MILITARY HYGIENE AND PATHOLOGY IN INDIA.

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V.—CANTONMENTS.

(Continued from p. 27.)

In 1589 a memorial was addressed by English merchants to Queen Elizabeth, asking for license and encouragement to their project of pushing forward adventures in the East Indies.

In 1600 a Charter was granted for fifteen years, by the Crown to the London Company.

With its charter renewed by Cromwell and subsequently by Charles II, the East India Company at the end of the seventeenth century had established itself on Indian soil, with Fort St. George and its dependent factories on the Coromandel Coast and in the Bay of Bengal, and on the coast of Bombay, Surat, with minor posts on the west coast. The Company maintained armed forces on land and a fleet of thirty-five armed vessels.

At Madras and Bombay prior to 1687, the Company's fortifications were in fair condition, their troops consisting of a few Europeans with a rabble of Armenians, Arabs, Negroes and half-bred Portuguese.

Being firmly settled in Bombay, Madras and Calcutta, the Company in 1687, with the object of securing their trade, assumed jurisdiction over their settlements, fortified them and began to enlist native militia.

The Company's force at Bombay at that time consisted of fifteen soldiers and some raw native militia. In Madras the Company's president had only a few English soldiers in garrison with some half-caste Portuguese.

In 1693 the Company's Charter was declared void for non-payment of a five per cent duty levied by the Crown on their capital stock; it was renewed, however, on a three years' basis.

In 1698 Parliament granted a Charter to a new Company, which undertook to lend two million pounds to Government at eight per cent.

There were now two rival English Companies in India, each doing its utmost to ruin the other.

The two English Companies amalgamated in 1702, and the East India Company administered India for the next 155 years.

During the later years of the Company's administration the troops at its disposal consisted of units of the "Royal Army" as well as European and Indian troops raised by the Company itself.

In 1858 India passed from Company rule to the British Crown.

Little information is available as to the conditions under which the troops lived in the early days.

In 1711 the garrison at Madras consisted of about 250 European
soldiers at 91 fanams (£1 1s. 9d.) per month, and 200 topasses or black mongrel Portuguese at 50 or 52 fanams a month. The "gun-room crew" (artillerymen) consisted of about 20 experienced Europeans to manage the guns, at 100 fanams per month. The captains were paid 14 pagodas per month, ensigns 10 pagodas, sergeants 5 pagodas and corporals the same pay as the "gun-room crew." (At that time the Governor of Madras had only £200 per annum salary and £100 gratuity. Councillors had from £100 to £40 per annum. Senior merchants drew £40, junior merchants £30, factors £15 and writers £5 per annum).

In 1757, Clive wrote to the Court from Camp Fatehpur near Rajmahal: "Notwithstanding the precautions taken for preserving the military in health by quartering the greatest part at Cossimbazar and Chandernagore, I am sorry to inform you that a terrible mortality has reigned among them and that many of the survivors are so reduced by illness as to be still incapable of duty. We have likewise lost several officers. The squadron has suffered no less than the land forces; indeed, the sickness has been general, not only with the English, but the French and Dutch, and even the natives. The enclosed return will give you particulars of our loss, as well as acquaint you with the small force I have at present in the field. Of the detachment of King's troops not above twenty privates were fit for duty
when we marched; therefore, at Mr. Pocock's pressing instance, I left the whole behind to be embarked on board the squadron. Of the Madras detachment there remained about 150 effective, trained included, so that the troops now with me are for the greatest part composed of foreign deserters, and topasses, entertained on the Bengal establishment. However the present face of affairs seems fortunately to require but little service from our arms, political negotiations are likely to be more necessary."

A disease called the "pucka fever" was prevalent in Calcutta during the eighteenth century, "probably owing to the mass of jungle which extended in every direction, and the fetid jheels. Mrs. K. writes of it as the illness of which most persons die in Calcutta; it frequently carries off persons in a few hours; the doctors esteem it the highest degree of putridity."

During the eighteenth century small-pox was a scourge: it is said by one authority that "inoculation is much practised by the natives, but they convert the contagious matter into powder, which they give internally mixed with some liquid."

The Calcutta Gazette of 1787 contained the following:—

"The sewage of an enormous native population lies festering under an appalling sun in open trenches, which run on either side of the streets, and are called 'drains.' These drains have no outfall, but the mass of filth which they contain is turned out occasionally upon the road—black, fetid, and ghastly—and is ultimately carried off by sweepers. The streets are saturated with these abominations, and the air is filled with the poisons which they give forth."

A glimpse of the brighter side is obtained from a description of a camp entertainment at Saloor Pettah, in 1792.

"About 76 persons sat down each day (for three days) to a table abundantly furnished, with a well chosen variety of the best viands, and as ample a supply of fruit and vegetables as if we had been within a mile of Leadenhall market. Horse racing gave an appetite for breakfast; and cricket, trap-ball, cock-fighting and ninepins occupied the other hours, which were not employed at the festive board. Dinner was served at 3 o'clock, and the bottle sat with the sun. Every person cheerful, not one intoxicated; the light of the moon was sufficient for the sport of the Roundabout, of which almost every one partook by turns till 8 o'clock, when each retired to his tent or bungalow."

A letter from the Court of Directors, in 1795, contained the following, which was published in Garrison Orders by the Governor-General:—

"Every precaution is taken to prevent improper recruits being sent out. After having been approved by the Company's inspector, the recruits are again examined by a Field Officer appointed by His Majesty, and such men only allowed to proceed as he approves; we therefore desire, that the boards be extremely cautious in their objections against the Company's troops."
When Sir James McGrigor arrived at Bombay in 1799, he found the barracks placed on the worst site in the island. He "quickly accumulated a hospital full of sick, the prevailing diseases being dysentery and hepatitis." In a strength of 500 there were 544 admissions and 40 deaths from these two diseases. He found this waste of men alarming in such a small force, and opined that "it would be highly worthy of the attention of the Honourable Company to take measures to lessen this waste of men."

In the following year, when McGrigor sailed with the expedition from Bombay to Egypt, there was "extreme prevalence of guinea-worm amongst the men."

In an order by the Governor-General, dated March 10, 1807, His Excellency directs "that the number of tatties to be in future provided for each building be restricted to half the number of apertures (doors or windows) in such building; that no more than one beesty and one cooly be passed for watering two tatties."

