new supply channel will
have to be constructed,
We: 10/11/18

183
which, with compensation,
forms item No. 7 and
amounts to Rs 26,130/- .

Items No. 2 & 3 are rendered
necessary by the scheme for
the diversion of the town
drainage by which it is
proposed to discharge the
drainage over the present
waste weir, which has to be
lowered for the purpose
(item 3) at a cost of
Rs 1360 in order to give a
free discharge. Item 2
is a new weir to discharge
the tank surplus, it is at
cost Rs 2030. The alterations
to the upper waste weir
which form item No. 4,

of the Report provide for
The construction at a cost
also of \$1850 of a filter in
front of the weir to remove
all impurities before the
water enters the lower
tank. This is explained in
para 37 of the Report
The remaining items
5 and 6 are Fencing (\$2040)
and Watering Places
(\$5320).
The fencing is necessary
for the proper conservation
of the tank. It will
prevent pack-trail bullocks
and stray cattle from
having access to the bed
of the tank - and will
shut off the public, to
compensate whom it is
have

proposed to erect some
watering places. Capt.
Ronilly's scheme provides
for four watering places
at each of which two
or more (as may be
necessary for cattle
distinctions) wells will
be constructed.

Good
See note on
the other paper

Attention is respectfully
invited to pages 20 to 25
of Capt. Ronilly's report,
where further information
on the subject will be
found.

W.
6-1-86.
W

105

MINUTE, BY THE OFFICIATING RESIDENT, ON THE WATER
SUPPLY OF BANGALORE.

The object of various measures to which the attention of this Residency has been given during the past fourteen months has been to increase the water supply of Bangalore and to improve the quality of the water.

2. To this end the bed of the Shoolay Tank was deepened and the weir and the embankment which surrounds it were raised in the spring of 1885, the result being that an additional depth of two and a half feet was secured over the whole reservoir. The cost of the work was Rs. 7,200. There still remains the work of enlarging the catchment area of this Tank and that at Hakitimanhalli, where more water is much required. The outlay on this account is estimated at Rs. 4,000, of which Rs. 1,000 have been entered in the present year's budget, and will be sanctioned, for a feeder on the side of Trinity Church.

3. During August and September 1885 about 35,000 cubic yards of earth were dug out from the bed of the Lower Ulsur Tank, on the northern and eastern sides, at a cost of about Rs. 5,600, and were formed into an island and an embankment on the eastern side, which are being laid out as ornamental grounds. In the conduct of all this work the help received from Colonel Burton, R. E., was very valuable. The total sum voted by the Municipality of the Civil and Military Station for the improvement of this Tank is Rs. 10,000. Since the end of last September the progress of excavation, and the raising of the waste weir, which was a part of the general scheme, have been stopped, owing to the high level of water in the reservoir caused by the autumnal rain. It is very desirable that both works should be taken in hand again whenever circumstances admit. Here as elsewhere it is of great importance to increase the capacity of the reservoir. For want of a higher waste weir much water ran off and was lost last October.

4. In connection with this particular supply, the Municipal Commissioners have exercised a wise forethought in acquiring the Jeevanhalli Tank. The cost of this has amounted to Rs. 6,675. The Tank will serve as a valuable feeder to the Upper Ulsur Tank.

5. The result of what has been done at Ulsur is to lessen in the Lower Tank the area exposed to evaporation, and to increase the capacity. As the level in the Lower Tank sinks, the Upper Tank is drawn upon at once to supply the deficiency, and so long as there is water in the Jeevanhalli Tank, the Upper Tank will similarly be replenished from it. The chief loss of water, in an extensive but comparatively shallow reservoir, such as the Lower Ulsur Tank, is due to evaporation, not to consumption. The device of preventing evaporation by means of aquatic foliage has not proved satisfactory in India. Hence the necessity for meeting the difficulty by restriction of area and corresponding excavation.

