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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

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12
GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

3rd December 1877, No. 1,923 W.

Buildings and Roads.

Military Works.

Read the following paper:—

No. 29. From Colonel C. POLLARD, R.E., Deputy Secretary to the Government of India, Public Works Department, (Military Works,) to the Secretary to the Government of Madras, Public Works Department, dated Simla, 8th November 1877, No. 1,181—87 M. W.

In forwarding for information the accompanying copy of a memorandum by the Army Sanitary Commission on the Medical and Sanitary Report of the Madras Native Army for 1875, I am directed to invite particular attention to the remarks of the Commission in regard to the insanitary condition of the huts of the Native soldiers in India.

Copy forwarded to the Military Department for information, with reference to its No. 167 S (Sanitary), dated the 5th ultimo.

(Signed) C. POLLARD, Colonel, R.E.,
Deputy Secy. to the Govt. of India.

From the Secretary of State for India, to the Government of India, dated 23rd August 1877, No. 128.

I FORWARD herewith a copy of a memorandum by the Army Sanitary Commission on the Medical and Sanitary Report of the Madras Native Army for 1875. This paper contains many valuable observations and suggestions, especially relating to the drainage of the sanitary native huts and lines.

Endorsement by the Military Department, dated 5th October 1877, No. 167 S.

Copy of the above and of the enclosure forwarded to the Public Works Department for information, with reference to paragraph 9.

Memorandum by the Army Sanitary Commission on the Medical and Sanitary Report of the Native Army of Madras for 1875.

THIS report consists of an instructive digest of medical and sanitary facts contained in a communication from Surgeon-General E. G. Balfour to the Madras Government, followed by reports on the medical and sanitary condition of each division, station and regiment of the Madras Native Army for the year 1875. Much of the detail is, as usual, of a purely departmental character, not coming within the sphere of the Army Sanitary Commission, but not many reports on the same subject hitherto received from India have contained so much information on the sanitary state of the Native army, or shown a most enlightened appreciation of the real importance of the sanitary element to the efficiency of Native troops.

It is proposed in the remarks which follow to call attention to the more important points in the report bearing on this subject, and to the practical principles which may be deduced from them.

1. The average strength of the Native Army of Madras for the year 1875 was—

Total strength	...	...	...	...	...	...	...	...	...	30,256
Absent	...	...	...	...	...	...	...	...	...	2,465
Present	...	...	...	...	...	...	...	...	...	27,791

The number of "absent" amounted to 8.14 per cent., the largest proportion of any of the five years given in the report, and is probably explained by "the progressive facilities for sending away sick men to a distance for change of air." However desirable this measure may be, its probable effect in lowering the death and raising the apparent inefficiency rates of the Native Army is not to be overlooked.

2. The next abstract gives the rates per 1,000 from inefficiency causes for 1875, contrasted with the same data for three preceding years:—

Years.	RATIO PER 1,000.				
	Admissions.	Daily sick.	Total deaths.	Invalided for	
				Discharge.	Sick leave.
1872	...	...	...	...	...
1873	...	...	...	...	...
1874	...	...	...	...	...
1875	...	...	...	...	...

The following were the total numbers of the chief inefficiency causes:—

	Admissions.	Deaths.
Eruptive fevers	94	...
Continued ditto	822	10
Malarial ditto	7,804	50
Rheumatic diseases	1,302	3
Diseases of eye	1,015	...
Disease of lungs	670	50
Diarrhoea	855	21
Dysentery	787	14
Skin diseases	2,320	...

The mortality relative to strength from these diseases for the last three years has been:—

	Ratios per 1,000.		
	1873.	1874.	1875.
Eruptive	.03	.07	...
Continued ditto	.2	.2	.3
Malarial ditto	.8	1.4	1.6
Rheumatic diseases	.03	.03	.09
Lung diseases	.8	1.0	1.6
Diarrhoea	.3	.4	.6
Dysentery	.4	.6	.4

With the single exception of the death-rate from dysentery all the other death causes showed higher rates in 1875 than in the two preceding years.