By an order by the Commander-in-Chief, dated October 12, 1810, "clubs and queues" were abolished in all ranks of the Army, and "the hair is in future to be cut close to the neck; no powder to be worn on duty."

In 1818 the new barracks at Dum-Dum were completed and occupied by troops.

In November, 1817, "cholera reached the centre division of the grand army, under the Marquis Hastings, whilst marching easterly from the Sindh (branch of the Ganges), where it developed itself in its most terrific form, assailing Europeans as well as natives. It attacked the division on November 14, and for about ten days the camp was converted into a hospital, the deaths, which were unusually sudden, amounting to a tenth of the number collected. The roads were strewed, on each day's route, with the dead and dying, owing to the impossibility of finding means of transport."

Government sanctioned the establishment of an experimental convalescent depot "in the hills bordering on the Dehyrah Doon, to which," says an order dated Camp Jellalabad, December 24, 1827, "European soldiers may be sent for a change of climate during the hot season."

The canteen system was introduced into the Army in India in 1828.

The soldier's life and surroundings are thus described in "The Good Old Days of Honourable John Company":—

"The condition of the soldier is better in India than in any other country. He is better paid there than elsewhere, and on the whole is well cared for. In India, too, there is nearly always the great charm of active service either in esse or in posse. And, moreover, if a man is intelligent and steady, he has a chance of employment away from his regiment, which may place him in a position far above that to which he could, under ordinary circumstances, aspire at home.

"The Indian climate is the great drawback; but as more attention
comes to be paid to habits of life adapted to the country, the soldier's condition will, no doubt, improve in a sanitary point of view. Much has already been done to improve it, and his life is now far more pleasant, and more profitable to himself and to the State, than it used to be. The life of the soldier is, in fact, so valuable in India, that every measure is political and useful, as well as humane, which tends to lengthen or improve it.

A sketch of camp life of the time:

"The rear guard are awaiting the removal of the camp, some with folded arms, a perfect illustration of the spirit of patience; others smoking a consolatory pipe; a few crouching round the expiring embers of the nocturnal fires. A chorus of horrid, gurgling sounds proceed from the throats of camels indignant at the heavy burdens imposed upon them; some laden with grain and supplies for the camp, others with a formidable amount of baggage. Tents of various sorts, shapes and sizes; tables large, small, round, square and oblong; sofas good, bad, and indifferent; chairs which had evidently passed through the ordeal of many previous marches, some bereft of arms, others destitute of legs, and not a few minus seat. Dilapidated chests of drawers, and every imaginable variety of trunk, box, bag, and basket, etc., capable of receiving odds and ends, utilities and rubbish, the omnium gatherum of a marching regiment; herds of buffaloes, bullocks, and ponies, bearing their share of the common burden, and laden also with the culinary apparatus of the camp. Hackeries, weighed down with a heavy cargo of goods; banghywallahs or bearers of boxes called petarras, for carrying refreshment, and suspended by ropes to each end of a broad bamboo borne over the shoulders; troops of grasscutters, with their wretched tattoos, or ponies; syces or grooms, and other useful appendages to a cavalry corps; the dhobees or washer-men of the regiment; and a dingy-looking tribe of bheesties or water-carriers, adorned with mussuks or skins in which the water is conveyed, slung over their shoulders. In addition to these, a train of servants, attendant on their masters; and the bazar people, interspersed with the camp equipage. In India, when troops are ordered to march, every requisite article of consumption accompanies the army or detachment moving, as the villages or small towns furnish a very insufficient supply for the numerous train; grain, oxen, sheep, goats, poultry—in fact, all things under the head of provisions must be procurable in the camp bazar, which is a most amusing and motley assemblage. The camp followers very far exceed the number of fighting men."

The following is from Hall's "Scenes of a Soldier's Life," published in 1848:

"Picture the bustle, confusion and excitement of an army on the march, being preceded by the skirmishers and advance guards, accompanied by the Quartermaster-General, who in the most systematic manner, on the arrival at the destined encampment, proceeds to calculate the relative distances required for each corps and department, and allots it to the parties attached from each regiment, for their further division. They form practical arrange-
ments, measure the necessary distance for each individual and tent, marking the spot, and awaiting the arrival, which quickly follows. The main body reaches the ground, and each corps marches at once to its quarters. The individual to the site of his place for the day. Shortly comes the numerous train of baggage carried by camels, elephants, mules, horses, asses, bullocks, carts, etc., etc., many thousands in number, and followers far exceeding the number of troops. The tent and its baggage arrive together and all is prepared to "pitch camp." A signal is given and, as if it were by magic, a town, a fort, and a stronghold is formed in a few minutes. Guards are mounted, pickets arranged, and sentries placed, and all is quiet and settled for the day. The commissariat proceeds to kill the cattle and issue the provisions. The baggage cattle are all sent out to graze under strong guards. The bazaars (one to each corps) open their stores or merchandise, and expose it for sale. The authorities at the head are engaged in the arrangement of the objects in view; emissaries sent out; chiefs are received and negotiated with for the supply of provisions; the weary soldier, after smoothing down for his domestic comfort his parlour of twenty-one-inches by six feet, lulled by the aid of that refreshing genius, sleep, beguiles the long, dreary hours of the day, filled with anxiety, and overpowered oftentimes with the intense heat, rendered more so by the trifling protection under canvas.

"At length comes the night, and every precaution having been taken, all is prepared for a fresh start; the cattle are placed in front of their to-morrow's load, each soul dissolves into that earthly heaven, which soon relieves the mind from the world's anxiety and care; at the dead of night is heard the trampling of the patrols carefully visiting guards and pickets, and the reliefs cautiously challenged by the watching sentries.

"Shortly after midnight are heard the shrill trumpets and bugles arousing the tired soldier from the midst of perhaps dreams of the happy hours of boyhood and home. The sound carries with it a volume of directions; and in a few minutes all is again confusion, yet regularity is there—all on tip-toe of bustle—yet all is steady and each at his place. The camp appears as one blaze of fire from the darkness of the night, and bushes and piles of brushwood collected, being fired to give light to enable the packing and loading to be carried on; and should you stray a dozen yards perchance it will take you half an hour to find your place again. And I have often seen, from the dream of the sleeper to the movement off the ground of more than 20,000 souls and cattle, not more than half an hour elapse. Long ere day dawns, all are again on the march; the keen morning air striking chilly through the wearied soldier, disturbed from refreshing sleep, and forced to trudge along an unknown path; all passes on in silence, nothing is heard, save the neighing of horses, and the heavy measured tread of the moving mass of men; line after line of connected camels and cattle move on, carefully guarded and guided by the troops and followers, each eye heavy from broken rest, and looking anxiously for the opening of the
distant horizon to admit the day and distribute the welcome rays of the sun, which at first are pleasant in the extreme, but ere a few hours are passed, become even more oppressive than the midnight air. All this it is which has so much astonished the natives of distant lands and placed our system at the top of the tree."

