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MADRAS RECORD OFFICE.

Government of Madras.

Public works DEPARTMENT.

G.O. No. 2349	Press Mis.
81-82	
Dated 3. 8	1867.

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
3rd August 1867.*

No. 81. Read the following Proceedings of the Madras Government in the
Military Department, No. 2,787, dated 29th July 1867 :—
Read the following Proceedings of the Madras Government in the Public
Department :—
(Here enter 23rd July 1867, No. 894.)

Communicated to the Commander-in-Chief.

(Signed) R. HAMILTON, Colonel,
Deputy Secretary to Government.

No. 82. ORDER THEREON, 3rd August 1867, No. 2,349.

MILITARY WORKS, No. 10.

Communicated to the Superintend-
ing Engineer of the 4th Division.

(True Extract.)

(Signed) J. H. M. SHAW STEWART, Major, R. E.
Under Secretary to Government.

To the Superintending Engineer, 4th Division.

Exd. S. T. Augustin.

2/2

Proceedings of the Madras Government, Public Department,
23rd July 1867.

Read the following papers:—

No. 237. From the Municipal Commissioners for the town of Madras, to the Acting Chief Secretary to Government, Fort Saint George; dated Madras, 4th July 1867.

We have the honor to submit, for the consideration of the Right Honorable the Governor in Council, a Memorandum drawn up by our Officiating Civil Engineer, Mr. Lee:—

1st.—On the construction of Lines for the 3rd Regiment Native Infantry on the esplanade, north of the old town wall, from which the “Seven” and other good water wells in Black Town and suburbs are likely to have the springs still further polluted than they are at present.

2nd.—On the urgent necessity for taking steps as to the distribution of water when brought into the Spur Tank, and which, from a letter to our President from Captain Magnay, appears may be the case in October 1868.

2. We also forward Minutes from the President, the Native Commissioner, and Mr. Orr on this Memorandum, as well as a statement kindly furnished by Mr. Pogson of the registered monthly rainfall in Madras from the year 1858 to 1867, with a diagram drawn by our Civil Engineer showing the depth of water in No. 1 well of the “Seven Wells” during that period.

3. With regard to the first portion of this Memorandum, we cannot but consider that, in a sanitary point of view, the erection of Lines for a Native Infantry Regiment on the spot proposed is a mistake, and that, unless great care is taken in the drainage, and for conveyance of sewage in an opposite direction to the “Seven Wells,” the water, already stated by the Government Analyzer some time ago to have 70 grains of solid impurities in the gallon, will be rendered undrinkable, and that the wells now on the esplanade, over one of which, by the plan furnished to our President by Colonel Freese, one block of buildings passes, and has its front face only 24 feet from another well, the water from both being extensively used for drinking purposes, will in a very short time, from the percolation of sewage, become too impure for use.

4. It is true that Government contemplate the bringing in from the Cortil-lar river and Red Hills, to the Spur Tank, water for the supply of Madras, but this we cannot expect under two years; but, allowing this, it seems to us very desirable not to be altogether dependent on one source of supply, but that the “Seven Wells” and other good wells in their neighbourhood may still be available in case of any delay in the project for bringing water to the Spur Tank, or when this may be retarded from any failure in the distribution scheme, such as accidents to engines, reservoirs, pipes &c; and, therefore, it is to be regretted, by building Lines for a Native Infantry Regiment on what may be said to be the “filtering bed” of the “Seven Wells,” that all these wells must in time be still further polluted.

5. The works are proceeding rapidly, and we request your attention to a Memorandum by our President on this subject, of this date. We would, therefore, venture respectfully to solicit Government to pause in its operations, before it is too late, and to direct the Acting Sanitary Commissioner and Principal Inspector General of Hospitals to report on the subject.

6. We have considered it our duty to bring this matter, which may so vitally affect so large a portion of the inhabitants of Black Town and suburbs, who draw water from the wells in the immediate vicinity of the "Seven Wells," and the Native Regiment who will draw it from the wells situated in the middle of their Lines, to the notice of Government, and shall be glad if the medical authorities be ordered to report on it.

7. With regard to the second portion of our Engineer's Memorandum, we would beg to ask the instructions of Government on this important point, viz., the distribution of the water; when brought to the gates of Madras—the Spur Tank. It is, we apprehend, quite clear that the Municipality are then to take charge of, and distribute, the water; but this is a plan of so comprehensive a nature, and one withal having to be carried out with the greatest care and minuteness of detail, that, with the great amount of work our Civil Engineer has on hand, and is likely to have for a long time to come, we feel that we could not expect him, unaided, to attempt the work.

8. We would, therefore, request Government to place at our disposal, as far as is compatible with the other work he has on hand, the services of Mr. Fraser, C. E. We name this gentleman specially, as he has had a great deal to do with the water supply of Madras, and has a perfect knowledge of the ground plan. If, therefore, we had Mr. Fraser to draw out the details, we should be able to carry out the executive portion of the works by contract, under his and our Civil Engineer's supervision. There would be a difficulty perhaps as to salary while so employed, but as it will be necessary to get out all the materials nearly from England, money will have to be borrowed for this purpose, and the amount of his salary could be included in this. Trusting Government may consider the two matters now brought before them of sufficient importance to merit early consideration, we have the honor to be, &c.