3. The following were the actual numbers invalided in the year for which the causes are assigned; but the total invalids were 729 for change, and 911 for discharge:—

	For discharge.	For change.	Total loss.
Eruptive fevers	1	1	2
Continued "	1	11	12
Malarial "	21	189	210
Rheumatic diseases	67	68	135
Eye diseases	48	7	55
Lung diseases	30	63	93
Diarrhoea	...	41	41
Dysentery	2	23	25
Skin diseases	11	8	19
	181	411	592

It is impossible to peruse these statistical data without seeing how large an influence local disease causes, productive of malaria and dampness, together with climatic agencies, such as rainfall and variable temperature, exert on the efficiency of the Native Army in Madras and its outlying stations, and it is not surprising to find how large a space of the sanitary notes on particular stations is devoted to them.

4. The drainage defects are due to three causes:—

First.—The position of lines in localities which scarcely admit of efficient drainage on account of lowness of ground, water logged sub-soil consequent on this topographical defect, and damp rising in the floors and walls of the men's huts.

Second.—Want of sub-soil drainage where the ground might be drained, leading to similar results.

Third.—Defective attempts at surface drainage by cuttings in the ground, by which not only surface water but the sewage of huts is conveyed directly into the sub-soil, thus increasing the evils which surface work of this kind is intended to remedy.

Each class of defects will come up in its place in the following brief abstract of sanitary notes on stations, to which attention may be called, beginning with the drainage.

(a). *Madras (Vepery).*—Lines low, and drainage defective. Huts not good.

(b). *"Cutlack"* continues a hot-bed of malaria. The drainage of the lines could hardly possibly be worse. The ground itself almost a dead level; the drains simply shallow open trenches, into which flows all liquid filth from the huts, as well as surface drainage generally percolating into the sub-soil, and during the greater part of the year, when there is no rainfall, to flush the channels, giving rise to most offensive odours." The reporter understood that the drains were about to be faced with stone. The site appears to be below the level of river floods, and the ground marshy as a natural result. It is doubtful whether any real drainage improvements are practicable in such a position, except at too great an outlay. The 41st Regiment, Native Infantry, at this station, out of an average strength of 633.5, had 1,017 admissions to hospital from malarial fever. It lost 56 men by invaliding and sick leave, which may account for its low death-rate, 5.6 per 1,000.

(c). *Sambalpore.*—"Drains are built in the V pattern, of stones which, not being set in chunam, permit earth contamination." Beyond the lines the channels are merely out out of the earth, and emit at times "a most offensive odour." The insalubrity of Sambalpore had been less marked during the year. The solitary sell is in a "most insanitary" state.

(d). *Berhampore.*—"The lines at Berhampore continue in *statu quo*, and the occurrence of 56 cases of cholera, with 19 deaths among them, in the right wing of the 2nd Regiment, Native Infantry, is a lesson which ought not to be forgotten. . . . The drainage and the sewerage of the lines are very imperfect. This condition has frequently been brought to notice." At this station the death-rate was 21 per 1,000.

(e). *Vizianagram.*—"Drainage of lines defective on account of insufficient slope of main drain."

(f). *Palamcottah.*—The family latrines are situated just in front, or a little on one side, of the hut doors, and infect the air inside the hut. The drains are mere cuts in the ground, with little or no fall, and the house refuse percolates into the sub-soil.

5. There is an interesting report on the Mysore Division by Dr. George Smith, Deputy Surgeon-General, which contains much interesting information about troops and stations in this region of India. Amongst other things he has enunciated the following propositions:—

- (1). "To the sanitarian cholera means dirt" (although to the ætiologist it may mean more), a motto which might very well be written up everywhere in India; "and truly," he says, "there is no lack of this in the Mysore Province and in the Ceded Districts."
- (2). "The unit of sanitary administration in civil life is the house, in military life the sepoy's hut, and, until these houses and huts are placed in a sanitary condition, the mere sanitation of surroundings will have but little influence upon the mortality and sickness ratios." The truth of this proposition may be admitted if it is made to include certain things without which no house or hut can be healthy, viz., dry healthy site and plan, drainage, and good water. On the other hand, as Dr. Smith argues, much benefit cannot be expected from such conditions if the house or hut itself is of a character inconsistent with healthy occupation.
- (3). "It is a matter of some difficulty and a constant labor to keep the old lines and huts in a satisfactory state of sanitation. The huts are badly constructed and of mud. The streets and lines are frequently much too narrow, and the total absence of artificial drainage leads necessarily to the extreme sullage of the soil, and to the inevitable pollution of the water of neighboring wells."