In the early days of the British dominion in India the camps, stations and posts of the field army developed into "cantonments," where troops were stationed in garrison.

As time went on, non-military persons were permitted to reside in cantonments; they occupied land, built houses for themselves and for the accommodation of officers, and set up shops and markets.

According to the rules, however, the ground within cantonments was to be kept appropriated exclusively to the use of troops, and it has always been consistently maintained, with few exceptions, that all land in cantonments belongs to Government.

The raison d'être of cantonments is defined in the opening paragraph of the "General Instructions for the Administration of Cantonments in India" issued with the Cantonment Manual of 1909: "It should be carefully borne in mind that the cardinal principle underlying the administration of cantonments in India is that cantonments exist primarily for the benefit of the health of the British troops, and to considerations affecting the well-being and efficiency of the garrison, all other matters must give place."

A "cantonment" then is an area marked out from the general civil administration and set apart as a place in which the first consideration is the health of the troops.

Information as to the health of the troops in the early days is scanty and unreliable. We have seen, however, that in 1799-1800 they suffered heavily from dysentery and abscess of the liver; "remittent fevers" were extremely prevalent all over the East.

Fortunately, the Report of the Royal Commission on the sanitary state of the Army in India (1863), gives a graphic description not only of the statistical position at that time but of the conditions under which the troops lived.

The deaths in the Royal Army in India during the thirty-nine years 1817 to 1855 were 55,584, or 70 per 1,000 per annum, of which 10 per 1,000 were attributed to active service.

In the Company's European troops during 1800 to 1856, the annual death-rate was 69 per 1,000:

"If the mortality is set down at 69 in 1,000, it follows that, besides deaths by natural causes, 60 per 1,000 of our troops perish in India annually. A company out of every regiment has been sacrificed every twenty months. These companies fade away in the prime of life, leave few children, and have to be replaced at great cost by successive shipsloads of recruits."
Commenting on the casualty figures of the Company's European troops during the ten-year period 1847 to 1856, the Report has the following:

"It will be observed that 100,000 men are reduced to 9,601 in twenty years of service, by 90,396 casualties of every kind:

- 40,447 by deaths in the service,
- 14,627 " invaliding,
- 3,558 " purchasing their discharge,
- 8,972 " the expiration of their time of service,
- 968 " promotion,
- 5,724 " transfers to the town major's list,
- 13,976 " transfer to other corps,
- 1,818 " desertion, and
- 306 " other causes.

1,000 effectives are thus reduced to 96 in twenty years."

Fever was of course the principal cause of sickness, and killed seventeen men per 1,000 annually.

"Of the various obstacles which bar the colonization of the white man in tropical regions, and of the many causes which reduce the strength of our armies there, remittent fever is the principal."

Dysentery was most prevalent in the plains and during the hot and rainy seasons. "Out of an aggregate British force of 25,433 men of Her Majesty's Army serving in periods of eight and ten years respectively in the stations of Calcutta, Chinsurah, and Berhampore, all in Bengal proper, there occurred 8,499 cases of dysentery and diarrhoea. The amount of sickness from dysentery and diarrhoea here exhibited is enormous. In the presidency of Madras, again, out of an aggregate British force of 82,342 men serving there from 1842 to 1848, there occurred 10,531 cases of dysentery and 9,189 cases of diarrhoea, making a total of 19,720 cases of bowel disease, exclusive of cholera. It thus appears that next to the malarious fevers of India, bowel complaints are the most prevalent, while the dangers to health and to life from these last are even greater than from fevers. Most of the casualties which occur amongst sick soldiers on the voyage homewards from India are from chronic dysentery."

Diseases of the liver were very prevalent and very fatal. Out of an aggregate British force of 211,993 men serving in Bengal from 1812 to 1832, there were 14,015 admissions into hospital for diseases of the liver, of which 924 died. From 1833 to 1854, out of an aggregate force of 331,775 men serving in the same presidency, there were 18,765 admissions and 1,345 deaths from liver diseases.

Dysentery and liver diseases together were responsible for twenty deaths per 1,000 per annum. Cholera vied with diseases of the liver as a cause of sickness and mortality. Eighteen deaths per thousand per annum were from cholera and diarrhoea.

Venereal diseases were responsible for a large proportion of the sickness and hospitalization.
Catarrh, rheumatism and scurvy were much more fatal in India than in England.

The question now arises, What is the source in India from which fresh healthy troops acquire infection with these diseases?  

Extract from observations by Miss Nightingale on the evidence contained in stational returns sent to her by the Royal Commission on the sanitary state of the Army in India:—

If there be an exception, i.e., if there be a single station in India with a good system of drainage, water-supply, and cleansing for itself and its bazaars, with properly planned and constructed barracks and hospitals, provided with what is necessary for occupation and health, to such station these remarks do not apply. But I have not found it. Everywhere there are grievous sanitary defects, which, wherever they exist, can lead only to sickness and loss of life to the degree in which they exist.

In the papers sent me I find an amount of evidence showing the causes of disease in the Army in India, such as perhaps was never before brought together on any similar subject. It is shown in these papers that:

I.—Indian Stations are Subject to the Diseases of Camps.

(1) The prevailing diseases at Indian stations are zymotic diseases, connected with camps—such as I myself have seen—all of them, cholera, fevers, diarrhoea, dysentery, together with hepatic disease.

The main point of the Indian sanitary question is, indeed, camp disease and liver disease.

Stations have been chosen with as little regard to health as camps often have been. Many are in positions which the mere verbal description proves to be unsuitable. Or at all events, little or nothing appears to have been done to render them suitable. They are low, damp, or even wet, often mixed with unhealthy native towns and bazaars abounding with nuisances.

II.—Indian Stations Present the Same Sanitary Defects as Camps.