MEMORANDUM.

Government having sanctioned the construction of Lines for the men of the 3rd Regiment N. I. on the sands to the north of the old town wall, from which the "Seven" and other good-water wells in Black Town are likely to have their springs polluted or entirely dried up, the Officiating Civil Engineer thinks it his duty to address the Board on the subject.

The Commissioners having a public interest in these wells, as Trustees for the town and suburbs of Madras, should take the initiative step, before much progress is made on these buildings, to place the interests which they represent in a safe condition, and remove, as far as practicable, the consequences which would result from a failure of the only source of water supply to Black Town.

Majors J. T. Smith and F. C. Cotton, and Captain G. C. Collyer, of the Engineers, in their report to Government, so far back as 1852, state—"they are apprehensive that the gradual extension of crowded dwellings on that site may ere long have a sensible effect upon the purity of the supplies of fresh water gathered from the sand between Trivatoor and Madras. They think it would be very desirable to keep that neighbourhood free from dense occupation, as much as possible."

Undoubtedly.
C. D.

The theory that land springs are supplied from the sea is now exploded, and it is an established and well-recognized fact that they are fed solely by the water which falls on the earth, either in the form of rain or dew.

The water which is thus received is partially returned into the atmosphere by evaporation and vegetation. The remainder either flows away from the surface, or percolates the various permeable strata lying beneath, in obedience to the laws of gravity, until its further descent is arrested by encountering a stratum of an impermeable nature, such as clay. The water-bearing strata, resting upon the impermeable stratum of clay, follow an undulating course, sometimes rising to the surface of the soil, or outcropping, as it is technically termed.

To inquire into the capability of any deposit, it is necessary to ascertain the physical conditions under which the present supply is obtained. They are regulated—

- 1stly. "By the character and thickness of the water-bearing strata."
 - 2ndly. "By the areas over which the exposed surfaces and outcrops of these strata extend."
 - 3rdly. "By the position which their outcrop occupies on the surface of the country."
 - 4thly. "By the existence of any lines of disturbance, by which the subterraneous circulation of the water may be interfered with or stopped."
- These are essentially geological, and, as far as Madras is concerned, have not yet been investigated.

Having stated the prevailing theory of land springs, the gathering grounds for the supply of the wells in Black Town have to be examined, to obtain their water value.

Of the sands stretching from the town to Trivatoor, a very small area comparatively is available for feeding the wells, owing to irregularities of structure and position of the strata. The clay outcrops immediately to the left of the Washermenpettah Road, and thus cuts off all supply further west. On the east, the sea is close by, and from the water in the wells not being in any way affected by the tides, it is evident that an impermeable ridge intervenes. The town is situated immediately to the south—in fact close by to the enclosure wall of the "Seven Wells." The surface being covered by houses and roads, absorption is reduced to a minimum, and, therefore, this direction cannot be looked to as a source of supply.

The north presents an extensive area of sand, several miles in length, but there are the villages of Washermenpettah, Tondiarpettah, Coorookoopettah, Sunjeevroyenpettah, and Kauluttupettah built on this sand.

The line of saturation of the wells in Washermenpettah, and all the villages to the north, is 12 feet from the surface. The wells on the sands close to where they are now building have their water-level only 11 feet below the ground. In addition to the greater number of people that resort to these wells, the large quantities abstracted daily from the "Seven Wells" ought to cause a depression of the water line in the shape of a funnel, the lowest point being the "Seven Wells," and the highest the furthest end from which the supply flows.

From examination, this is found to be the case only within a very limited area. The "Seven Wells" themselves are the lowest, being 19 feet from the surface; then the wells close to them and within the town walls are 15 feet, and 13 feet, respectively, according to their distance; next, the wells on the south end of the sands are 12 feet; those on the north near the Railway crossing are 11 feet only. These figures show that all these receive their supply from the same source; but the wells of the villages further north have their water-level 12 feet, or 1 foot lower than the wells on the south of the Railway.

In the absence of a Geological Section, the difference of the level of water is taken as indicative of a line of disturbance running east and west somewhere between the wells and the village of Washermenpettah. The gathering ground being thus restricted to an area of about 200 acres, it becomes a matter of serious importance when 30 acres of it are taken up as building sites.

This estimate is, however, from the want of correct information as to the physical situation of these strata, problematical, but it may be sufficient to show that, not only will the supply be reduced by the absorbing ground being covered by buildings, but that sewage, percolating through the porous brick and chunam drains, will at no distant period destroy the purity of the water.

Owing to the defective nature of the brick drains, the two wells* nearest the town, Nos. 9 and 10, have been pronounced unwholesome, and the Chemical Examiner to Government reports the water to contain 70 grains of solid impurities in an imperial gallon.

* Of the "Seven Wells"
Shows the necessity for a proper system of drainage, and that the drains should not be constructed of the wretched material we have been using

The returns showing the water line of each well during the last 10 years prove that the supply is entirely dependent on the rainfall, as it varies according to the irregularities of the monsoons in each year. The accompanying diagram will show at a glance the influence the rain has on the wells.