6. The Madras Government has a separate project under consideration, whereby, at a cost of about 2½ lacs of rupees, it would fill the Lower Ulsur Tank entirely from a new catchment area on the east side of the Tank. The undertaking is prompted by the wish to afford the European soldiers, who are entirely dependent on the Ulsur reservoir, purer water than it is believed can, with the best conditions, be secured under the present system. As the Madras Government is ready to bear all the expense, and as it has given an assurance that the rain drainage from the cantonment bazaar &c., which now enters the Tank from the west, shall not be cut off till the success of the new gathering ground to the east shall have been fully established, the Municipal Commissioners of the Civil and Military Station have raised no objection to the proposal. They are averse to sharing the cost, not only because it would be difficult to find the necessary funds, but also because they do not feel justified in making such a marked change, so long as the water supply, as at present it exists, is acceptable to the townspeople and not unhealthy in its effects. The scheme is now before the Mysore Government, whose consent has been sought to the alienation of the land involved by it.

7. Much has been done of late to purify, and to maintain pure in its passage to the Ulsur Tanks, the water which runs thither from the western side. Within the

gathering ground there is much cultivated land. This it is practically impossible, owing to the prohibitive cost of compensation, to throw out of cultivation. But scavenging is systematically carried out, and patrolling frequent in all places of public resort. For the protection of the Tanks eight watchmen have been appointed at a cost to the Municipality of Rs. 56 a month. It having been found that on the occasion of heavy rain in the Cantonment bazaar the main drain overflowed into the main sewer, the dividing wall between them has been raised, so as to prevent this evil, and has satisfactorily withstood the test of the late sharp storms. The nuisance caused by the pollution of ground in and about the tanneries and potteries has been much diminished. New sites, beyond the limits of the catchment area, have been chosen for small pox and cholera camps, with special regard to the accommodation of the homeless poor in time of scarcity or famine; for experience has proved that the inhabitants of the town are best treated for infectious and contagious diseases in their own houses. A new site has also been chosen for the Hindu Burial Ground, which it is hoped that the Durbar will concede. In such case the present one will be closed with a little delay as possible.

8. The supply of water to Miller's Tanks, which is the third of the three great systems on which the Civil and Military Station depends, has been facilitated by the construction of a diversion sluice in Cunningham Road to serve Tank No. 3. The channel with which such diversion is connected is one of the principal feeders of the Sampangi Tank, which lies for the most part outside the limits of the Assigned Tract. Consequently, as the Durbar has a direct interest in the matter, it has been suggested that it should be left to the Public Works Department Secretary of the Mysore Government and to the President of the Civil and Military Station to agree when the diversion sluice should be used, and that in case of difference the Resident should settle the question. This arrangement I hope that the Durbar will acquiesce in.

9. Advantage would be gained, I believe, by deepening all three Miller's Tanks, provided that the lower soil is tenacious enough to hold water, and provided that there is no risk of setting free malarious influences if the present bottom be disturbed. Such has not been the result of the excavations at Shoolay and Ulsur. I also think favourably of a scheme advocated by Mr. J. W. Hayes, Municipal Commissioner, for the construction of another Reservoir below, but in close vicinity to the Shoolay Tank. The configuration of the ground is such that the undertaking is not likely to be very expensive. Mr. Hayes puts the cost at Rs. 15,000, irrespective of compensation for house property. Population in this neighbourhood is numerous and apparently on the increase. Hence the desirability of intercepting and holding water which, as actually happened last year, may otherwise run to waste. In the present year I am afraid there is no prospect of funds being available for this work. I am also strongly impressed with the necessity of taking water nearer to the houses of the inhabitants as soon as money can be spared. At present the distance to which poor persons have to go for water, specially those who live in the Cantonment Bazaar, is considerable. This improvement may perhaps be best effected by pumping from existing reservoirs through pipes into cisterns or open basins at convenient centres. In connection with it the establishment of drinking fountains and drinking troughs at places of general resort seems desirable.

