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TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

Public works - DEPARTMENT

G.O. No.	2347 W	Press.
B.P. No.		Mis.
Dated	11-9-1882	187.

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Not to be folded or roughly handled

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

General.
Account.

No. 82.

READ—the following papers:—

From Lieutenant-Colonel W. H. BURTON, R.E., Executive Engineer, Presidency, to the Superintending Engineer, Fifth Circle, dated Chepauk, 25th August 1882, No. 2254.

I have the honor to report, with reference to G.O., No. 2023 W., dated 8th August 1882, and your endorsement No. 2994, dated 8th August 1882, that the only residence available and suitable to the Engineer in charge of the Ulsoor Water Works is the most northern of a group of houses on the eastern shores of the tank, which can be now rented at Rs. 45 per mensem.

It is 750 yards off the rock engine. I would request very early sanction to renting this house.

No. 1936.

Endorsement on the above.

Colonel Burton tells me that the Lieutenant-General Commanding the Mysore Division approves of the house which is situated on Kensington Road. Orders are requested upon paragraph 4 of G.O., No. 3578 of the 13th July, Military Department, in Public Works Department No. 2023, dated 8th instant, whether the house should be hired.

CHEPAUK,
25th August 1882.

(Signed) H. L. PRENDERGAST, Colonel, R.E.,
Superintending Engineer, Fifth Circle.

To the Chief Engineer, Public Works Department.

No. 665 E.

Referred to the Military Department for approval.
Very early return requested.

(By Order.)

30th August 1882.

(Signed) ROSS THOMPSON, Lt.-Col., R.E.,
Acting Under Secy. to Govt., P.W.D.

No. 4636.

MILITARY DEPARTMENT.

Approved.

(By Order.)

OOTACAMUND,
31st August 1882.

(Signed) E. L. HANKIN, Colonel,
Acting Secretary to Govt.

No. 83.

ORDER—dated 11th September 1882, No. 2347 W., Public Works.

The Superintending Engineer, Fifth Circle, is authorised to rent the house referred to at Rs. 45 per mensem, as a residence for the Engineer in charge of the Ulsoor Water Works.

(True Extract.)

For Under Secy. to Govt., P.W.D.,
Irrigation Branch.

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

Exd. S. T. Austin.
Spare Copies

2/
2347

GENERAL
ACCOUNT.

Govt. of [1882] Madras.
PUBLIC WORKS.

Dated September, 11th.

Recd.

Encl.

G.O., 11th.Sep. 1882, No. 2347 W.

SEPTEMBER.

Nos. 82-83.

House for the Engineer in
charge of the Ulsoor Water
Works.

The Superintending Engineer, Fifth Circle,
authorised to rent a — at Rs. 45 per mensem.

3/2347
GOVERNMENT OF MADRAS.

MILITARY DEPARTMENT.

13th July 1882, No. 3578.

Sanitary—Reports and Returns.

Read the following papers:—

No. 243. From Sir ANTHONY D. HOME, v.c., k.c.b., Surgeon-General, Her Majesty's Forces, Madras, to Colonel E. L. HANKIN, Acting Secretary to Government, Military Department; dated Madras, 3rd March 1882, No. 103-82.

On the completion of my recent tour of inspection of hospitals, barracks, &c., at the several stations sanctioned in G.O., No. 367, of 23rd January 1882, I have the honor to report, for the information of the Right Honorable the Governor in Council, that, speaking generally, I found the sanitary state of the buildings in the cantonments well cared for; no instance of very serious default in this respect came under my notice; here and there a probably casual laxity in the carrying out of conservancy arrangements was observed. Of small little organic defects, in the lodging of the European soldiers and in the environments of their dwellings, capable of being abated, I have to report chiefly respecting one instance, and in this instance I am not prepared to say that any complete remedy is applicable.

It will be convenient to make the remarks I have to offer on each station *seriatim*.

Secunderabad.—This large station, the barracks of which are magnified structures, models of commodiousness and conspicuous examples of wise liberality in arrangements for the comfort of the soldier, has been less healthy since its occupation than many stations at which the outlay for sanitary improvements has been in comparison trifling. The disappointment felt at the want of results commensurate with the care given and the money expended has led, I think, to the fastening now on this, and now on that, defect, the continued existence of which is held to keep in abeyance the prophesied good effects which should follow successive measures for the sanitary improvement of the cantonment. The latest expression of this feeling is seen in the Memorandum of the Army Sanitary Commission, dated 22nd July 1881, and both on account of the professional eminence of the Commissioners themselves and of the prominence given to their views by Her Majesty's Secretary of State, it is incumbent on me to refer to them in this connection. It has been pointed out year after year, in the reports of the medical officers of regiments at Secunderabad, that no means are taken to carry to a distance the roof water from the various buildings in the cantonment; the water flowing off the roofs is received into gutters between the walls and the roofs, and is thence discharged by means of short stone spouts (gargoyles?) on the ground close to the foundations of the buildings; this practice ignores one of the first principles of sanitation, which is that dryness of the ground close to a dwelling shall be efficiently provided for; its ignorance is very properly regarded as an evil at Secunderabad—one contributing to the prevalence of ague amongst the troops in the buildings there, besides interfering with the reasonable comfort of the men in wet weather. The remedy need not be pointed out it is obvious, and that no practical difficulties exist to prevent the making of channels around the buildings to carry off the roof water to a sufficient distance is evidenced by the fact that very suitable conduits have been made for the