The remedies Dr. Smith suggests are the adoption of some uniform plan for the latrine and lavatory of the sepoy's hut, regimental latrines for both sexes, experiments on the dry-ash and dry-earth systems, and efficient artificial drainage of the lines. As regards the stations:—

(a). *Bangalore Head-quarters, Sappers and Miners.*—Complaint is made of foul odours from the municipal drains running along the southern front of the lines, and of other sanitary defects in the vicinity.

(b). *Bangalore, 23rd Light Infantry.*—Drains throughout the lines are objectionable. They are mere open ditches cut or worn out of the soil, into which there is a constant flow of wash from the huts, and consequent percolation. The domestic privies are a "standing nuisance." With reference to these lines, Dr. George Smith states that the large "box drains" in the vicinity are "kept clean with great difficulty," and that "the lines, as a whole, exhibit all those defects which sanitary science condemns," only to be overcome by reconstruction. The medical officer reports strongly against the existing state of the conservancy in the neighbourhood of the lines. Forty per cent. of the admissions to hospital from this regiment were due to fever.

(c). Regarding sickness in the 36th Regiment, Native Infantry at Bangalore, the medical officer reports that "ague, as usual, heads the list," but that this disease will doubtless diminish when the whole corps is properly hutted.

6. While calling attention to these defects, the Commission desires, at the same time, to cite Dr. Smith's testimony to the fact "that the great and pressing subject of sanitation is that fair, though not always rapid, progress is being made in reducing the principles of the science to practice." The chief difficulty is in dealing with the habits and prejudices of the Native troops, which are often opposed to sanitary procedure.

(a). *Mercara.*—The Surgeon of the 29th Regiment, Native Infantry, says that "the sanitation of the lines will never be fairly good until good brick and chunam drains are put up, and the basin beneath the lines drained." He makes the following remarkable statement:—"The principal causes of disease have been bad or insufficient food, cold" (the station is 4,500 feet above sea level), "thin and insufficient clothing when not in uniform, malaria." This must be left as it is given for inquiry and remedy, if such be needed.

(b). *Bellary.*—In the lines of the 21st Regiment, Native Infantry, at this station, the hut sewage is conveyed by drain pipes into chatties placed outside, which are emptied morning and evening by the Municipality. This was done to prevent the sewage passing into the sub-soil. It exhibits house drainage in its most elementary form, and is better than fouling the ground between the lines.

(c). *Secunderabad.*—The following account of the drainage of Native lines is given by Deputy Surgeon-General Burn:—"Surface drainage in all the lines is defective, only shallow trenches along the sides of the streets exist, which soon get silted up, more especially in the monsoon." Some lines are, it appears, built across the natural drainage fall.

(d). Of one set of lines, those of the 1st Regiment, Light Cavalry, the drainage and other sanitary conditions are reported as eminently satisfactory, "and to these conditions was largely due the high state of health the regiment enjoyed." The average strength was 202, out of which there were 111 admissions during the year; the daily sick in hospital averaged only 3, there were 2 deaths, 6 men were pensioned, and 2 went on sick leave.

In all the other Native lines at Secunderabad the drainage appears to be done mainly by surface cuts, and there is lodgment of water and dam during the rains.

(e). *Kamptee.*—The medical officer of the 2nd Regiment, Light Cavalry, says that his belief is "that the admissions from malarious causes would be diminished one-half were a thorough system of sub-soil drainage to be established. The sub-soil is very retentive of moisture, and the houses are very damp in the rains." The general sanitary state of Kamptee has nevertheless undergone improvement, for Surgeon W. E. Johnson, in charge of the 35th Regiment, Native Infantry, says: "Some years ago the station of Kamptee had the unenviable reputation of being unhealthy, but happily for the residents it is now one of the healthiest stations in India, and this change is no doubt due to the improved sanitary arrangements."

(f). *Seetabuldee.*—The Deputy Surgeon-General says, that "the lines are situated in a swamp, and have been condemned in every report forwarded, . . . and although everything has been done that can be done by the regimental authorities to improve the drainage, it still remains very faulty; . . . unless the present site of the lines is abandoned and a less objectionable one selected, it is not easy to suggest a remedy for the state of matters as reported." He expresses his astonishment "that the rising piece of ground on the opposite side of the road from the lines should have been overlooked by the Committee when selecting a site for lines." He says; "The site adverted to is in every way eligible, as regards soil, elevation, and natural configuration for the most perfect drainage."