The greatest depth of water is, therefore, between November and February, the lowest in October; and this confirms an old proverb "as the days lengthen, the springs shorten."

It is a noticeable fact that the yield is falling off every year: well No. 1 contained in 1859 12 feet of water, and in 1862 there was only 2 feet for 3 months. Since then, however, owing to better seasons, it has somewhat recovered, and this year there is now 5 feet of water in it. But all experienced Engineers seem agreed that it is not judicious to rely for a supply on an exceptional rainfall, but that the minimum should decide its merits. If, therefore, another such year as 1862 should visit us (when the water for 8 months in the "Seven Wells" was 3 feet deep) what would be the result?

Very unpleasant
C. D.

During the last 5 years, no care has been taken to prevent the gathering ground being reduced by new houses springing up on it.

Government ought to pause before they sanction any measure, the result of which will be the immediate consummation of what, under other circumstances, would be merely a question of time. It was never expected, by men of science, that the present supply of good water to the town would last long, and they have, for years past, pressed on Government the necessity of looking for other sources.

The project now under execution will certainly make the Public and Government independent of any local supply, but, until that is an accomplished fact, every means should be taken to keep the present supply as pure as possible.

Certainly
C. D.

I hope we may knock off three years from this, and see water brought in from the Spur Tank in two years, but it is necessary we should look into this matter at once, for all the materials will have to be got out from England. I have written to Captain Magney to propose going out to the Red Hills with Mr. Orr and Mr. Lee.

C. D.

The Lines are pushed on with the utmost expedition (the men having a personal interest in the undertaking are working with a will), and in the next south-west monsoon is sure to take contamination to the well springs. From whence then is the town and the Garrison of Fort Saint George to get their supply for four years?

Before concluding this report, it may not be out of place to force on the attention of the Commissioners the great necessity for taking immediate action in getting a proper project for the distribution. An error has unfortunately

been committed in the Report of the Commissioners for 1866, by stating that the Officiating Civil Engineer is employed on this project. Government, in their Order, did not contemplate that the details of such an important undertaking should be left to the Municipality to design. It will take an experienced Engineer, devoting his uninterrupted attention, about a year* to complete.

Proceedings of Madras Government, Public Works Department, 5th February 1867
Extract from a letter from the Right Honorable the Secretary of State for India.

Paragraph 3 It would then only remain for the Municipality to construct the distribution works, and, if any difficulty were found in raising sufficient funds for that purpose, Government would apparently incur little or no risk in advancing the money on the security of water rates, fixed sufficiently high to be likely to pay off principal and interest within a limited period.
Not so long I hope
C. D.

None at all but this is a matter for our earnest and serious consideration, and not one admitting of delay.
C. D.

Most certainly; and if all this were done while Captain Tulloch was at Home, he might be of great assistance in selecting what was required, as he has so thorough a knowledge of the ground plan of Madras.
C. D.

not too soon to press for the details of the project, and to take the necessary measures to ensure the completion of the distribution works, if not anterior, at least contemporaneously with that of supply.

(Signed) S. LEE.
Offg. Civil Engineer.

CIVIL ENGINEER'S OFFICE,
MADRAS, 14th June 1867.
To the Municipal Commissioners, Madras.

OBSERVATORY, 19th June

MY DEAR COLONEL DENISON,

You require the average monthly rainfall for (?) years—I cannot decipher the figures (not yours) whether 10, 20, or 60! Now upon the succession of years selected every thing depends; for the annual average of the five years 1844 to 1848 was above 63 inches, whereas that of the six years 1860 to 1865 was only about 41 inches. The twenty year average, 1841 to 1860, was assumed here as standard until lately, and was 50.75 inches. The best result of all is, however, what I have only very lately completed, a sixty year mean, ending with 1866. The annual average by this is 47.82 inches, distributed throughout the year as in the table on next page. Any more detailed information required I will, of course, supply with pleasure. Do not forget that 20 inches can come here in less than as many hours in monsoon time.

Believe me, &c
(Signed) N R POGSON.

MADRAS RAINFALL,
Average of sixty years to 1866

	Inches
January 1-15	0.60
" 16-31	0.29
February 1-14	0.20
" 15-28-29	0.02
March 1-15	0.14
" 16-31	0.34
April 1-15	0.25
" 16-30	0.43

*Proceedings of the Madras Government, Public Department,
23rd July 1867.*

May	1-15	1 43
"	16-31	0 83
June	1-15	0 70
"	16-30	0 95
July	1-15	1 63
"	16-31	1 78
August	1-15	2 05
"	16-31	2 33
September	1-15	2 46
"	16-30	2 12
October	1-15	3 89
"	16-31	7 01
November	1-15	6 94
"	16-31	5 96
December	1-15	3 48
"	16-31	1 94

Annual Average . 47 82

MINUTE.