Royal Artillery Barracks at Bangalore (some being also in course of making) in ground not greatly dissimilar to that at Secunderabad. I strongly recommend that this matter should receive immediate attention.

Another alleged insanitary condition often reported (indeed the subject of yearly report) as injuriously affecting the men quartered in the two European Infantry Barracks is that of the existence of much broken ground on every side in the environs of both buildings, in part due to the cutting up of the surface into deep channels by the floods of storm water, and in part to the neglect to fill up the hollows from which stone boulders have been quarried. A proper system of surface drainage outside, and continuous with that within the barrack compounds, is an evident need, and its execution on a judicious plan will contribute to the conservation of the health of those inhabiting the barracks. That the necessary work to effect the intended purpose will be both difficult to plan and difficult to effect is a fact which it requires no technical knowledge to understand; the ground to be operated on contains immense or half buried-boulders of gneiss and of other primary rocks, opposing the course of any line of drainage whatever that might be selected, whilst at places the necessary channels might require to be cut through the rock itself. The great scour of the storm floods would necessitate the use of very solid and of very well laid masonry, and the question of outfall would be a perplexing one. I mention these matters not with the view of acquiescing in the relegation of the project to some future time on account of its expense and difficulty, but with that of showing that, whilst I appreciate the onerousness of the task, I yet think that, as a sanitary measure, it is urgent.

To fill in the numerous small quarries near the barracks and to level the rough ground where this is required in order to prevent the lodgment of water would not be difficult; the employment for this purpose of the labor to be had from the neighbouring military prison might perhaps be practicable; at the proper season and at proper hours the work would benefit, rather than injure, the men in confinement.

The measures advocated above are conducive to the attainment of dryness round the dwellings of soldiers, an important sanitary need in every country, and especially needful one in this; their appropriateness will not, I feel sure, be disputed, nor, as I think, will their execution be considered as impossible; the next measure I have to recommend is one the propriety of which has been evident to every medical man whose duty it has been to consider the subject, and it has been recently strongly enforced by the Army Sanitary Commission in the memorandum previously referred to; the possibility of any engineering work proving effectual for the purpose in view, however, is doubtful. The matter in question is the drainage of the low swampy ground between the two Infantry Barracks and situated about half a mile to the south-west of the 2nd Infantry Barrack. The ground lies low; it is the natural drainage outlet of much of the neighbouring higher ground; the house-water drain of the entrenched camp barracks has lately been carried to this point for discharge, and several wells exist in it for the procuring of water with which to irrigate the fields about here, many of which are cultivated in rice; the swampy ground is sinuous in configuration, is of irregular level, and is of considerable extent. The acquisition of the ground by Government might not be an easy matter; it is understood that it belongs to persons of influence in Hyderabad who might not wish to be expropriated. To the existence of this unwholesome ground successive medical officers have attributed much of the malarial sickness from which the men (particularly those in the 2nd Infantry Barrack) have suffered, and their opinion has received the high sanction of the Army Sanitary Commissioners. Viewing the matter as one of statistical evidence, I am obliged to say that this is not very strong; the comparative incidence of the diseases caused by malarial influence has not been very much greater in the barracks most under the influence of the emanations from the swampy ground than in those of the entrenchment, and the question is complicated with that of the effect which the particular views of individual medical officers, in discriminating different illnesses, may have had. This will be seen in the return (A) appended.