(2) At all or nearly all the stations, the usual causes of camp disease appear to exist.

(1) Bad Water.

Hyderabad (in Sind) says "No doubt it (the water) swarms with animal life."

At Bangalore, the Ulsoor tank, used for drinking, is the outlet for the whole drainage of a most filthy bazaar (125,000 inhabitants), for that of our cavalry, infantry, and horse artillery barracks, and of the greater proportion of the station. The Commander-in-Chief says "the disgustingly filthy nature of the source from which the water used at Bangalore is taken, has been brought to notice scores of times by me within the last

1 Native villages.
four and a half years”; but, as usual, “nothing has been done to remedy this most crying evil.” Even the wells from which drinking water is taken are impure from sewage. They are open; and “when they get dirty, are cleaned.”

At Secunderabad, as much as 119 grains of solid matter, and as it would appear, thirty grains of organic matter per gallon, are found in some of the well and tank water. (Secunderabad and Poona are almost the only stations which give a chemical analysis.)

At Asseerghur, the same tank is used for drinking and bathing. “For the former the natives slightly clear away the surface.” Asseerghur thinks that its water “smells good.”

The application of chemical science to water supply appears hardly to be in its infancy in India.

The arrangements for raising and distributing water are everywhere, as Bombay Presidency remarks, the same as what they might have been “1,000 years or more ago.” Belgaum has attained the maximum of civilization under this antique system. The water is there “raised in leather skins by bullocks, emptied into troughs, and thence conveyed by water ‘carriers.’”

Everywhere “each individual has his bheestie, and each regiment its set of bheesties.”

The “water-pipes with a will” are not always found to answer, for Fort William (which pays them £134 per annum) admits that they sometimes take the water from “nearer and impurer sources.” Would it not be better to try water-pipes without a will? (The reason usually assigned for employing these human water-pipes in barracks is, that they are indispensable on field service. But so are tents; and nobody proposes to barrack men in tents in time of peace.)

The practical result of this part of the evidence is that safe water supplies are yet to be found both for Indian cities and for British cantonments.

Washing and bathing in barracks and hospitals will have to be conducted on quite a different scale from the present in India, if health and cleanliness are aimed at.

(2) Bad Drainage.

This may be rendered “no drainage whatever,” in any sense in which we understand drainage.

At the capital of the Bombay Presidency, where civilization has introduced a “main drain,” two feet square, with a “flat bottom,” this “main drain” is a “great nuisance,” and the “stench at times scarcely to be endured.” At Fort George, in Bombay, the “latrines are not drained except into an open ditch, which is always in a foul state.”

Indeed, Bombay would gladly say, as the London woman said when asked to point out the drains, in the days when London drainage was in a
similar state, "No, thank God, Sir, we have none of them foul stinking things here."

At Madras (Fort St. George) the drainage hitherto is stated to be worse than useless. The main drain of the town is eighty yards distant from the European fort; the effluvia from it very offensive. The arrangements at the native lines, as described in the reports, are simply abominable.

At Secunderabad (Trimulgherry) there is no drainage of any kind. The fluid refuse evaporates or sinks into the subsoil. A nallah which intersects the cantonment stinks. The extent of the cantonment is so enormous that it is said "to preclude any general surface draining"; a statement which, if true, would amount to this, that the occupation of ground by human beings must inevitably lead to disease, a statement as applicable, or rather much more applicable to the area of London than to that of Secunderabad, and yet London is drained both on the surface and below it.

Everywhere the system of "drainage" is that "cesspits" are "emptied" when "filled," or "when necessary," and their contents carried away by hand, as at Deesa and Belgaum. Generally they are close to the buildings.

At Hyderabad, in Sinde, in the native lines, the contents of the cesspits are "thrown about in close vicinity to the cesspits." "Anything edible is immediately picked up by birds or dogs." There is "great room for reform" in the native latrines, the cleansing of which consists mainly in the liquid "sinking into the subsoil, so that the earth is thoroughly saturated, and a noisome odour pervades the atmosphere."

At Neemuch, which has attained the high pitch of civilization of building latrines for its bazaar, the "latrines are too close to the houses, and are not used at present for lack of a proper establishment to keep them clean." Therefore the people at Neemuch do like their neighbours in this respect—a proceeding which it is impossible to describe farther. At Asseerghur a similar abomination appears to be practised on an "open space of ground near the main guard and parade," which is "always offensive," and "ready to nurture epidemic disease."

At Asseerghur the "construction of sewers and drains has not as yet been considered." They "consider," on the contrary, that the sewage "will probably be removed by hand." "One of the tanks" is called "unsavoury."

Allahabad, one of our largest and most important stations, in one of the worst positions, as if that position were not unhealthy enough by itself, trusts to nature again, has no drainage nor sewage, and leaves its surface water to "evaporate," "percolate," and "run off."

Benares follows in the train. At Rangoon the drainage is supposed to run up-hill. For we are told that all sewage and drainage are merely "trenches, made without reference to slope."

It is impossible to pursue this subject further. There are such worse things in the Stational Reports than what I have chosen to give, that I
must say to those who call my "bonnet ugly," "there are much uglier bonnets to be had."

The system of water supply and drainage in India may be briefly defined as follows: they draw water from a well, not knowing whence it comes; and if there be any means to drain off water, it is into a cesspit, or into long, open, pervious drains, not knowing whither it goes. Where this is not done, all the fluid refuse is collected in open cesspits, and carried away by hand labour or carts; or else it is allowed to dispose of itself in the air or earth as best it can.

Drainage, in the sense in which we have found it necessary for health in this colder climate, is by no means considered necessary for health in the hot climate of India; for as in the case of the water supply, most of the reporters consider no drainage a sufficient guarantee for health.

(3) Filthy Bazaars.

It is almost impossible to describe these. But one description will do for all. Except where the two Lawrences have been—there one can always recognize their traces—the bazaars are simply in the first savage stage of social savage life.

No regular system of drainage, no public latrines, or if there are any, no sufficient establishment to keep them clean, no regular laying out of houses; overcrowding, bad ventilation, bad water-supply, filth, foul ditches, stagnant water, jungle and nuisances, this is the account of all. The country round some is stated to be "one immense privy."

At Neemuch, the Bazaar Superintendent maintains "strict supervision," and "punishes the inhabitants," although the latrines cannot be used. The native houses are all more or less dirty, with dung-heaps close to them. The "disagreeable emanations" from the bazaar are felt in barracks.