10. Not long ago it was represented to me that the water level in the wells of the Civil and Military Station has been steadily getting lower for some years past. The fall has been variously attributed to the increased growth of casuarinas, which have a great tendency to absorb moisture, to a diminution in the rain fall, and to other climatic influences. The subject is, I think, worthy of investigation. At present the information at disposal is too limited to warrant the assumption that the water level in general has sunk. Till this fact has been established it is premature to speculate on the causes which may be at work.

11. The construction of the low level sluice from Sankey's reservoir for the benefit of the City of Bangalore does not in my opinion imperil the interests of the Civil and Military Station. Colonel Sankey's main object of continuously supplying the High Ground and neighbourhood with water having failed, and there being no present means or likelihood of achieving that object, it would be an act of selfishness to oppose the utilization of such water as can serve the City under circumstances when

the high level sluice cannot be worked. Apart from this consideration the city has a claim by reason of the catchment area of the Dharmabudi Tank having been circumscribed by the formation of Sankey's reservoir. The distribution of the water can always be determined by the Resident and the Dewan in consultation. It was by mutual agreement that Miller's Tanks were thus replenished last autumn in a season of exceptional drought. As no difficulty was then experienced there is reason for anticipating as satisfactory results in cases of future necessity. There seems no likelihood of raising the level in Sankey's reservoir, except at inordinate expense, and with risk of taking from the supply of other tanks in the neighbourhood.

12. The importance of not allowing present sources of water supply beyond the limits of the Assigned Tract to be interfered with for purposes of irrigation or otherwise has been recognized, and assurances have been given on the part of the Durbar that it will not allow such interference and that practically now it stops such interference in all cases which are brought to its notice.

13. There has not been leisure, on the part either of myself or of the Engineer officers who have favoured me with their help and advice in the above mentioned matters of more immediate importance, to go deeply into the larger consideration of making Bangalore independent of its present system of tanks and wells. Even the preliminary enquiries involved in such schemes as that of leading water from Nundidroog and of pumping from the Caverry would necessitate the employment of specially qualified professional men at no slight expense. That the cost of either scheme would be very great is beyond doubt. Such cost could only be met by a water rate on the population which would be unobjectionable, if it did not exceed the present cost of fetching water, but which otherwise might press on a community that believes municipal taxation to be already quite high enough. Geologists have hitherto declared against the practicability of Artesian boring. It may be that this process, when more perfected, may solve the difficulty. Such a measure would be less likely to be hampered by questions of compensation; it would be without the risk of intermediate interruption which is attendant on the other two schemes, and it might be comparatively inexpensive. The deep borings which are now being made at various points on the Kolar Gold Fields may show what volume of water is to be hoped for at specified levels under known conditions of intervening rock or other material, and may yield information on other important points. Meanwhile I think that the Municipalities of Bangalore will be wise in restricting themselves, as regards improvement, to the lines which they have been pursuing of late.

MAY 12TH 1886.

C. E. R. GIRDLESTONE.

Former papers.

MILITARY (1886) DEPARTMENT.

P.W.C. 7054

No. 475

From

THE Public Works Dept

N^o 380

Dated 30. 6. 1886.

Recd. 30. 6. 1886.

Registered

Recd: 10. 9. 86

ENCLOSURE 6

P. G., No. , dated

Regarding the water
supply of Bangalore

No.

Q^R M^R GENERAL'S OFFICE.

RECEIVED 2-JUL. 86

Dy. No. 1657.

B

S.A.W.

107

We had not time
to look into this
file.

Please submit
it to him at Madras.

You might first
show him 177 & 87
26. 5. 86 to Dir.

Cu

27. 5. 86

Dir.

Please see
177 & the former
file after
file after
file after

177 & 87

29

Dir. paper to be shown to
Cmrs.