A.
Return showing the relation of Sickness to Locality in the Cantonment of Secunderabad for the Years 1872 to 1881.

Barracks	Rate per 1,000 of Strength.									
	Admissions into Hospital.	Deaths.	Invalids.	Average Daily Sick.	Admissions from all Causes.	Admissions from Malarial Fevers.	Admissions for Dysentery and Diarrhoea.	Admissions for Typhoid, etc.	Admissions for Hepatitis.	Admissions for Dysentery and Diarrhoea.
Cavalry at Trimulgherry	3,981	4,685	208	261	742	205	287	287	721	1589
Royal Artillery at do.	4,158	5,890	236	295	802	281	448	448	1069	2220
Do. at Mud Fort	682	1,204	9	51	404	267	40	40	464	1114
1st European Infantry Barracks.	7,218	8,579	409	374	1,718	383	398	1,126	551	1560
2nd European Infantry the entrenchment.	7,569	9,218	371	437	1,723	688	388	1,243	446	1642

Omitting notice of the body of men quartered in the mud fort both on account of its relatively small strength and because the illnesses of the men there may perhaps have been often due to previous residence at unhealthy places, it is seen from the return that more malarial illness is associated with the 1st European Barracks (those most under the influence of unwholesome conditions proceeding from the swampy ground) than from the neighbouring Infantry Barracks in the entrenchment, or from the barracks at Trimulgherry, or from those of the Artillery; but it is also seen that this particular unfavorable feature is balanced by more favorable ones as respects certain other diseases, and particularly by a lower death-rate and by a lower rate of average number of constantly sick; the effect of the swampy ground in determining exceptional sickness has been confined to one kind of sickness, and that not of a formidable kind. The causes of ill health at Secunderabad

are in the main general over its area. The Army Sanitary Commissioners have been misled into an erroneous opinion as to excessive local unhealthiness by the want of a sufficiency of statistical facts for their analysis.

In recommending that the swampy ground spoken of should (if possible) be well drained, I justify my recommendation on general sanitary principles, the hope being that the measure which has unquestionably improved the healthiness of countless places elsewhere may effect the same good here.

As regards the 2nd Infantry Barracks, it has been noticed that sickness amongst the men has a very evident relation to chilling produced by the strong winds of the south-west monsoon which blow over this low ground before reaching the barracks referred to. It is not easy to determine in how much the causation of the sickness may be connected with the (relatively) considerable elevation of the barracks, in how much to the moisture of the south-west wind, and in how much to perhaps added noxiousness derived from its blowing over a malarious ground (particularly in the night) before it reaches the men. With the view of breaking the force of this wind, I would recommend that fast-growing umbrageous trees be planted in belts between the low ground and the barracks as near the latter as practicably convenient. Good may, I think, be effected in this way, and at all events a secondary good will be effected in the relief given to the eye by the sight of green trees, where a general aspect of barrenness now distresses it, and I would make the recommendation to apply more generally; the whole of the cantonment at Secunderabad would be improved by the planting of trees of suitable kinds in all situations where they can be grown without hurt to the defensive military works.

With the view of giving protection from the cold night winds of the south-west monsoon, I recommend that the windows on the windward sides of all the barracks be glazed. The various barracks are exceedingly open to the external air, a great advantage in hot and sultry weather, but unquestionably a cause of sickness, and that of a serious kind, in cold and rainy weather. This effect has been recognized of late, and the venetians to windward are now closed at night when necessary, but this is insufficient to exclude the driving rack which chills the sleeping men. I anticipate objections to this recommendation on the score of breakages and would say that with ordinary care the barrack damages for which the soldier would have to pay in respect of broken windows would be as nothing in comparison of the added comfort he would enjoy were glazed sashes supplied.

It will be right to recognise the fact that, when every sanitary measure which current sanitary knowledge indicates has been taken, Secunderabad will still be one of the less healthy stations of the Command; its topographical position exposes it to extremes of temperatures; great caution in avoiding chilling air, after being excessively heated in the hot winds, may serve to prevent illness in an individual, but men living in communities as soldiers live can rarely manage this, and hence acute liver disease and dysentery will always be relatively common amongst them at this station. In face of the decrease in the frequency of the occurrence of those diseases effected since greater sanitary care has been given, it is perhaps hazardous to assert this, and certainly the success referred to affords encouragement to continue in the path entered on, bearing in mind that we must look to the sum of a multitude of small measures for tangible results in the conservation of the health of the soldiers rather than to the effect of one or two apparently radical measures.

Barracks of Royal Artillery, Trimulgherry.—For this barrack I would recommend an extension of the surface channel system to carry off kitchen and house drainage, instead of the present objectionable catch-pit arrangement, in which the refuse water, &c., is stored in cisterns and is carried away daily (presumably) in carts. The system which was formerly in use at the married quarters has this year been reformed in the open channel principle with a very satisfactory result. For special reasons it was right to treat the alteration at the married quarters as the most urgent, but the reform should be general throughout the barracks, and the outfall for the main drainage channel should be led further out than it is at present.

Kamptee.—I may perhaps be allowed to say here incidentally that I was struck by the generally healthy-looking appearance of the men at Kamptee much, as a portion of them had suffered in the cholera epidemic (and consequent exposure in camp) in September last. The situation of Kamptee exposes it to attack in every invasion by epidemic cholera, and the unfortunate selection of the site of the cantonment on the bank of the Kanhan on the low ground liable to flooding on a rise of the river aggravates the danger to those residing in the cantonment from the well-known effect of low and damp ground in localising cholera. Ague is also necessarily a disease of frequent occurrence in the alluvial tract of ground on which the barracks are built.