In Dinapore some streets were impassable dunghills "last year," "until cleared." The elephant sheds and all the south of the station in a state disgraceful to any cantonment. The drains, deep holes of festering mud. No latrines, although "the population is as thick as can be;" until lately, only one filth cart—now three. At a neighbouring village the dead are buried within the huts.

At Agra it is a proof of "respectability" to have cesspools. The inhabitants (152,000) generally "resort to the fields."

At Berhampore "nothing can be worse than the sanitary condition of bazaars." The native houses are dirty in the extreme. Dung-heaps or deep holes full of stagnant water, the common cesspit of the houses, are close to them. The nuisance is felt even at barracks. The "Conservancy" establishment is quite unequal to its work.

At Muttra the bazaar is an accumulation of huts without order. "Drainage bad; ventilation worse; water supply execrable." "All the wells brackish, from nitre," the earth being contaminated with all sorts of impurities. Latrines "hardly known." "In short, the bazaar is a mass of filth."
At one hill station, Nynee Tal, where men are sent for their health, the stench is at times overpowering from both bazaars being in a filthy and crowded state, no proper drainage or latrines, no means of preserving cleanliness, which causes nuisance even in the barracks. At another, Darjeeling, among other defects, "the native villages," writes the medical officer, "are the most filthy" he has "ever entered, and it is quite sickening to walk through them."

At Jubbulpore, where every hut is crowded, where there are no latrines, where cleanliness is almost impossible, the same causes produce the same results.

At Cannanore the native houses have dungheaps and cesspits within the compounds. Owing to the want of latrines, the "filth and indecency" are described to be what it is impossible to repeat. The dead are buried within the compounds of houses.

At Trichinopoly the water supply is bad, scanty and brackish. The bazaar is said to be "clean," while the open cesspits are described as an "intolerable nuisance" when the wind blows over them. The native houses are ruinous and not ventilated. Levelling, filling up, pulling down deserted huts, etc., is urgently required, but not done.

Those who think I have given anecdotes, and not fair illustrations, I refer again to the Stational Reports for further and fouler evidence:

These instances are enough to illustrate the subject. Bazaars are the real hot-beds of disease and require sweeping reforms as much as or even more than the stations.

Native regimental bazaars, from which the soldiers procure supplies, are within military limits, and as much under military control as the ground on which the barracks stand, and ought to be kept in as good a sanitary state as the barracks will be when thoroughly improved.

(End of Miss Nightingale's observations.)

The Commission itself had no doubt as to the source from which the troops became infected. "India differs from the colonies in one essential particular; it is peopled by the inhabitants of villages, towns, and large cities, as well as by families engaged in agriculture. As we shall afterwards show, the cities are still undrained, the earth is saturated with organic matter, the water is contaminated, and other sanitary defects abound. In these cities, zymotic diseases are aggravated, and assume the same destructive forms as they did in London before it was drained, and was supplied with water free from enteric impurities.

"The health of the English army is indissolubly associated with the health of the population of the country which it occupies; hence it will be found that the mortality of the troops is above 20 in 1,000 at all the stations of the great Indian cities. The numerous camp followers always
connect the cantonments with the city, and they exist in a community of suffering, as well as of advantage.

"The capital of India is still undrained, uncleansed, and unsupplied with fresh water; so its diseases are as fatal as some of the diseases of London in former times. The main artery of the commerce of Asia, the Ganges, does the same work as the Thames; it also carries down 236 million cubic yards of soil annually; it floods the land, and besides ships, its tides waft up and down the unburnt and unburied dead of the Hindu population.

"Fort William, as might be anticipated, enjoys no sanitary immunities, for the mortality of the infantry during ten years, within its walls, was not at the rate of 20 or 10, but of 102 per 1,000, for ten years. For long periods the mortality is cited at 69 and 58 per 1,000. At Dum-Dum the mortality was 77; and at Chinsurah, the old Dutch settlement, 54 and 70."

The Report proceeded to consider the sanitary condition of existing stations as it bore on the health of the troops. "But in doing so it is necessary to include the sanitary state of native towns and bazaars, because not only is a part of the soldier's time spent in these places, but the mere fact of their proximity to European barracks must necessarily exercise an injurious influence on the healthiness of both barracks and hospitals, if the native dwellings are in an unwholesome condition. It is indeed impossible to separate the question of health, as it relates to troops, from the sanitary condition of the native population; especially as regards the occurrence of epidemics which, whenever they occur among natives, indicate a condition of matters dangerous in the highest degree to the troops in the neighbourhood.

"Every military station in India has its bazaars, mostly in close proximity to the European lines. They consist of huts or houses arranged on no general plan, and without any regard at all to sanitary conditions. They have grown up anyhow, and have increased with the bazaar population, which always bears a very high proportion to that of the European troops at the station.

"There has hitherto been no limit to the proximity by which these large native populations may approach European barracks, nor to their position as regards prevailing winds. There are no regulations as to the general arrangement of the houses, the width or direction of streets, drainage, or water supply. The habits of the natives are such that unless they are closely watched, they cover the whole neighbouring surface with filth; and if there be any ravines or pits in the neighbourhood they convert them into dangerous nuisances. There are generally no public necessaries. There are often open cesspits among the houses. The surface drainage sometimes flows into tanks from which the water-supply is derived."

"The reports from the stations confirm these general statements given in evidence, and show that in time past bazaars have been neither more
nor less than native towns of the worst class, which have grown up in and around military cantonments, without any suspicion having been apparently excited, in the first instance, as to their probable influence on the health of the troops.

"Venereal disease prevails to a very great extent in the army, and at almost every station. . . . . There is no subject so difficult to deal with as this."

In its Recapitulation the Royal Commission declared:—

"The towns and bazaars in the vicinity of lines are in the worst possible sanitary state, undrained, unpaved, badly cleansed, often teeming with offensive and dangerous nuisances; with tanks, pools, and badly-made surface gutters, containing filth and foul water; the area overcrowded with houses, put up without order or regularity; the external ventilation obstructed, and the houses overcrowded with people; no public latrines, and every spare plot of ground covered with filth in consequence; no water-supply, except what is obtained from bad shallow wells and unwholesome or doubtful tanks. These towns and bazaars are the earliest seats of epidemics, especially of cholera, before their ravages extend to the European troops in the vicinity."