29/7/86

105
These papers, with the note
thereon which has been drawn
up in this Dept., will in the
first instance be referred to
Surgeon General Bidie, who,
with advertence to his letter dated
15.4.85 W. 414 (written as
Sanitary Commissioner) will
be requested to favour the Govt.
with his opinion on the point
which has lately been raised.

The papers will then be forwarded
to the A. M. S. who will be
requested to obtain the opinion
of the C. in C. and to
return the papers to the Sec.
to Govt. in the P. W. Dept.

W

reopened
vide in No. 970 B. 31.5.86
2/5/85

To the Surgeon General
with the portopendras
(thru' the Public Dept)

The Medical Dept
Reference vide above
No. 830. C. 2. 1/2/86

110

Letter from the Secy Mr Sp
no 2797 B d 26. 8. 86, relative
to Wampone Water
supply scheme.

The next step
apparently is to address
the G. of D. asking their
sanction to Capt. Roundell's
Project B, plus first
seven items of Project
C = Rs 2,26,860.

In the earlier note
on the subject ~~some~~
it was stated that the
engineering merits of
the several schemes
~~was~~ had not been
closely scrutinised,
& that this would be
done after all necessary
references had been
made & replied to -
vide note d 19.2.85,
signed by Major Bowen
& attached to no 68W
d 8.1.86.

The question now
is whether Capt. Roundell's
proposals may be

accepted as they are, &
the disposal of the file
proceeded with. More
proposals were submitted
through S.E. V. & were
doubtless examined by
him.

C
30.8.86

Yes. The papers may
now be printed with
a full description of
what has been done
& explaining the
the matter stands.
And a letter to the
may be drafted,
asking for sanction
to project B. Plus
item 7 to 7.4 Project
C.

W

30.8.86

11 (137)
The area of the new catch-
ment basin according to para 41
of Capt. Romilly's report is
2.4 square miles or 1536 acres.

All the compensation allow-
ed by him appears from para 43
to be Rs 2680 for the contour
channel & Rs 2635 for 52.7 acres
of land thrown out of cultiva-
tion under the Kadarampolem tank,
it therefore seems that, no com-
pensation is allowed for the
greater portion of the catchment
basin.

This basin belongs to the
Mysore Govt who now point out
in their letter 1159 of 28th
80 April 1886 that the proposals
made in para 4 letter No 2172
70 dated 6th Novr 1885 from the
Resident of Mysore to the Govt
of Madras are likely to lead to
complications and might necessi-
tate the payment of compensa-
tion far in excess of what was
contemplated by the projectors
of the scheme. The proposals
referred to were that the Can-
tonment Municipal Commissioners
were to have the right of clear-
ing trees, of preventing the

6-25-86 R. 31.5.86

erection of new buildings or
change of levels, and of for-
bidding the construction of
unauthorized water channels
and further that they were to
have conservancy powers over
the villages situated on the
catchment basin.

It would appear from the letter
from Mysore Govt that they are
not willing to accede to these
proposals without compensation
being paid for the land.

The question is a difficult
one but there can be no doubt
that the proposals of the Resi-
dent would lead to complications
and it seems doubtful if it
would be necessary to confer
such powers on the Cantonment
Municipality. It is not thought
that such measures are found
necessary in the case of Red
Hills & other tanks of like
nature.

[Signature]
25/5/86
D.W.

I think it would be well to
draw up a brief note, explaining
the present position of the scheme.

2-31-5-86

Bangalore Water Supply

note by Gov.

*and refer the points at issue
to the Sanitary Commission
for an expression of opinion*

[Signature]
29-5-86

No. 21924 Public Works Department 112

Proceedings of the Madras Government.

Under date the 10th September 1883

Read again:-

Proceedings dated October 5. 1883 Nos 2794, 2795 W
" " June 13. 1884 Nos 1473, 1474 W.
" " July 25. 1884 No 1814 W.