The removal of the cantonment to the higher ground on the left side of the river and at a little distance from it is the only remedy for the organic defect noted.

The barracks for the Royal Artillery are very good, and those for the Infantry Regiment now in course of being reformed are also suitable; both however require that provision should be made for the carrying off of the roof water, which is now discharged too near the dwelling rooms of the men. The protection from the sun for the sentry at the gun-shed should be extended and be made much thicker.

The water-supply for the barracks at Kamptee is from wells sunk within the barrack compounds. As the water (derived remotely by percolation from the bed of the Kanhan river) is situated near the dwellings and the out-houses ancillary to them, much care is necessary for their protection from the ingress of polluting matters; the evidence respecting the outbreak of enteric fever amongst the men of the Infantry in 1880 points to neglect in this respect as the probable cause of the epidemic.

Bellary.—The great heat of this station in certain months and its situation partly on the "black cotton soil" and partly on a soil formed of decomposed primary rock are inherent defects as respects its suitability as a healthy residence in mitigation of which sanitary measures have only a very modified power. Here, as at Secunderabad and at Kamptee, the roof water should be conveyed to a distance from the dwellings in suitable, properly-laid, well-pointed surface channels, and the surface drainage system generally should be extended and perfected. By this means additional dryness in the neighbourhood of the men's dwellings will be ensured, and we are justified in believing that the improvement will avail in decreasing the malarial illnesses from which the men now suffer to an exceptional extent.

Bangalore Infantry Barracks.—In these barracks a good many minor defects, chiefly due to the restriction of expenditure on current repairs, I imagine, exist. Certain of the ablution room floors are in great disrepair, being broken and sunken; pegs are required on which the men can hang their clothing when washing; this last is apparently a small discomfort, but it is not a small one in reality. More grating should be issued for the wash-houses, and more tubs for private bathing should be provided.

Cook-houses.—The fire-places (of the native pattern) are generally very dilapidated; chimneys should be built to each of the cook-houses on the plan so successfully carried out (as regards resulting cleanliness and comfort) at the Cavalry and some of the other barracks at Secunderabad.

The Regimental Cells are ample in cubic space, and are not much deficient in superficial area, but a greater extension should be given to the provision for ventilation in them; the present, consisting of a small opening in the ceiling and of a little grating space in the door, is insufficient for the legitimate needs of men confined in the cells in the hot weather. A bench for the basins in the wash-house attached to the cells is required.

Guard Room Latrine.—The latrine used by the guard is very close and requires considerable additional ventilation; this might probably be effected by the substitution of honeycomb-work for solid brick-work in one or more of the walls.

Cavalry Barracks, Cook-houses.—There is no effectual means for furthering the escape of the smoke during cooking in the native fire-places; consequently dirt and discomfort result; chimneys and the valve-like slanting board projecting a little way above the fires to direct the smoke upwards (as introduced at Secunderabad) should be constructed. A water stand-pipe should also be provided for each cook-house.

Barracks of the European Company, Royal Engineers.—A proper ablution room similar to that allowed for European troops generally should be provided and equipped, in replacement of the wretched make-shift place now in use.

Kitchen is very defective; it should be reformed on the plan introduced at Secunderabad before alluded to; a proper receptacle for storing a sufficiency of water should be provided, if a water stand-pipe cannot be given.

Latrine requires more ventilation.

Hospital.—The building now in use is too small for the requirements of the force and its actual strength. The remedy for this in my judgment is not to add to the present buildings, but to arrange for the reception of the sick in the existing Garrison Hospital.

Water-supply.—In no report concerning Bangalore can mention be omitted of the source from which water for greatest part of the garrison is obtained. The suitability of the water for drinking purposes has for a long time past been a subject of almost continuous reference, and the condemnation of the present source of supply by the Army Sanitary Commissions has been sharp and unqualified. The barracks and hospitals of the Cavalry, of the Royal Artillery, and of the Infantry, are all dependent for this first necessary of life on the water stored in the Ulsoor tank, and carried thence by an effective system of distribution to the various buildings noted. In ordinary years the quantity available is ample for all legitimate requirements, but the tank is simply a catch-pit for rain-water; it is not fed by a single spring, and in a season of extraordinary drought (as in 1877) it might be perfectly dry. Situated in a natural depression on a slope on the south-east of the cantonment and of the considerable native town of Bangalore, and having villages on its environs on every side except the south, the tank, covering an area of 125 acres, necessarily receives with the storm-waters which supply it an immense amount of horrible impurities; the surface scourings and the special defilements which native habits cause in every nullah are with certainty swept, in longer or in shorter time, into the Ulsoor tank. Natives also bathe, and wash their slight personal clothing after bathing, in this tank. From time to time means have been taken to abate the evil of pollution; ground has been acquired near the tank, and an intercepting drain has been constructed to carry off to a lower level the sewage which in large quantity comes from the native town. A certain degree of police supervision is also directed against some of the more glaring causes of contamination.