Dealing with sanitary administration, the Commission delivered itself as follows:—

"The sanitary police of bazaars is, with few exceptions, of a most inefficient character. The administration seems to vary at different places, and to be confined chiefly to surface cleansing. The power is exercised by the cantonment magistrate, but on no definite system; sometimes carts and sweepers are allowed, in other cases the people are held responsible for their own cleanliness. Certain bazaars and cantonments are described as being 'clean.' But the majority bear no evidence of any consistent sanitary authority being in existence.

"There are no proper sanitary officers; a sanitary department is altogether wanting.

"An examination of the stational returns shows that the proper functions of officers of health are not even recognized, and that there is neither order nor system in the administration.

"It follows from what has been said that, except for regimental and certain stational purposes, there is no sanitary authority or administration in India, and no means of bringing the large experience acquired in dealing with sanitary questions, as regards towns, stations and barracks, including the description of works which have been successfully introduced at Home, to bear on the Indian question."

To remedy this state of affairs and prevent the troops from becoming infected by the native population, the Commission made certain recommendations, some with regard to sanitary measures, others in connexion with sanitary administration. Of the latter the most important was:—

"That the sanitary duties of regimental, garrison, and inspecting medical officers, prescribed in the new (Home) medical regulations of
October 7, 1859, be applied or adapted to all stations in India; and that properly trained army medical officers of health be appointed to this service at the larger stations."

"There can be no doubt that well-considered measures of water-supply, drainage, paving, cleansing, and general construction in these towns, would be attended with most beneficial results to the health of troops quartered near them. As regards the native population, we concur in opinion with Sir C. Trevelyan, who says:—

"I consider that not only the preservation of life and health is concerned, but the strength and comfort and general efficiency of the population are involved; they would be better and abler men, women and children for all the purposes of life, if the average standard of mental and bodily vigour were improved by the removal of these local causes of a low state of health."

It may be argued that all this was away back in 1860, and has nothing to do with to-day.

Nearly fifty years later, in an article on "The Difficulties of Indian Sanitation" in the Journal of the Royal Army Medical Corps, 1907, Colonel R. H. Forman wrote: "At first sight it would almost appear that the existence of the bazaars in close proximity to the troop lines, wallowing in the filth and squalor of an immemorial custom, and disseminating disease broadcast, as they do, would make us acknowledge defeat, and force us to shrink from the herculean task discouraged and dismayed. . . . It is certain that in bygone days the condition of the bazaars was very much the same as it is now; the people have not changed their mode of living."

A few extracts from sanitary reports in 1925 bring the subject up to date:—

It is noticed that some houses have no arrangements for disposal of sullage water.

- Buckets at ablution places full of filthy water and smelling badly.
- Drains not swept and in a bad insanitary condition.
- All incinerators found in a most disgusting and filthy condition and full of faecal matter with no litter and not burning.
- Water was lying on the ground round the pans.
- The latrines were smelling badly.
- Drains not properly swept. The whole street was found in a very dirty condition.
- Offal shops were in a dirty condition and full of flies.
- . . . the drains were found choked and water stagnant. This condition of the drains was general in the whole bazaar.
- There are no urinals in the bazaar, with the result that people urinate into the drains.
- Children are defecating on the ground round this latrine, which was therefore in a filthy condition, and residents near by are complaining of the bad smell.
- The litter house is broken down.
Military Hygiene and Pathology in India

Feces were found in the ablution place. The ground round the incinerator was filthy.

. . . . the sweepers were throwing feces from the latrines on the heap of filth. The smell was therefore disgusting, and this place is most insanitary and dangerous.

. . . . after a time the faecal matter is removed from the incinerators by the sweepers and thrown in an ashpit.

The large pucca drain was blocked and full of filth, and filthy stagnant water.

Instead of adopting the Royal Commission's recommendation to appoint a properly trained or specially qualified medical officer of health at the larger stations, the action taken in 1863 was to designate the senior medical officer at each station as "sanitary officer."

A very great improvement has undoubtedly taken place in the health of the troops as a result of the Commission's recommendations with regard to water supplies, drainage, barrack construction, barrack cook-houses, etc.

When we come to the bazaars and other native parts of the cantonments we are on less certain ground.

It must be remembered that in those days health administration in England was in its infancy. Many of the obnoxious features described by the Commission as obtaining in Indian cantonments had their counterpart at Home. Medical officers of health were unknown in most parts of England, and the organization of a health office as we see it to-day was entirely unknown.

The effect of the measure adopted in 1863 was merely to add to one man's existing titles of "O.C. Station Hospital" and "Senior Medical Officer" still another title, viz., "Sanitary Officer of the Cantonment." This new title was included in the Cantonment Act and given statutory authority. It has now been changed to "Health Officer."

We shall see later on that this arrangement, excellent in itself, fell far short of the requirements.

In the meantime let us take stock of the state of health of the troops in Indian cantonments to-day.

<table>
<thead>
<tr>
<th>Years</th>
<th>Average annual strength</th>
<th>Hospital admissions</th>
<th>Deaths</th>
<th>Invalids</th>
<th>Constantly sick</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sent home</td>
</tr>
<tr>
<td>At Home</td>
<td>1924</td>
<td>102,391</td>
<td>343.7</td>
<td>1.95</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>1925</td>
<td>.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1926</td>
<td>.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>1924</td>
<td>57,597</td>
<td>645.3</td>
<td>3.47</td>
<td>15.97</td>
</tr>
<tr>
<td></td>
<td>1925</td>
<td>.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1926</td>
<td>.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
It will be seen that in India the admissions to hospital are nearly double those at Home, the deaths are nearly double, the invalids discharged are nearly a third as many again, the constantly sick are half as many again, and the average sick time to each soldier is more than half as much again.