Read also:-

Letter from the Supty Eng- & Coke of Jan'y 19. 1885 No 3900
Proceedings - - - - - of Feb'y 23. 1885 No 427 W.
From the Resident Mysore of March 14. 1885 No 2456
" " Sanitary Commission of April 15. " No 1280
" " Quartermaster General of May 2 " No 970 B.
" " Resident Mysore of May 23 " No 477
To " Resident Mysore of June 2 " No 236
From " do do of June 6 " No 173 E.
" " do do of November " No 2172
" " do do of November " No 70
To the do do of July 17 " No 2293
From the do do of Jan'y 8. 1886 No 70
" " do do of April 15. 1886 No 684
" " do do of May 22 " No 1022
" " do do of May 21 " No 705
" " do do of May 21 " No 1420
" " do do of May 21 " No 705
" " do do of May 21 " No 1218
" " do do of May 21 " No 340

Note by the Secy. to Government I.W.D. of May 31. 1886.

Proceedings dated June 1. 1886 No 1386 W.

Endorsement in the Public Dept of June 8. 1886 No 924 C.

From the Surgeon General of June 23^d. No 9/191

Endorsement in the Public Dept of June 29. No 1026 C.

" " Public Works Dept of June 30. No 318 D.

From the Quartermaster General of Aug. 24. No 2797 B.

Endorsement in the Military Dept of Aug. 25. No 5157.

Frequent outbreaks of
enteric fever among the troops
at Bangalore having led
strong representations
respecting the quality of
the water and the sufficiency
of the water-supply available
to the use of the troops
of the command

W. C. W. G.

* GO. No 2794 W of Oct 5. 1883.

1253 113
bazaar at that station,
the Government, after careful
consideration of the subject,
arrived at the conclusion
in October 1883 that the
best means of providing
the troops and towns with
wholesome water would be
to extend and complete the
scheme known as the
Oopankalli Project, which
had been originated in 1868,
by Major General Sankey,
R.E., C.B., then Chief
Engineer of Mysore.
2. With that object, Col.
J. M. Sullivan, R.E., was
placed on special duty
to investigate the subject

Note. and, on the 31st March 1884,
that officer submitted a
report in which the whole
subject of the water supply
of Bangalore was exhaustively
treated. The results of
Colonel Mopell's inquiries

were summed up by the
Chief Engineer in his note
printed with Proceedings

No. 1473 W dated 13th June
1884, as follows:-

(1) The Osprey project
is incapable of supplying
the station or troop.

(2) The Halems tanks
are not capable of
being made a satisfactory

source of supply for the
troops.

(3) Wells may be sunk
which would yield a
sufficient supply for
the troops for drinking
and cooking purposes,
but the quality of the
water must remain
doubtful.

(4) The Agaram tank
offers a new source of
supply of potable
water, having an ample
and sufficiently clean
catchment basin.

(5) Water of exceptional
quality is probably

Note obtainable at Bangalore
Spec only by distillation.

Endors 3. In their order No
From 1473 W dated 13th June
Ends 1884, the Government recorded

Spec their opinion that the
Ends Aqueduct tank scheme
offered the most promising
solution of the question

of the water supply to the
Bangalore garrison, and
directed the late Capt
Romilly, R.E., to elaborate

the scheme, and to prepare
the requisite plans and
estimates. In the following
month, orders were issued

G.O. No 1814 W of
July 25. 1884

115 1253
to Capt Romilly to
include in his investigations
the alternative scheme
suggested by Colonel
Mullins for condensing
a supply of water from
the dhobies wells sufficient
to meet the requirements
of the troops for drinking
and cooking purposes,
leaving the water required
for other purposes to be
pumped from the Balan
tank. Capt Romilly
was further ordered to
investigate the question
of taking up an area

No of additional gathering
ground to the eastward
End of the Halsin tank,
and to include in his
estimate for the Agaram
tank scheme all com-
pensation for land rendered
necessary thereby.