Notwithstanding the theoretical opinion that water so foul in its origin must be unusable by human beings, that taken from the Ulsoor tank, as judged by consent of native opinion, by the non-occurrence of illnesses amongst the garrison such as demonstrate the noxiousness of it, and by evidence from chemical analysis, is usable; its use contravenes a first sanitary principle, but after many years' experience objection to the use of this water can still only be sustained by an appeal to abstract principle. The objection to using water so revolting to sentiment is overcome, just as the sentiment against the use of some waters with which London is supplied is overcome, water contaminated in the same way, if not to the same extent, as the Ulsoor water.

It may be feared, however, that impunity in both cases is owing to causes which may not be lasting.

For use of the garrison the Ulsoor water is taken partly directly from the lakelet itself, partly mediately from wells ("the Dhobies' Wells") dug near the margin; that supplied by the wells is clear and of good appearance, being much improved by natural filtration through the intervening bank of laterite, but analysis (by a

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very able and practised chemist) showed that no great difference existed in the composition of the two waters—the direct and the Dhobies' Wells supply. The water taken directly from the tank is passed through a filtering bed and thence into the cistern containing the water from "the Dhobies' Wells," the two being then distributed together. There is no fixed proportion in which the waters from the two supplies are distributed; at the time of my visit the largest proportion was that taken directly from the lakelet. The Dhobies' Wells are pumped dry every day. It has been proposed to augment the quantity of this last, unquestionably the best, supply by the purchase of more of the adjoining ground in which to sink additional wells, but I could not learn what the estimated increased quantity to be obtained was.

The water-supply for the garrison being mainly that from the Ulsoor tank is a highly artificial and a risky one both in the sense of liability to failure and in that of possible widely-extended and serious danger to health consequent on its use; every known precaution for its conservation should therefore be taken. I was not prepared to see that a very unquestionable risk was tolerated in the presence of a dwelling house on the rocky eminence at the south border of the lakelet, where the pumping station and the filtering bed are placed. The dwelling house has stables, out-houses, and servants' godowns, with latrines for the servants, all of which are located on a very small area of ground which rises abruptly from near the margin of the filtering bed to a height of about 40 feet; the water-shed of this ground is directly towards the filter bed, the wall of which is flush with the surface. The wall of the stable is built on the wall of the filter bed, which serves for a foundation to it; the horses thus stand within a foot or two of the water which is being filtered for human use; a drain carrying sewage-like water passes within 3 feet of the wall of the filter bed, and as regards the latrines, it was a point of doubt whether the human ordure deposited near, instead of in, them must be carried by rain into the filtering tank, or whether it might not be deflected by an inequality of the ground towards another side. I have not exaggerated in the above details, nor is the description one exhaustive of the subject. As regards the impurities received into a lakelet the size of the Ulsoor tank, it is possible to maintain that oxidation in an immense volume of water renders their presence harmless, but, if a relatively very small volume of water in a filtering tank is poisoned by the specific dejections of a person having enteric fever, those using the Ulsoor water run a very appreciable risk, and with the knowledge gained by my visit I am not prepared to say that this risk has always been escaped. I strongly recommend the immediate removal of the dwelling house; no care in the conservancy of the environs of the dwelling that can possibly be given can be effectual in certainly averting an ever-menacing danger.

The trees near the filter tank should be cut down, as their dead leaves fall in large quantities into the water.

The water for the filter bed should be taken, not directly from the lakelet, but from a properly-constructed subsidence tank. The filtering media in the tank should be changed, and the surface dirt should be scraped off the upper sand layer at regular, not as at present at irregular, intervals; the occasional emptying of the filter tank would also give opportunity for the examination of its walls for cracks permitting the ingress of soil water.

Greater care should be given to provide that the channel round the "Dhobies' Well water" cistern is not choked; at the time of my visit the channel was nearly silted up at one part to a level with the top of the cistern.

In short, what should be aimed at in the arrangements connected with the supply of Ulsoor water at the point where the distribution begins is the scrupulous avoidance of everything likely to injure its quality, and a fastidious cleanliness even, exercised in regard of everything likely to come in contact with it.