This is a very interesting and important document, and deserves our best and earliest consideration. I think the Civil Engineer has considerably over-estimated the time at which we may expect a supply of water to Madras from the Red Hills, and that if we are to wait five years for so desirable and necessary a project being carried out, the Government and Municipality will most justly deserve censure. In a conversation with His Lordship the Governor last Saturday morning, he said Captain Magnay had told him he should have water, if necessary, in the Spur Tank in 10 months. I think, however, this is not very likely to be the case, and, if it were, would be of no use, as it would find the Municipality quite unprepared with the distribution works. There is, of course, an immense deal to be considered as to the proper distribution of the water when once brought to the Spur Tank, where and how many reservoirs, construction of filtering beds, &c.; and then nearly all the materials, engines, iron piping, &c., will have to be got out from England. In the Minute by the Right Honorable the Governor, No 71, of the 28th of January 1867, he says, in paragraph 2, under head of what he proposes should be done, "that the correspondence which has occurred on this subject should be communicated to the Municipal Commission and the Public, with a view to the discussion of measures for the construction of the distributive works."

2. The Board, in their Order on this, on the 14th of February 1867, said "ordered to be referred to the Officiating Civil Engineer, with a view to his reporting as to the measures for the distribution of water within the town"

3. But I consider this Order as tantamount to nothing, and that it is useless to expect our Civil Engineer, with the immense amount of work, in-door and out-of-door, he has on hand, and is likely to have for a long time to come, can, unaided, prepare such a plan, which must not only be most comprehensive, but all the minutest details require to be carefully marked out; and I propose, therefore, that we ask Government to assist us, if, as I take it, it be their intention that, when the water is brought by them to the gates of Madras, viz, the Spur Tank, the Municipality are then to take charge of and deliver it to all such places as shall be decided upon within municipal limits.

4. I shall be glad if, for the distribution project, we have the services of Mr. Fraser made available, as I know he has studied the matter very carefully. The difficulty would be as to salary, but as we shall have to borrow money from the Supreme Government to carry out the distribution project, such salary as might be fixed upon could be also borrowed.

MUNICIPAL COMMISSIONER'S OFFICE,
19th June 1867.

(Signed) C. DENISON,

*Proceedings of the Madras Government, Public Department,
23rd July 1867.*

MINUTE.

Since writing the foregoing, I have received a letter from Captain Magnay, saying he hopes to put water in the Spur Tank by the first Fresh of October 1868.

2. I have also inspected twice the site of the new Lines north of the "Seven Wells", and last evening with the Native Commissioner and Mr. Lee, and with a plan kindly furnished me by Colonel Freese, Commanding 3rd Regiment Native Infantry, submitted to the Board to-day together with his letter, we carefully inspected the ground of the four outer blocks to the north. One has been erected, and will soon be ready for roofing, another has the two gable ends partly erected.

3. The fourth block, when erected (and the north end of which by the plan encroaches on the road leading to Ennore) passes directly over a fine well, the water of which is, I understand, much used by people of the Sudra Caste; and there were many drawing from it last evening. An interval in the building is I hear to be left, so that this well would be nearly the centre of the 4th block; and 24 feet from its front face is a splendid well with more excellent water, very largely used by the Brahmans, and was crowded last evening. This well is not shown in the plan (and No. 1 block almost touches the road) is another very fine well, the water of which is only used for domestic purposes.

4. Of the eight adjoining blocks in the place between Nos. 1 and 2 blocks from the road, (and No. 1 block almost touches the road) is another very fine well, the water of which is only used for domestic purposes.

5. There are, therefore, three fine wells—two extensively used for drinking purposes, and one for washing and cooking—directly in the heart of the proposed Lines, and though Colonel Freese in his letter says, "as regards the sewerage, any one acquainted with the interior economy of a Native Regiment can inform you that from the ample supply of toties and sweepers furnished by Government, together with the constant supervision of both European and Native Officers, no spot is cleaner than its Lines," with all due deference to such high authority, having seen something of Barracks and Native Lines in my own service, I cannot but consider the "filtering bed" for the "Seven Wells," and in close contact with three fine wells (all of which were cleaned and put in order last year) as a grievous mistake, and about which we should address Government without loss of time. I do not quite see why this spot has been selected. Had the other side of the road been fixed upon, there would be space sufficient for the twelve blocks of buildings, I think, though perhaps not for all the others. We should, of course, have had to remove the public latrine, but this we would gladly do, if Government will, before it is too late, reconsider the question. The ground where they are now building on would have made an excellent Parade and Drill Ground.

6. Colonel Freese also says—"the blue lines in the plan will show you the extensive nature of the drainage proposed to be carried out by Government, at an additional expense of 25,000 Rupees." We, however, know something about drainage, and that, unless the utmost care be taken in the construction of the drains and material used, the sewage is eventually pretty safe to find its way through the sand, and so further contaminate the springs from which the "Seven Wells" draw their supply, and effectually contaminate the wells situated within the Lines.

7. My opinion, therefore, is that it is a mistake erecting Lines for a Native Infantry Regiment on the spot marked out in the plan, when there is ground on the other side of the road, which might be made available, and which is, I believe, a clay soil, so would not allow of percolation, and though it is to be hoped, before two years are over, Madras may draw its water supply from the Cortilliar river and Red Hills reservoir, still I maintain it is as well to have another source of supply open to the large population of Black Town and its suburbs. Any defect in the distribution project, any accident to the engines, reservoirs, pipes, &c., might make all that neighbourhood for a time dependent on the supply of water from the "Seven" and other good wells; and, under any circumstances, I imagine there would always be a certain amount taken from these wells, and from those situated in the proposed Lines, and which, in course of time, would contain probably more than 70 grains of solid impurities in the gallon, the amount stated by the Chemical Examiner to Government to be contained in the "Seven Wells" water some years ago.