Taking now the principal preventable diseases:

**Malaria.—Actual Admissions to Hospital.**

<table>
<thead>
<tr>
<th>Year</th>
<th>British Troops</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fresh</td>
<td>Relapse</td>
</tr>
<tr>
<td>1924</td>
<td>4,515</td>
<td>7,605</td>
</tr>
<tr>
<td>1925</td>
<td>3,064</td>
<td>6,020</td>
</tr>
<tr>
<td>1926</td>
<td>4,175</td>
<td>5,214</td>
</tr>
<tr>
<td>3 years' totals</td>
<td>11,754</td>
<td>18,879</td>
</tr>
</tbody>
</table>

**Indian Troops.**

<table>
<thead>
<tr>
<th>Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1924</td>
<td>3,293</td>
</tr>
<tr>
<td>1925</td>
<td>2,616</td>
</tr>
<tr>
<td>1926</td>
<td>3,520</td>
</tr>
<tr>
<td>3 years' totals</td>
<td>9,429</td>
</tr>
</tbody>
</table>

We have here a great mass of hospital admissions. Admitting that the distinction between fresh and relapse cases is by no means exact, we have still, in three years, approximately 20,000 fresh infections, demanding preventive measures, and 55,000 relapses, requiring improved methods of treatment.

**Venereal Diseases.—Actual Admissions to Hospital.**

<table>
<thead>
<tr>
<th>Year</th>
<th>British Troops</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F.</td>
<td>R.</td>
</tr>
<tr>
<td>1924</td>
<td>2,042</td>
<td>720</td>
</tr>
<tr>
<td>1925</td>
<td>2,126</td>
<td>801</td>
</tr>
<tr>
<td>1926</td>
<td>1,848</td>
<td>665</td>
</tr>
<tr>
<td>3 years' totals</td>
<td>6,015</td>
<td>4,136</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Indian Troops</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1924</td>
<td>816</td>
<td>389</td>
</tr>
<tr>
<td>1925</td>
<td>884</td>
<td>732</td>
</tr>
<tr>
<td>1926</td>
<td>740</td>
<td>294</td>
</tr>
<tr>
<td>3 years' totals</td>
<td>2,330</td>
<td>942</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Indian and British Troops</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F.</td>
<td>R.</td>
</tr>
<tr>
<td>1924</td>
<td>8,405</td>
<td>3,128</td>
</tr>
</tbody>
</table>

Here are 19,314 admissions for venereal disease acquired from the native population, 15,549 being fresh cases demanding preventive measures and 3,765 being relapses requiring improved methods of treatment.

We may well agree with the Royal Commission—"There is no subject so difficult to deal with as this."
Military Hygiene and Pathology in India

INTESTINAL DISEASES.

1925.

<table>
<thead>
<tr>
<th></th>
<th>Dysentery</th>
<th>Colitis</th>
<th>Diarrhea</th>
<th>Enteric fevers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>British troops</td>
<td>725</td>
<td>207</td>
<td>669</td>
<td>184</td>
<td>1,785</td>
</tr>
<tr>
<td>Officers</td>
<td>71</td>
<td>29</td>
<td>115</td>
<td>27</td>
<td>242</td>
</tr>
<tr>
<td>Women</td>
<td>39</td>
<td>27</td>
<td>90</td>
<td>22</td>
<td>173</td>
</tr>
<tr>
<td>Children</td>
<td>93</td>
<td>30</td>
<td>253</td>
<td>20</td>
<td>396</td>
</tr>
<tr>
<td>Indian troops</td>
<td>883</td>
<td>476</td>
<td>1,890</td>
<td>98</td>
<td>3,347</td>
</tr>
<tr>
<td>Total</td>
<td>1,811</td>
<td>769</td>
<td>3,017</td>
<td>351</td>
<td>5,948</td>
</tr>
<tr>
<td>Deaths</td>
<td></td>
<td></td>
<td></td>
<td>39</td>
<td></td>
</tr>
</tbody>
</table>

1926.

<table>
<thead>
<tr>
<th></th>
<th>Dysentery</th>
<th>Colitis</th>
<th>Diarrhea</th>
<th>Enteric fevers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>British troops</td>
<td>892</td>
<td>45</td>
<td>866</td>
<td>152</td>
<td>1,955</td>
</tr>
<tr>
<td>Officers</td>
<td>82</td>
<td>7</td>
<td>146</td>
<td>20</td>
<td>255</td>
</tr>
<tr>
<td>Women</td>
<td>64</td>
<td>7</td>
<td>159</td>
<td>8</td>
<td>238</td>
</tr>
<tr>
<td>Children</td>
<td>94</td>
<td>7</td>
<td>237</td>
<td>29</td>
<td>367</td>
</tr>
<tr>
<td>Indian troops</td>
<td>1,415</td>
<td>40</td>
<td>1,894</td>
<td>79</td>
<td>3,428</td>
</tr>
<tr>
<td>Total</td>
<td>2,547</td>
<td>106</td>
<td>3,302</td>
<td>288</td>
<td>6,243</td>
</tr>
<tr>
<td>Deaths</td>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

1927.

<table>
<thead>
<tr>
<th></th>
<th>Dysentery</th>
<th>Colitis</th>
<th>Diarrhea</th>
<th>Enteric fevers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>British troops</td>
<td>877</td>
<td>36</td>
<td>922</td>
<td>169</td>
<td>2,004</td>
</tr>
<tr>
<td>Officers</td>
<td>69</td>
<td>6</td>
<td>139</td>
<td>22</td>
<td>236</td>
</tr>
<tr>
<td>Women</td>
<td>44</td>
<td>5</td>
<td>120</td>
<td>5</td>
<td>174</td>
</tr>
<tr>
<td>Children</td>
<td>98</td>
<td>16</td>
<td>281</td>
<td>18</td>
<td>413</td>
</tr>
<tr>
<td>Indian troops</td>
<td>1,540</td>
<td>42</td>
<td>1,418</td>
<td>164</td>
<td>3,164</td>
</tr>
<tr>
<td>Total</td>
<td>2,628</td>
<td>105</td>
<td>2,880</td>
<td>378</td>
<td>5,991</td>
</tr>
<tr>
<td>Deaths</td>
<td></td>
<td></td>
<td></td>
<td>56</td>
<td></td>
</tr>
</tbody>
</table>

Here is a welter of sickness, misery and inefficiency that at once raises the question, "Is all well with our system of health administration in Cantonments?" It is this baleful group of diseases, striking below the belt, that makes life in India so precarious and uncertain.

The rôle of the fly in the dissemination of intestinal diseases has been demonstrated beyond reasonable doubt. Manifold's work at Poona has shown that excreta with blood and mucus are to be found exposed in practically all native latrines and that the organisms of dysentery can be recovered from the flies in the neighbourhood.

We must either (a) abolish flies, or (b) prevent flies from getting at the excreta in the latrines.