As the Ulsoor lakelet depends on the "upper Ulsoor tank" for a considerable portion of its water, much care should be given to the conservancy of the margin

of the latter and to a considerable distance from the shore; the matters discharged from the neighbouring tanneries might no doubt be intercepted by proper means.

The second receiving cistern in the Cavalry Barracks designed to permit of the cleaning out of the first one should be repaired or rebuilt.

Environs of the Dumloor Tank.—I took the opportunity of my inspection of the cantonment to visit this tank, from the borders of which it had been asserted, in a correspondence of the Quartermaster-General, No. 53-3554, of 24th April 1880, malarial emanations proceeded. As reported in my letter, No. 180-80, of 6th May 1880, to Quartermaster-General, I did not find that the allegation was sustained by evidence from the amount of the sickness from this cause amongst the troops in the Agram district; further experience has not led me to change this view. I notice, however, that the outfall of the town sewer near the north-west end of the tank, is likely in time—perhaps in a short time—to become a nuisance to health; the sewer should be led further off, and its contents perhaps should be used in irrigation, as the local conditions seem peculiarly fitted for this method of sewage disposal.

Hospitals.—At the various stations I found nearly everything connected with the treatment of the sick in efficient order, but the same defect, namely, the absence of means for carrying off roof water noticed in speaking of barracks exists in respect of hospitals at most of the stations, and requires the same remedy recommended for them. In connection with this matter I would submit for consideration whether the immense roof areas of the barracks and hospitals could not be utilized as gathering grounds for water for the supply of the troops in whole or in part. In making this recommendation I do not concern myself with any calculations of the sufficiency of the amount of the proposed supply; this is chiefly a question of rainfall of available area in which to collect it on, and of probably less from evaporation and other waste which legitimately concerns other advisers than sanitary ones. I confine myself to endeavouring to meet by anticipation objections likely to be made to my proposal on the score of the wholesomeness for use of rain water stored in tanks. With proper precautions as regards the soundness of masonry tanks (should such be used) and as regards the clean state of the roofs used as collecting surfaces, and rejection for drinking or cooking purposes of the water at the very bottom of the tanks, I consider that no water is more wholesome to drink than rain water. It is highly appreciated in the West Indies, where it is the only water used in barracks; it is used very largely, if not exclusively, at Gibraltar, and it is used also at certain stations on the coast of Africa. Speaking from personal experience of its quality at all of the places mentioned and of observation of its use in large bodies of men, I say with confidence that no better water than properly-stored rain water can be found. It is a great evil to have two sources of water-supply in a barrack if the one is a good one as to quality and the other is a suspicious one to be used only for certain purposes, but the objection would not lie to the use of rain water; this might be used for every purpose. I satisfied myself during my inspection that the present regimental hospitals were well suited for conversion into station hospitals; I need not point out the good which will accrue to the sick soldier by the better provision of special wards and rooms obtainable in one large hospital establishment, than could be allowed for each of a number of small hospitals. I am sure that greater efficiency and comfort will be added to the greater economy of station hospitals as compared with regimental ones.

Native Army.—In the preceding notices I have not referred to the Native Army, having reserved for separate notice the few remarks I have to make on its medical and sanitary arrangements.

The hospital provision for the sepoy is, I think, liberal, regard being had to the simplicity of native habits; but, if the best means for the restoration to health of the sick sepoy are to be used, it is necessary that he should be dieted in hospital; at present the extra food, &c., which Government allows for issue to the sick is in great measure wasted owing to its being cooked by the man's family; this means that it is also eaten by the family in part probably always, sometimes perhaps in

whole. The dieting of men in hospital would cause a little extra expense in providing cooks for two or perhaps three castes, but no practical difficulty which could not be overcome by a reasonable degree of care is connected with the alteration proposed. Nursing for the sick other than that obtained by withdrawing comrades from their duty for attendance on men in hospital should also be provided.

Both of these recommendations naturally lead up to another, that of the treatment of the whole of the sick sepoys of a garrison in one general, instead of in several particular (or regimental), hospitals. This would interfere very little, and that little in my judgment altogether for the better in the present family-like constitution of a native corps.