8 Another great objection to the plan is that the Lines run north and south, instead of east and west, so will not benefit so much from the sea breeze.

9. I propose, therefore, we at once address Government on this subject, asking them to stop operations until the matter has been reported upon by the Acting Sanitary Commissioner and Principal Inspector General of Hospitals

MUNICIPAL COMMISSIONERS' OFFICE,
MADRAS, 4th July 1867.

(Signed) C. DENISON

MINUTE.

The matter brought to notice by the Officiating Civil Engineer in this interesting Memorandum is a most important one.

2. There was at one time no source of supply of good water within Black Town that contained better or larger quantities of water than the "Seven Wells"; but these wells have for some time past been gradually deteriorating in the quality of their supply. The water supplied to the Garrison has become almost unpotable, and chemical examinations have proved that the water has become highly impregnated with animal matter and other impurities.

3. The gradual increase of habitations around the locality where these wells are situated, and the percolations from those habitations into the springs from whence these wells are supplied, have greatly tainted the stream, and any further augmentation to those sources of impurity should be brought to the notice of Government, as, thereby, not only the health of the people in the city who use the water of these wells will be affected, but also that of the troops in Garrison, whose maintenance cost Government so large a sum.

4. I am really surprised that the locality referred to has been selected for the Lines, and I am further surprised to observe that no drainage appears to have been at all provided for these Lines; so that the increase of the evil alluded to is indubitable, as every drop of impure and foul liquid that is not drained away from the locality must certainly percolate towards, and inevitably pollute, the streams below.

5. I, therefore, recommend that Government be at once addressed on the subject, with the papers relating thereto, with the view of the Lines in question being removed to some other locality. The esplanade west of the locality on which the Lines are now being built will afford sufficient room, and the Lines can be there constructed with advantage.

6. The matter should at once receive the serious consideration of Government, by whom a Committee may be appointed to investigate the subject.

7. With regard to the distribution of fresh water, when the same is brought to the Spur Tank, I would beg to observe that Captain Tulloch has taken with him to England a minute ground plan of every portion of the city, and if it be once decided to what places the water shall be carried, it will be easy for Captain Tulloch to make arrangements, on behalf of the Board, for the required tubings, &c., and the necessary specifications can be prepared by our Civil Engineer, aided by Mr. Fraser, the able Government Engineer, who deserves so much credit for the skill and ability manifested, and the pains and trouble he has taken in maturing this most important scheme, the supply of fresh water to the town.

MUNICIPAL COMMISSIONERS' OFFICE,
MADRAS, 19th June 1867.

(Signed) S. JESUDASEN,
Municipal Commissioner.

P. S.—The two lines of huts which are being built may be allowed to remain, but the others can be well built on the esplanade west of the road, and on the sites of the present Lines. It is observed that the Lines under erection run in an oblique direction, north to south, thereby shutting out the sea breeze entirely. They should have been built from east to west, leaving good roadway between each line of huts, so as to admit of free ventilation, and circulation of the sea breeze. The present plan is very defective: the public wells come, some within, and some quite close to the Lines, thereby endangering the purity of the streams, and precluding the use of the wells by the Public. The public convenience and health require that this matter should at once be taken notice of.

(Signed) S. JESUDASEN.

MINUTE.

I have read with interest the report of the Officiating Civil Engineer in reference to the curtailing of the area of the watershed from which the "Seven Wells" draw their supply, by Government erecting Lines for the 3rd N. I. near the old wall, occupying a space from 20 to 30 acres

2. In considering the subject, under the circumstances in which we are placed, if the Lines are far advanced, it is very awkward to ask Government to withdraw. Again, we find, from the report and Mr. Jesudasen's Minute, that the water is very bad now, and if the Lines were erected elsewhere, the water would not be better than it is now.

3. It is clear then we must look to another quarter for the remedy for all the evils complained of, viz., the water supply now in course of being brought into the Spur Tank. I would, therefore, urge the present encroachment on the source of water supply for the "Seven Wells" as another cogent reason for entreating Government to expedite the bringing in the water with as little delay as possible. I do not know what progress has been made in the work, but it is a gloomy prospect to look forward five years for its completion, as hinted at in the report. I would say that another year ought to be nearer the time, as it requires two working seasons to execute the whole work; and, if Lord Napier urge the matter, we would not require to wait long to see this long looked for boon in our midst.

4. As to the distribution, our Commissioners and our good President, bestirring themselves, might be ready, by the time the water is brought in, to send it over all Black Town at least by pipes and wells put down in the streets. In 1860, I wrote a pamphlet on water supply and cleansing of Black Town drains. We allowed then, for the distribution in Black Town, 15,840 yards of 8 inch pipe, and 1910 lineal yards of main, 3 feet diameter, the total cost of which was, with laying, estimated at Rupees 1,88,389. Of course, on the nature of distribution will depend the quantity and kind of pipes. The best mode of distribution ought to be gone into at once, in which I shall be very happy to assist.