It is not open to dispute that the best and most straightforward method would be to abolish flies. This, however, is easier said than done. Measures directed against fly-breeding are very necessary in all cantonments, but I confess I am not an optimist in this matter. Just as in malaria seasonal withdrawal of troops and mosquito-proofing of barracks are necessary until we discover a reliable means of mosquito prevention, so seasonal withdrawal of troops and fly-proofing of latrines appear to be the rational way of dealing with this age-long problem of intestinal diseases what time we learn how to abolish the fly. I am of opinion that all latrines in Indian cantonments should be completely fly-proofed, beginning with those stations such as Poona and Quetta in which intestinal diseases are most prevalent. Better still, a water carriage system should be introduced wherever possible.
We now come to the question of health administration in cantonments. According to the present system the "Health Officer" (O.C. British or Indian Military Hospital and S.M.O. of the station), is in the military hospital which he commands, often miles away from the main bazaars. The "Assistant Health Officer" is in the Cantonment Hospital, of which he is in charge, often miles away from the Health Officer. Neither of these is given a conveyance allowance to induce or enable him to move about the cantonment. There is no central Health Office. There are no clerks for statistical or other purposes. There are no sanitary inspectors under the orders of the Health Officer or Assistant Health Officer.

Yet it is solemnly laid down in Section 129 of the Cantonments Act of 1924 that:

"(1) The Health Officer shall exercise a general sanitary supervision over the whole cantonment, and shall submit monthly to the cantonment authority a report as to the sanitary condition of the cantonment, together with such recommendations in connection therewith as he thinks fit.

(2) The Assistant Health Officer shall perform such duties in connection with the sanitation of the cantonment as are, subject to the control of the cantonment authority, allotted to him by the Health Officer."

In case the Health Officer might be like a voice crying in the wilderness, a footnote remarks that, "due consideration should be given to the recommendations of the Health Officer in all matters affecting the Health (sic) of the cantonment generally."

It must not be thought, however, that the Health Officer is entirely without powers. Far otherwise.

Section 156 enacts that, "The Health Officer may take possession of any milk, clothes or other articles which are or have recently been in the possession of any dairy-man . . . or of any washer-man . . . and may subject the same or cause the same to be subjected to such chemical or other process as he may think necessary."

It will be noticed that the Health Officer "may subject the same or cause the same to be subjected to such chemical process, etc." but he must take possession of them himself. He cannot delegate his powers; this is according to the interpretation of high authority.

Imagine then a September morning in a large cantonment in India. Temperature 110° F. in the shade; clouds of dust rolling along the parched road, no rain has fallen for a week.

Enter gaily—in service dress uniform—a Lieutenant-Colonel of the R.A.M.C. or I.M.S. on his way from hospital to inspect the cantonment bazaars, and by the prophylactic power of his eye to stem the advancing tide of malaria and dysentery. He is on foot—after all it is only twelve miles to the far end of the cantonment and back again. His horse (his private property, but supported—as to two-thirds of the cost—by
Government) is lame; most of his juniors are away on hot-weather duty in the hills.

Enter from the other side a milkman with suspicious ware.

This is where Section 156 of the Act comes in.

It will be of no use the Health Officer blowing his whistle or calling the nearest “lal-puggri” to lend assistance. *With his own hand* must he seize the milk or sample thereof, and eke the “clothes or other articles” in possession of the reluctant milkman.

The miserable gwala is no match for the Health Officer of preventive eye and hardened biceps.

It is soon over. Observe now the despoiled milk-vendor sink in the dust with bitter unavailing tears; while the dutiful but now heavy-laden Health Officer—milk chatties in one hand, clothes or other articles in the other—reflects too late as to whether it is the milk or the clothes he must “subject or cause to be subjected to chemical or other process,” and—even more important—where and by whom this chemical process is to be carried out.

Section 2 (1) of the Cantonments Act of 1924 asserts, that “Assistant Health Officer” means the medical officer appointed by the officer commanding the district (now the Command) to be the Assistant Health Officer for a cantonment. A small type footnote supplements this as follows:—

“The Cantonment Reforms Committee recommended that the appointment of Assistant Health Officer and Health Officer should be in the hands of the Cantonment Board. This is similar to the appointment of Health Officers in Municipalities. But Government cannot divest itself of its responsibility for the health of troops, nor can it lose the means by which alone it can discharge that responsibility in a satisfactory manner. It is essential that both these officers should be officers of the Military Medical Services selected and appointed by Government. Government pays their salaries, and apart from anything else very few cantonments could afford to pay the salary which a competent Health Officer would require. Many cantonments are not self-supporting, they receive grants-in-aid from army estimates. But in any case a Board could not obtain from outside the Military Medical Services an officer who is trained in the special requirements of the troops. The posting and transfer of these officers could not be dependent on the will of individual Cantonment Boards”.

Notwithstanding the somewhat confused reasoning, the main contention of this note is essentially sound. Cantonments exist for the health of the troops. The military medical services alone can provide properly trained Health and Assistant Health Officers who understand the special requirements of the troops.

The Cantonments Act of 1924 requires alteration and amplification, as regards health administration, to render it practical and workable. The amendments should preferably be drawn up by those who have themselves been Health Officers in cantonments and who understand what health administration means in all its bearings.
It is essential that the health organization in a cantonment should be
co-ordinated under the Health Officer in a central Health Office, located
in the offices of the Cantonment Authority, and that clerks and sanitary
inspectors should be placed at the Health Officer's disposal. Assistant
Health Officers are necessary only in the larger cantonments, specially
qualified officers being appointed for a fixed term of years.

It is further essential that the A.D.M.S. of the district, assisted by his
Deputy Assistant Director of Hygiene, if any (some districts are still with­
out a hygiene expert), should have control over the health organization in
cantonments in his district, that the D.D.M.S. of the Command should
have super-control, and that the whole organization throughout India
should come under the general supervision of the Director of Medical
Services at Army headquarters.

Only in this way can we bring to bear on the problem of the soldier's
health in India the modern methods of health organization which have
abolished from England those very diseases which "injure the health and
destroy the life" of the soldier in India to-day.

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Lincoln's "The Administration of Cantonments."
ARMY MEDICAL CORPS, xiii, 149.
Hall's "Scenes in a Soldier's Life," 1848.
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Army Medical Department Reports.

(To be concluded.)