One-third of the entire number of admissions at this station was due to ague.

(g). *Hoshungabad, 22nd Regiment, Native Infantry.*—During the cold season the chief diseases are intermittent fevers, of which the predisposing causes are stated to be—(1) bad housing; (2) want of proper warm clothing; (3) insufficient and non-nutritive food in many instances; and the fact that the men and their families generally sleep on thin mats spread on the cold ground instead of on charpoys. . . . As really no system of drainage beyond merely the shallow drains on either side of the streets is carried out, and bearing in mind the retentive nature of the sub-soil (black cotton), it is not to be wondered at that the walls and floors are always more or less damp during the rains."

A test illustration of the effects of this ground damp is given regarding the officers' quarters at this station. The main surface water drain of part of the lines runs through the officers' compounds. During the rains this drain overflowed and saturated the ground, and several officers were seized with fever.

(h). At *Saugor* the position of lines occupied by the 5th Regiment, Native Infantry, is described as "low, and in the rains little better than a swamp, and was formerly the site of a burning and burial ground. The huts are low, miserable little buildings."

(i). A matter of experience may be cited from the *Nagode* report as follows:—"The drainage of the lines is now very satisfactory; the old V shaped drains, which it was found very difficult to keep clean, have been replaced by open saucer-shaped drains of masonry . . . These drains are swept daily and flushed with water twice a week."

(k). At *Dorundah*, in Bengal, the sewage from the huts is passed into surface cuts and so into the sub-soil; the medical officer very properly says, "this must be a patent cause of disease amongst the men." This station is 2,100 feet above the sea level, which to some extent neutralizes this defect, but does not justify it.

7. *Water-supply.*—There is no sufficient information as to the condition of the water used by Native troops. In one or two cases complaints are made, in others it is evident that wells have been improved, but the general impression produced by the paragraphs relating to this important subject is that there is little now to complain of.

8. *Conservancy.*—There are a few complaints of local nuisances, but as a rule the lines appear to be kept clean. The main difficulty arises in the latrine arrangements for families, which appear to be of a very unwholesome character, chiefly on account of the number of inmates crowded into the small hut which constitutes the Native soldiers' barrack accommodation. From suggestions made in the reports this whole subject appears to require consideration, with the view of determining whether a remedy for the present state of matters might not be found in providing common latrine accommodation in suitable places for the lines, or in the introduction of better domestic contrivances, involving speedy removal of all excrementitious matters beyond the lines.

9. It is evident from the general tenor of the reports, as well as from the statistical data contained in them, that future progress in the sanitary state of Native troops in Madras Presidency lies in the direction of improved position of lines, better huts, and efficient station drainage; the chief points in which have been abstracted in the preceding paragraphs.

The present position of the whole question, as regards the Native Army in Madras, cannot be better described than in the following extract from Surgeon-General E. G. Balfour's report already referred to.

"Of late years the efforts to improve the sanitary condition of the huts and lines of Native troops have been unremitting, and to the results of these may, in a great measure, be attributed the comparatively favorable state of health enjoyed by the Native Army during an unhealthy year. Scavenging, drainage, water-supply, ventilation of huts and lines, have all received careful attention; and although much remains to be done, nearly all has been effected that could possibly be carried out with the available means and under existing circumstances. In some cases the sites of lines are naturally bad, and so long as financial exigencies prevent the construction of proper drains, it is quite impossible to entirely prevent the pollution of the ground by sewage. Again, as to the huts, it is quite easy to describe what a sepoy's hut ought to be, but the Native soldier cannot afford to erect a more perfect and, therefore, more expensive dwelling than the one which he now inhabits. It would be a matter of economy were the State to provide quarters for the Native as it does for the European Army, but till that be done we can only try to reduce the unhealthy features of Native lines and their surroundings to a minimum."