(Signed) P. ORR.

26th June 1867.

Referred to the Inspector General, Medical Department, and the Acting Sanitary Commissioner, for immediate report.

2. It is requested that Doctors Mackenzie and Montgomery will state whether the objections raised by the Municipal Commissioners to the site selected for the erection of the Lines are so grave and indisputable as to render it desirable to stop the prosecution of the works which have been already commenced.

3. It is further requested that precise direction of the drainage may be carefully ascertained, as it does not appear that the mere vicinity of the Lines to the "Seven Wells" is sufficient to condemn the situation of the lines.

(Signed) R. S. ELLIS,
Acting Chief Secretary.

FORT SAINT GEORGE,
10th July 1867.

No. 233. From W. MACKENZIE, Esq., M. D., Inspector General, Indian Medical Department, and H. B. MONTGOMERY, Esq., M. D., Acting Sanitary Commissioner, Madras, to the Acting Chief Secretary to Government, Fort Saint George; dated Madras, 12th July 1867.

In reply to your reference, under date 10th current, directing us to report whether certain "objections raised by the Municipal Commissioners to the site selected for the Lines at Royapooram are so grave and indisputable as to render it desirable to stop the prosecution of the works which have been already commenced" &c, we have the honor to submit the following report for the information of Government.

2. We have this day carefully examined the site of the proposed Lines. Two blocks of buildings are now erected, but not roofed in. Materials in large quantity are on the ground, and the men are actively employed in constructing the Lines.

3. The Municipal Commissioners for the town of Madras maintain that, "unless great care is taken in the drainage, and for conveyance of sewage in opposite direction to the 'Seven Wells,' the water, already stated by the Government Analyzer some time ago to have seventy grains of solid impurities to the gallon, will be rendered undrinkable."

4. It might be sufficient to reply to this objection that arrangements have been made for the purpose indicated; but to relieve Government from all anxiety on this point we may state that, on an examination of the plan of drainage proposed by the Superintending Engineer, we find (1) that, along the front of the enclosure of each house, an open drain runs, which, at the end of each block of buildings, passes into a closed drain completely impervious to sewage of any kind; (2) that one covered drain passing along the contour line of the ground receives the contents of all the minor (open) drains, and eventually empties itself into one of the closed town drains, about half a mile to the east of the Lines, in a direction entirely away from the "Seven Wells."

5. We do not consider that such a system of drainage, if carefully conserved, can produce any deleterious effect upon the "Seven Wells," between which (in the case of the nearest or northern well) and the nearest part of the drainage 600 feet of ground intervene, while included in this space are the foundations of the town wall and the public road.

6. It is to be observed, also, that the old Lines of the Regiment are in part situated not more than 200 feet from the new Lines, and in the same direction as those now planned, and for these Lines for the past ten years no drainage whatever was provided. We cannot find that the Municipal Commissioners have ever represented that any evil effect was induced by the old Lines, and we have further to observe that, within 150 feet of the "Seven Wells," some of the ill-made open town drains of Madras have been allowed to exist.

7. On the occasion of our visit this day, we counted about 100 dhobies washing on the open plain where the Lines, are to be erected, and we need hardly remark that the soiled water resulting from their operations, and which is of necessity largely charged with organic impurities of the most offensive character, must tend, much more than Regimental Lines properly conserved could possibly do, to taint the soil into which it passes. In addition to this, a most foul collection of stagnant water lies in the open space, and cattle of all kind are allowed to stray over the ground. We respectfully submit that the change of occupation of the ground proposed will not only prove not injurious, but that it will effectually prevent contamination, now inevitable, and of hourly occurrence.

8. In the plain to be built upon there are six wells: of these two only afford potable water. One good and one indifferent well must be sacrificed in the construction of the Lines. But the water supply can be readily increased by the sinking of one or more deep wells where probably good water can be easily reached.

The symmetry of the Lines would be needlessly broken by any attempt to preserve the one good well which will be lost, and Captain Tulloch has reported* that, at the other side of the Ennore road, "a

* Proceedings of late Sanitary Commission, August 1864, pages 52 and 53.

well that was dug a few feet north of the rampart, but south of the Government Distillery, yielded very good water." This place is close to the public road, and would be much more suitable for resort by the general population than wells close to Regimental Lines.

9. In compliance with the Orders of Government, we have next to report in detail the system of drainage to be adopted. This has been already noticed in paragraph 4 of this report, and we forward, herewith, a plan of the proposed lines of drains, prepared by Captain Goddard. This system of drainage is fully described in paragraph 13 of the report by the Honorable Mr. Ellis, Dr. Mackenzie, and Major Drury, recorded in Proceedings of Government, with Order, No. 854, dated 9th March 1867, wherein it is approved.

10. In one of the enclosures in the reference of Government under reply, Native Surgeon Jesudasen, the Medical Commissioner of Madras, has questioned the propriety of the site selected, and his remarks betray a want of acquaintance with facts that cannot be passed over without notice. His surmise that no drainage was contemplated could have been easily disposed of, had he made inquiry on the subject, and his "surprise" at the selection of the Lines should certainly have found expression earlier than four months after the allotment of the ground by Government and the commencement of the works.