4. With his letter No 3900
dated 19th January 1885,
the Supply Engineer I
wrote submitted Capt
Lomilly's report, accom-
panied by three alternative
estimates. The first,
A, provided for the
supply of water to the

110
barracks from the Agaram
tank, and amounted to
Rs 2,90,000/-; the annual
cost of maintenance being
Rs 44,385/-. The second,
B, provided for drawing
the supply from the
Halsin tank and distilling
the water by means of
condensing engines, and
amounted to Rs 1,67,000/-,
the annual cost of
maintenance being —
Rs 84,600/-. The third,
C, provided for certain
improvements to the
existing source of supply,

and the augmentation
of the supply by taking
up a new gathering
ground. The cost was
£1,35,000 and the
annual maintenance
charges, £27,000/-.

5. This report having
been referred to the
Sanitary Commission,
and His Excellency the
Commander-in-Chief, for
opinion, the former officer
condemned Project A,
and concurred in Capt
Rouilly's views that
the Agumbe tank water

117 158
was liable to dangerous
contamination, and, if
adopted as the future
reservoir for the troops,
the source of supply could
not be accepted as
expected to be pure.

His Excellency approved
Project B as the only
means of ensuring a supply
of pure water for the
use of the troops. His
Excellency the Commander-
in-Chief also expressed
his preference for Project
B, "provided that at
the same time the consi-

of the Ahar tank, will
be taken in hand by
Government, and the
catchment area increased.
His Excellency was of
opinion that, as the
civil population of Mysore
would benefit by the
improvements, the municipality
should bear a portion of
the cost, but he expressed
a hope that, if the
municipality were not
prepared to do so, the
Government would carry
out the improvements
and bear the whole expense.

118 119
6. In June 1885, the
Resident in Mysore was
addressed on the subject.
The plans and estimates
prepared by Capt. Linnell
were forwarded with the
remark that, whilst sup-
porting the project for
the distillation of the
drinking water drawn
from the tank for the use
of the garrison, both
the military and sanitary
authorities strongly advocated
the contemporaneous adoption
of Capt. Linnell's ^{proposals} project
for adding to the supply.

available for the civil
population, for excluding
four per cent from the
tank, and for improving
its conservancy. These
improvements comprised
the first seven items
of Capt. Romilly's project
C, estimated to cost
Rs 59,860; and the Resident
was asked whether the
Bangalore Municipality
were prepared to contribute
towards the cost, and if
so, to what extent.

In his reply dated
15th November 1885, the

Resident intimated that
the municipality had
already incurred considerable
expense on works undertaken
by themselves in improving
the Balan tank; and,
with respect to Capt.
Romilly's proposal to
substitute a tract of
high and sloping ground
to the east of the tank
for the existing catchment
area on the west, Mr.
Girdlestone did not
think the Commission
would have any portion
of the money involved.

inasmuch as the necessity
for the change had not
been demonstrated to
their satisfaction. The
Resident intimated
clearly that, if the
Madras Govt still
considered the change
imperative, it would rest
with the Government to
provide funds to the full
amount required for its
accomplishment. On an
assurance from the Govt
that the supply from the
catchment on the west
shall not be cut off

1257
until the success of the
new gathering ground to
the east ~~shall~~^{has} been
fully established, the
municipality have given
their assent to the
proposal to divert the
town drainage from the
tank. The Government
of His Highness the
Maharajah also have
intimated their willingness
to afford every facility
for the transfer on
reasonable terms of the
land required for the
new catchment area.

in while doing this, the
for Myson Government pointed
he out that complications
the would arise, and the
cost of compensation
it would be greatly enhanced,
if attempts were made
to thoroughly conserve
the new gathering ground,
and throw it permanently
out of cultivation. With
reference to this point,
the Government have
received the opinion of
Surgeon General Bidie,
(who as Sanitary Commis-
sioner previously

121 1852
reported on the water
supply question) that,
if certain precautionary
measures be taken, the
prohibition of cultivation
in the new intendant area
need not be insisted
upon; and His Excellency
the Commander in Chief,
in view of the great
outlay which would be
involved if this Govt.
determined to acquire
the whole of the gathering
ground, has accepted
the position.