10. Mr. Balfour's views are, no doubt, consistent with the facts, but it may be suggested that the sepoy might be advised, or in cases where the Government grants assistance, required to conform to such simple constructive sanitary principles in erecting his hut as shall obviate the defects referred to. Generally speaking, it is not so much money that is needed as an intelligent application of means at the sepoy's disposal. But thanks to the energy of the authorities, much has been already done to remedy defects, and to provide more healthily constructed lines for Native troops. The problem would be greatly simplified were it possible to get rid of the crowd of people who follow the Native soldier and prey on his limited means of subsistence, or, at all events, to limit the number. The Native soldier in the Madras Army not only has to support his family out of his small means, but an army of paupers, many of whom are described in these reports as being quite able to find their own living. The result is that the servant of the State is badly fed, insufficiently clothed, his hut is crowded to excess, and the sub-soil of the lines and huts in which he lives is fouled to a far greater degree than would be the case without them.

11. The reports clearly show that some of the most important drainage works for Native lines could be executed by unskilled labor, if properly directed; and if the laborers are there and are fed by the soldier really at the cost of the State, it becomes a question whether this labor might not be made useful in draining wet ground, and for general improvements in the drainage of stations. There are, of course, some portions of the work requiring special material and more skilful labor in its use.

12. There are facts sufficient, in the preceding abstracts, to show that there is a large amount of drainage work required at most of the stations.

Note much has been gained in the way of experience in this matter, and the principles long since laid down by the Army Sanitary Commission on the subject may still be taken as a guide. These may be summarized as follows:—

- (1). Station drainage for removal of rainfall must be effected over the surface.
- (2). Mere surface cuts, except on steep inclines only, afford a more certain means of water-logging the sub-soil.
- (3). Efficient surface drainage requires that the rainfall and all other liquids received by the drains shall be kept out of the sub-soil, and passed to the outfall as rapidly as possible.
- (4). Box drains or V-shaped drains for such purposes, although greatly superior to mere cuts, are useful only so far as they are impervious and easily cleansed; and broad, shallow, impervious saucer-sectioned drains are the best for meeting the conditions of drainage described in the present report.
- (5). Some remedy for damp floors, even in existing huts, might be found in raising the floors above the ground level by clean wholesome earth, and further by raising the beds on charpoys, or some similar contrivance. In new huts means could be adopted to prevent damp in both floors and walls.
- (6). The important question of latrines for families in Native lines requires to be dealt with.

Lastly, the principles for protecting wells from sub-soil pollution may be again stated. They are as follow:—

The best wells to be selected for culinary and drinking purposes. The tubes of these wells to be protected by a layer of concrete round the tube to a sufficient depth to cut off the impure sub-soil drainage. The tube to be raised two or three feet above the surface level, and the surrounding area concreted with a slope away from the well, and with drainage for the removal of waste water. The well to be covered.

Water to be drawn, not by dipping everybody's vessel and cord into the well, but by an iron bucket and iron chain.

No. 30. ORDER THEREON, 3rd December 1877, No. 1,923 W.

COMMUNICATED to District Engineers concerned.

(True Extract.)

(Signed) E. A. FOORD, Colonel, R.E.,
Secretary to Government, P.W.D.

To the District Engineers concerned.

Exd. E. C. Shunker.
Spare Copies

137/R

No 1923 W & B Dept
Communicated
to District Engineers
Concerned.

9/11/77

GOVERNMENT OF INDIA.
PUBLIC WORKS DEPARTMENT.
MILITARY WORKS.

To
The Governments of Madras, Bengal, Mysore,
and Central Provinces.
The Resident at Hyderabad.
The Inspector General of Military Works.

Nos. 1181-87 M. W.
Dated SIMLA, November 8, 1877.
Received

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5632 Dec 29

S.E. concerned
Disptd 11-12-77

Insanitary condition of huts of Native soldiers
in India.

With order.

Ch 123911

Govt. of 1877 India

PUBLIC WORKS.

To

Chief Engineer
Cantonment

Dated

Issued

Recd.

Encl.

G. O., 3 Dec 1877, No. 1923

Nos. 29-30

Art of Native Soldiers in
India Memorandum by
the Army Sanitary Commission
in regard to the sanitary
condition of the ————
to B. P. C. C. C. C.

B. P. C. C. C. C.

Ganjam - 7
Vizag - 4
Bellary - 6
Puzos - 6
Chingleput - 6
N. West - 6
Bangalore - 3
Inchikop - 5
Malabar - 9
S. Canara - 4
Tumaculy - 4