It is well known that a very large, if not the greater, part of the sickness and other disability which incapacitate sepoys for duty are consequent on weakness, the causative connection of which is with innutrition; the men suffer inordinately from ague and the severer forms of malarial illness, they suffer from beri-beri and from scurvy to a degree unknown amongst the European soldiers. Their feeble stamina is shown in a special liability to ulcers and to skin diseases of other kind. On my inspection at Bellary I found the two native corps there just emerging from the epidemic prevalence of a malarial illness which had also affected the Europeans at that station with the result that for the three last months of 1881 the attacks amongst the latter were in the annual proportion of 1519.1 per 1,000 of the strength, whilst in the two Native Corps together the rate of attack was 2224.1 per 1,000. No deaths from this cause occurred amongst the Europeans, in whom the illness appeared only as an ague; five deaths occurred amongst the native troops, in whom, with excessive prevalence, there was also great severity of the illness, the dangerous remittent fever being common. I notice this instance, and in the past year other similar occurrences could have been brought forward, not on account of the importance of the outbreak itself, but because it illustrates how much may be done by good lodging, good food and clothing, and general attention to sanitary requirements to give the well-cared for European a very great advantage over the native of the country in respect of one kind of disease; with a relative success the European strengthened to withstand the onset of malarial illness. The food, the clothing, and the dwelling of the sepoy require an approximate conformity, not a copying, but a conformity in principle to those stated means by which the European soldier, with the many disadvantages against him, suffers, when he does suffer, but moderately when the native soldier suffers immoderately. The one answer which has hitherto been given to proposals having for their object the physical improvement of the sepoy is that it is impossible to interfere with the social usages of his race; that early marriage—the admitted source of his poverty—must be allowed and be unchecked. I am told, however, by old officers of the Madras Army that it is possible, and with the approbation of the recruits themselves, to make them defer marriage for several years after enlistment, and that a system of messing has actually been tried and with success in some regiments, and that in time a salutary modification of the domestic customs of the Madras sepoy might be effected, consequent on which strong and vigorous men would replace the now too-commonly-seen feeble and listless ones. The continued maintenance of a nursery for recruits afforded by the "Pension Boy" establishment has not, so far as I know, been hitherto regarded with any other feeling than that of satisfaction; but, like some other arrangements in which it is sought to get a double advantage, it is questionable if by it a single one is assured. It was usually easy for me, when looking at the recruits of a Native Corps, to recognise the "Pension Boy" recruits from their puny and weak appearance. It does not require experience to know that, when a lad has been brought up from childhood with a particular regiment and on which he has a hereditary claim, he is pretty certain to be passed as a recruit for it when he arrives at the age usual for enlistment. The hopeful view that a slight, slender boy will become a robust man under the influence which increased pay and training should bring will aid the natural feeling of dislike to overthrow expectations

cherished since childhood, and the combination of these views burthens native regiments with physically unsuitable men. Looking at the matter from the standpoint of physical efficiency solely, I think it would be well to separate a charitable care for the offspring of deceased sepoys from any special connection with the supply of the recruits for the army. During my inspection I found that, with a partial exception in one instance only, external cleanliness of surface and also of drainage channels was well cared for in the lines of the various Native Regiments, and that in most of them pains had been taken (in some great pains) to render the courtyards of the men's dwellings as little offensive as possible; but I feel the unreality of making suggestions for the sanitary improvement of dwellings which cannot really be reformed; the lines in effect are standing camps, and, if this sort of lodging for the sepoy is to continue, the lines should be assimilated to the camp on the provision that from time to time fresh ground shall be taken for it.

No. 244. *From Lieutenant-Colonel J. EWING, Officiating Quartermaster-General, to Colonel E. L. HANKIN, Acting Secretary to Government, Military Department; dated Ootacamund, 1st July 1882, No. 562.*

Forwarded to Government.

2. Arrangements have been made to remedy some of the matters brought to notice, the cost of which will not be too great. The cost of some of the other proposals would be so high that His Excellency cannot recommend their being carried out at present.

3. The delay in forwarding the above letter to Government has been occasioned by several references having had to be made to the various Officers Commanding Divisions and Districts concerned.

No. 245. *ORDER THEREON, 13th July 1882, No. 3578.*

The Right Honorable the Governor in Council has perused with much interest the foregoing report by Surgeon-General Sir A. Home of his last tour of inspection in this Presidency, and resolves to communicate it for the information of the Government of India and the Secretary of State.

2. The stations visited were Secunderabad, Kamptee, Bellary, and Bangalore.

3. Several defects, particularly in arrangements for drainage, in barracks and their surroundings, are noticed, and to these are attributed not a little of the sickness amongst the troops.

Suggestions are offered for remedying existing evils, and His Excellency the Commander-in-Chief has already taken action on such of them as admitted of immediate attention, but in some instances, as in the case of the Kamptee Cantonment, the site of which is condemned, the cost of the proposed measures deters His Excellency the Commander-in-Chief from recommending that they be carried out at present.

4. The very important subject of water-supply at Bangalore is fully noticed. The question is a difficult one, and the existing arrangements for supplying the troops with pure drinking water are admitted on all hands to be imperfect, though considered the best that local circumstances admit of, save at enormous cost.