8. His Excellency the

Governor in Council considers
that the question has now
arrived at a stage when
the Govt of India may
be addressed that

Government will accordingly
be asked to sanction

Capt Romilly's project
B, with the addition

of the first seven items
of project C, involving
a total estimated outlay
from Imperial funds of
£ 2,26,860/-.

The measures suggested
by the Surgeon General

in paras 5 and 6 of his
letter of 23rd June 1886 will
receive consideration here-
after, should the Govt of
India sanction the
proposals now to be sub-
mitted.

10. The following letter
will be addressed to the
Govt of India

(H. No. 272 W. 10/1886)

To

The Secretary to the
Govt of India

Military dept

To the Military Dept ✓

" S.E. & Circle ✓

" Gen. M. & A. ✓

" Public Dept ✓

Des
22/8/86

Sir,

I am directed to
forward for the consideration

of the Govt of India, copies
of the Proceedings of this
Government marginally
noted, relative to the
proposals for improving
the water supply of the
troops at Bangalore.

No 2794 W of 5. 10. 53.
" 2795 W of 5. 10. 53.
" 1473 W of 13. 6. 84.
" 1474 W of 13. 6. 84.
" 1814 W of 25. 7. 84.
" 2292 W of 10. 9. 1886
with Capt. Hamilton's
account.

2. The history of the
question and its present
position are stated in
the last quoted Proceedings
of this date, and it will
be seen that the sanction
of the Govt of India is
required to a total
estimated outlay, from
the Imperial Military Fund

of Rs 2,26,860. *Rs*

2. It will further be
seen from the correspondence
that the question of
improving the water
supply of Bangalore
has been the subject of
exhaustive inquiry by
this Government, who are
convinced that the only
feasible means of giving
the garrison a pure
water supply, at a
reasonable cost, is by
adopting Captain Hamilton's
Project B, estimated
to cost Rs 1,67,000/-.

with the addition of the
first seven items of
project C, estimated
to cost Rs 59,800. The
annual cost of maintenance
of project B is estimated
to Rs 600/-.

3. The Army Sanitary
Commission in England
have frequently noticed
the high rate of mortality
from enteric fever among
the troops at Bangalore,
and have urged a
consideration of the
question of improving
the water supply; and

N^o 4290 d/ Aug: 5. 1885.
" 4761 d/ " 9. " }

I am to forward, for the
information of the Govt of
India, copies of the two
last reports of that body,
printed with the Proceedings
of this Govt in the Military
department marginally
noted.

4. I am therefore to
express the hope of His
Excellency the Governor
in Council, that the
Govt of India will take
this subject into early
consideration, and sanction
the proposed expenditure
of Rs 2,25,800/-.

that the Govt of India
will be pleased to
make a substantial
grant for purchase in
the Budget for 1887-88,
prior to the ^{early} commencement
of the work.

W.
29.8

Despatch
with 6 P.W. 400
with 4000
and 2 rail apt
4000 quoted in
the letter
25/9/88

Prangley Water 2 1/2

Indemnity Sullivan

Mr. C. B. MacLean

May 8, 1881



25/4
- 12/19/81

May

7055 +

Govt. of Madras

PUBLIC WORKS

Dated

Recd

Recd

10 Sept 1880 No 2292

2293

~~30~~ Bangalore Water Supply
5

Proposals for improving
the — for troops, &c
Submitted for the sanction
of the Govt of India

~~40~~ Bangalore Water
Supply

Proposals for improving
the — for troops,
Submitted for the
Sanction of the
Govt of India.
30 for Collyer

Gift