11. The Native Commissioner also suggests that the esplanade west of the locality chosen should be selected for the Lines, but it should be brought to the notice of Government that this site was carefully examined by the Committee named in paragraph 9 of this letter, and condemned on two grounds—(1) the distance of it from the Hospital and Place of Arms, and (2) the fact that the ground is confined in position, and insufficient in space.

12. Mr. Jesudasen makes certain observations regarding the direction of the lines of huts as regards prevailing winds. These observations are intended apparently to call in question the propriety of the suggestions on this point already submitted to, and approved by, Government. These observations are in every respect as erroneous as those noticed in last paragraph. The huts are placed so that the roadways run to the S. by E, from which point and the S. and S. E., the sea breeze blows more frequently than from any other (vide Captain Tulloch on the Drainage of Madras, Chart to face page 109). The direction indicated by the Medical Commissioner would have most effectually shut out the prevailing winds from all the Lines, except the northern and southern ranges.

13. His remark regarding "good roadways" between each line of huts is superfluous. Plans show that the streets are designed to be 40 feet wide, or 15 feet in excess of the regulation. For two Companies, the regulation width of road between the huts has, in consequence of the limited space available, been, of necessity, adapted, but a cross roadway, 50 feet wide, has been pierced through the blocks. This road runs N. E., and will be thoroughly ventilated by the wind from that quarter.

14. We append, for the information of Government, copy of letter from Officer Commanding 3rd Regiment now stationed at Royapoorum, and remarks thereon by the Inspector General, Indian Medical Department, and the Officer Commanding the Centre Division.

From Colonel W. FREESE, Commandant, 3rd Regiment L. I., to the Quarter Master General; dated Royapoorum, 5th July 1867.

Having received intimation from Colonel Denison, President of the Municipal Commission, of the intention of that body to address Government on the subject of the erection of new Lines for the 3rd Regiment, L. I., at Royapoorum, on the plea that the sewerage of so large a body of men would, by filtration, contaminate the water of the "Seven Wells" and other wells situated in Black Town, I have the honor to request you will lay before His Excellency the Commander-in-Chief the following report, with a view that (should he consider it necessary) Government may be put in possession of facts which would go far to prove that the Municipal Commission, urged to this act by petitions from certain Natives, residents of Royapoorum and Black Town, are proceeding on grounds not one of which has any foundation, and that these grounds are made the cloak of objections to the erection of these Lines for other and personal reasons, which I shall have the honor of stating in this report.

2. Anybody conversant with the interior economy of a Native Regiment would be aware that the increasing supervision of the Lines by both European and Native Officers rendered the collection of any sewerage an impossibility.

3. The Lines are not only under the immediate charge of the Quarter Master, who is answerable for this cleanliness, but the Native Commissioned and Non-Commissioned Officers residing in them are held strictly responsible for the requisite sanitary measures being fully carried out. They are authorized and ordered to inspect and report upon any house from which a bad odour may arise, or of which suspicion of its non-cleanliness may occur; and, further, it is one of the duties of the Orderly Officer of the day to inspect and enter in his report the state of cleanliness or otherwise of the Lines in general; and, in addition to this, may be added the frequent visits of the Commandant, to ensure his orders being carried out. The old Lines of the Regiment abut upon the present projected ones, and have been in use by Native Corps for a period of nine years, yet, to this day, the objections now brought forward, which would equally apply to the old as to the new, have never been started, though, from the crowded state and wretched material of these huts, filth would be much more liable to remain unperceived than in the open Lines now projected, where, with the adoption of the regimental sanitary measures, it would be impossible; and yet, even through these lines of miserable hovels, if the Municipal Commissioners had been pleased to make inspection, they could not but have remarked upon the absence of all offensive matter, and the pureness of the atmosphere, in comparison with that of the portion of the town surrounding the "Seven Wells" and Royapoorum in general. In fact, I have no hesitation in asserting that the area comprehending the Lines of the Native Regiment is the only permanently sweet spot in Royapoorum.

4. One portion of the site intended to be built upon is now made use of by a considerable number of dhobies, and is intersected by small nullahs filled with black offensive refuse; and the adjacent small tank is stagnant and green with a thick black unctuous deposit, so that, if contamination to the "Seven Wells" by surface filth is so possible and objectionable, surely some remedial measures would have been applied to what is, and has been for a long time, apparent. The erection of the Lines upon this spot will ensure that cleanliness which is now wanting, and should be looked upon by the Municipality as advantageous to their interests, rather than the contrary. I would here mention, in support of my opinion that the arguments against the occupation of this spot have no foundation, the fact that the sweetest well of water for many miles round is situated in the midst of the old Lines.

5. The ostensible reason given by the Municipal Body for their objection to this spot being built upon will be given in their memorial. The real reasons I believe to be as follows, viz., the

3 petitions of a large body of the Native community, who are induced to this act, firstly, by the influence possessed over them by the Brahmins resident about this spot, and who, for bathing purposes, have been accustomed at all hours of the day to make use of certain wells now about to be annexed to the Lines; secondly, by the power possessed over the minds of these people by certain "Sunniasees" (pseudo) holy men, resident in a "Mundla" abutting on the new Lines—men whose days are spent in begging and nights in debauchery, and in whose favor, some short time ago, a petition, complaining of the presence of the dhobies, who, doubtless, will be inconvenienced, being urged to this course of proceeding by the dhobies, who, doubtless, will be inconvenienced.