The suggestions now offered by Sir A. Home in connection with the subject will be communicated to the Public Works Department for consideration and for such action as may be deemed necessary. The dwelling house referred to is, it is supposed, the quarters of the Mechanical Engineer in charge of the works. Immediate measures should be taken to remove from the site the stables, servants' godowns, and latrines mentioned. If accommodation for the Engineer within

reasonable distance be available, he should be required to vacate the house on the rock, and the place, after being thoroughly cleaned, should not be again occupied, except perhaps as store-rooms.

(True Extract.)

(Signed) E. L. HANKIN, Colonel,
Ag. Secretary to Government.

To the Quartermaster-General.

" Surgeon-General, Her Majesty's Forces.

" Public Works Department.

" Adjutant-General, for information.

Exd. E. C. Shunker.

Govt. of (1882) Madras
MILITARY.

To The QUARTERMASTER-GENERAL.
Ac., Ac., Ac.

Order No 2023 Wd/8 Aug/82

Communicated
to the Superintending
Engineer Difta Circle for
report on the points noticed
in para 1 of the foregoing
order

2 Immediate
action should be taken
on the instructions in the
Military Dept with regard
to the out houses & the residence
of the Mechanical Engineer
on the Ulsur Rock

(True Extract)

(sd) A S Russell

Under Secy to Govt

In the Dept of
Military Dept

Dated July, 13th.

Tested

Recd.

G.O. 13th July 1882, No. 3573.

B. No 2023 Wd/8/8/82

JULY.

Nos. 243-247.

(Passing orders on Surgeon-General Sir A.
Home's report on the sanitary condition of the
hospitals, barracks, etc. in this Presidency re-
cently inspected by him.)

No 64936 of 82

No 665 E of 30/8/82
P. W. DEPARTMENT-1881-82

MEMORANDUM.

Current No. 5762

Letter Number 1936

dated the 25th August 82

from the Supg. Engineer of 5th Circle

Referred to the
Military Department
for approval -

Very early return
requested.
(By order)

W. H. Russell

As under Secy to Govt

W. Aug/82

no. 4 of 82 Approved

(By order)

W. H. Russell

As Secy to Govt

To the P.W.D.

The Military Dept

with papers in original

& B. No 2023 Wd/8/8/82 to be returned

to the Engineer

Public Works Office.

MADRAS,

Chepauk,

25 Aug 1882

No. 2254

From

THE EXECUTIVE ENGINEER,
PRESIDENCY,

To

THE Superintending Engineer
Mylapore.

Sir,

Enclosures.

180
returned

I have the honor to report, with reference to G.O. No. 2023 of 8 Aug. 82 and your endorsement No. 2994 of 8 Aug. 82, that the only residence available and suitable to the Engineer in charge of the Mysore Water works is the most northern of a group of houses on the eastern shores of the Tank - which can be now rented at Rs. 45/- per mensem.

It is 750 yards off the Rock Engine -
I would request very much sanction to renting this house.

I have the honor to be

Your most obedient servant

W. H. S. S. S.

W. H. S. S. S.

Executive Engineer

B. No. 20234. 8-8-82

N^o 1936.

JN

Endorsement on the
Colonel Burton
testifies that the
General Commanding
the Mysore Division
approved of the house
which is situated on
Kingsington Road.
Orders are requested
upon para 4 of G.O. 3578 of the 15th July
Military Department
in P.W. Department
N^o 2023 dated 8th Inst.
whether the house should
be hired.

Chik Sunder
Sd/-

Suprmtg Engineer
5 Circle
25 August 1882

To
The Dy Commr
P.W.D.

Recd
only 25/8 5/5/82

P.W.C. No 5762
From P.W. Dept
5970
The Executive Engineer
Presiding

N^o 2256
dated 25th } Aug 1882
Recd

Requests sanction to
renting of house at Rs. 45
for Engineer, Nilsoor
water works, Bangalore

14936/82

N^o 2347w 11/24/82
PUBLIC WORKS DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT
Under date the 11th Sept 82
Read the following:—

From the S.E. Fifth Circle to S. No 1936 of 25th inst
Inms to the Mil Dept - 6658, 230.8.82
From - - - - - 4636 of 31st inst 82.

The Supt. Engr
Fifth Circle is au-
thorised to rent the
house referred to
at Rs. 45 per mensem,
as a residence for
the Engineer in Charge
of the Nilsoor water
works.

40 39 10
3 3 3

11/9 11/9

S.E. Fifth Circle
Engr
Mil Dept

Cy

8-9-82

12
9347

add 57/10 vol 6/19 Dec 11/19

5974

Govt. of (1882) Madras.

PUBLIC WORKS.

12/9

S. O. // Sept 1882, No. 2347

Nos. 82 to 88

House for the Super.
in charge of the
Teloor water works.

The Sd. Fifth C. L.
authorized to keep
a — at Rs 45
per mensem

Entd. in Receipt Book