6. The above, I believe, to be the real and only grievances which the memorial of the Municipal Body gives under another colouring. With the facility for making wells in ground where water is everywhere but six feet from the surface, the first and last grievances are easily remedied; and, with regard to the second, I believe that another spot of ground given, with a few hundred Rupees, to these so called holy men, would be eagerly accepted, while the removal from the vicinity of the Native Corps of themselves and their evil habits would be of the greatest advantage. I would point out to His Excellency that the men have worked hard and willingly; that the building is considerably advanced; and that, were it now put a stop to, they would be thoroughly disheartened, and, in any future work, would labor under the impression that their exertions might again be rendered of no avail.

7. From the easy access to material, in no other spot could the Lines be built in so superior a style at so small a cost. Already nearly Rupees 3000 have been expended; contracts for the supply of further material have been entered into; and, if the work is now put a stop to, remuneration for labor, from which they derive no benefit, would naturally be looked for by the men.

8. I trust His Excellency will excuse the length to which I have extended this report upon a matter I consider of vital importance to the Regiment I command, and that he will be pleased to take the subject into consideration, with a view that Government may not decide upon a hearing of one side only.

No. 92.

In forwarding the above letter for the information of His Excellency the Commander-in-Chief, I would observe that the objections taken by the Sanitary Commission appear to have no validity. It will at once be seen, from an inspection of the site, that no portion of the proposed Lines come within about 200 yards of the nearest of the "Seven Wells," whereas to the south—only 50 yards from No. 1 well—there is a dense bazaar, intersected by a net work of drains, filled with fetid black filth. The drainage of the Lines, on the contrary, has been planned by the Department of Public Works, in communication with the Sanitary Commissioner, and is, I understand, to consist of tarred earthen-ware pipes laid in concrete, from which no sewage can percolate into the soil.

* Should be Municipal.
H. B. M.

(Signed) D. FRASER, Colonel,
Commanding Centre Division.

HD. QRS, CENTRE DN.,
ST. THOMAS' MOUNT,
8th July 1867.

From the Inspector General, Indian Medical Department, to the Quarter Master General; dated Fort Saint George, 11th July 1867, No. 2543.

In returning the letter from Colonel Freese, forwarded for my perusal, under your docket, No. 4480, of the 9th instant, I have the honor to observe that, from my acquaintance (as a Member of the Committee which planned the new Native Infantry Lines at Royapooram) with the arrangements made for the thorough drainage of the site, and from my knowledge of the state of conservancy now maintained in all Native Regiments, I am convinced that there will be far less risk of contamination to neighbouring wells from the ground being occupied as projected, than from its being left in its present condition; and I fully agree with Colonel Freese that the objections raised by the Municipal Commission to the proposed occupation of the site are entirely groundless.

*Proceedings of the Madras Government, Public Department,
23rd July 1867.*

No. 239.

ORDER THEREON, 23rd July 1867, No. 894.

Resolved that the foregoing report of the Inspector General of the Indian Medical Department and the Acting Sanitary Commissioner be communicated to the Municipal Commissioners.

2. The Government will content themselves with remarking that the site selected for the erection of the new Native Infantry Lines was chosen after mature deliberation, as being the best available for the purpose; and that every precaution, with regard to drainage and conservancy, appears to have been taken for rendering the site and the dwellings commodious and healthy for the Troops. They will no doubt be cleaner than the adjacent portions of the town.

3. The Government are of opinion that the "Seven Wells" will certainly not be more liable to contamination from the proximity of the Lines than they are under existing circumstances.

4. It is desirable, for the purposes of official convenience, that each communication from the Municipal Commissioners should, as far as possible, be complete in itself, and be unaccompanied by the separate Minutes in which it has originated.

(True Extract.)

Wm. A. S. Ellis

Acting Chief Secretary.

To the Municipal Commissioners for the town of Madras,
with a diagram and two statements, returned.

- „ Inspector General, Medical Department.
- „ Sanitary Commissioner.
- „ Military Department.

Exd. J. H. Burns.

Military Department

No. 2787

22

Communicated to the

Commander in Chief.

*Munition Colonels,
Dy. Secy. to Government*

*Fort Saint George,
29 July 1867*

*The Quarter Master General.
Barack Master, Fort St George.
Brigade Major, Fort St George.
Public Works Department.*

5456

Pro: of Govt. for August
No 2059.

Pro: of the Hon. Govt.
in the office of the

21 29 July 67
Pro: of the

Pro: of the

Communicating the
orders of Govt. in the Public Dept.
on the representations of the
Principal Commrs of the inquiry which
is likely to be caused to the opening
of the "Seven Walls" by the construction
of lines for the 3rd Regt. dr. I in the
site selected for them at Pozapomam.

No 2049. 2nd August 67

With an order

bid

Pro: of the

Comm: to the Judge

No 81-82

No 2054 de Guatemala
2nd August 1867