

A general perusal of this book inclines one to the opinion that the Russian system of physical training is very thorough, moreover that, though every precaution is ordered to be taken to bring the men on gradually, it is on the whole more severe than our own, especially in the exercises with apparatus. One would suppose that the Russian authorities were not as convinced as our own as to the efficiency of free exercises. What is specially admirable in the Russian system is the variety of the free exercises as tending to diminish boredom in the men under instruction, and the large number of "practical" exercises which link physical training with more special forms of military training. A system of physical training in which these points are emphasized is, however, likely to prove complicated in practice.

But in comparing the Russian system with our own we should remember that the Russian authorities are not legislating for the immature lad, that the regiments practically receive all their recruits on a settled date in each year (there is nothing in Russia corresponding to our depots) and that the large majority of these recruits are of a hardy "backwoods" type. Under these conditions it should be possible to train hard and get good results.

Lectures.

THE SANITARY ORGANIZATION OF THE IMPERIAL AND INDIAN ARMIES, WITH SANITARY LESSONS FROM AN ORIENTAL CAMPAIGN.¹

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Royal Army Medical Corps.

"It is disease, not the field of action, which digs the graves of armies."—*McCulloch's Malaria, dated 1827.*

FREDERICK THE GREAT once said that "God fought on the side of the strongest battalions," and it has also been asserted that "it is disease and not the field of action which digs the graves of armies." The keeping of his battalions as strong as possible must ever be an all-important question for the Commander in the field, and, as it can be shown by military history, it is microbes more than bullets that the soldier has to dread. The study of the means of preventing disease in war—i.e., sanitary organization is, therefore, a matter of more than passing interest to every one interested in the welfare of armies.

¹ A lecture delivered to the officers and non-commissioned officers of the First Division of the Indian Army. (Received for publication on May 30, 1911.—ED.)

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I promise not to weary you with figures, but I venture to emphasize this essential point by quoting just five instances, three in the experience of our own Army, one instance from the French Army, and one from the American Army, all of which occurred in the past century.

British Army.—(1) The Walcheren Expedition of 1809, in which there were 23,000 deaths in four months out of a force of 39,000 men. On this occasion 217 men were killed by the enemy.

(2) The Ashanti Expedition of 1864, which simply melted away from disease. Those who did not die were invalided.

(3) The Tirah Campaign of 1897, in which there were twenty-five admissions per thousand for disease for each one from wounds, and fourteen deaths due to microbes for each one credited to the Afridis.

French Army.—In the French Expedition to Madagascar in 1895, a third of an army of 23,000 men died from malaria alone.

American Army.—In 1898, after the capture of Santiago, one-half of the American Army in Cuba was incapacitated at the same time from disease. The condition of affairs was so grave that it evoked an appeal to the War Department, signed by all the officers of higher rank, for an immediate removal of the troops to a healthier locality, using the sentence "this army must be moved or perish."

Scattered instances of this kind might be multiplied indefinitely, but in studying war from history the maximum instruction is to be obtained, according to the Training and Manœuvres Regulations, 1909, Section 5, by a close examination of operations from a selected campaign, rather than from a broad view of the leading incidents of many wars.

Applying this principle to military sanitation, I propose to briefly sketch to you the sanitary organization for war of our own Army, both in Europe and in India, and then to point out the methods which were adopted in the Russo-Japanese War, a campaign which is worthy of special study by soldiers serving in the East, as it is the first instance of an Oriental power defeating a European army by Western methods.

The organization of the sanitary service of an army in the field is laid down in the Field Service Regulations for the Imperial Army, and in a recent Indian Army order for the Indian Army.

These Regulations lay down as a fundamental principle that the study of sanitation and the preservation of health is incumbent on every officer and soldier. It is declared that the importance of sanitary measures, whereby health is preserved, cannot be over-estimated.

The commander of every unit and formation is responsible for the sanitary condition of the quarters and localities occupied by his command; and for taking all measures necessary for the preservation of the health of those under him. He is also responsible for seeing that each officer and soldier observes all sanitary orders, and also for the good order and cleanliness of that portion of a quarter or locality under his charge, irrespective of the period for which the latter may be occupied.

These regulations effectively break down the old notion that sanitation is a matter for the doctors, and show that the authorities fully realize that the rôle of the medical officer is essentially advisory, and that it is the soldier and his officer who are the executive sanitarians of military life.

It is the duty of the cleric to preach the Gospel, but the salvation of the individual must depend on his own exertions. Similarly the military surgeon can but preach the gospel of hygiene and rely on his executive brother officers for its practical application.

The personnel which will be concerned in the preservation of health of future armies is threefold :—

- (I) The Regimental Sanitary Organization of Field Units.
- (II) The Sanitary Organization on the Lines of Communication.
- (III) The Sanitary Inspection Committee.

Let us consider these *seriatim*.

(I) *The Regimental Sanitary Organization of Units in the Field.*—The sanitary service of field units is organized on the principle that every unit, through its commander, is responsible for its own sanitation and for the sanitary condition of any area it may occupy. For this purpose each unit is provided with a regimental sanitary detachment, drawn partly from the ranks of the Royal Army Medical Corps and partly from the ranks of the unit itself in the case of the Imperial Army, but entirely from the latter source in the case of the Indian Army.

The establishments of the regimental detachments of the Royal Army Medical Corps is as follows :—

For each Cavalry Regiment	1 N.C.O. and 2 men.
„ Infantry Battalion	1 „ „ 4 „
„ Field Artillery Brigade	1 „ „ 3 „
„ Horse Artillery „	1 „ „ 2 „
„ Howitzer „	1 „ „ 2 „
„ Mounted Infantry Battalion	1 „ „ 2 „
„ Field Company Royal Engineers	2 „
„ Divisional Ammunition Column	1 „ „ 3 „

The Sanitary personnel furnished from the fighting men of the unit itself is :—

Cavalry Regiment	1 N.C.O. and 8 men.
Infantry Battalion	1 „ „ 8 „
Horse Artillery Brigade.. .. .	1 „ „ 6 „
Field Company Royal Engineers and similar units.. .. .	2 „

The medical officer of each unit is responsible to its commander for the efficient performance of the work of the regimental sanitary detachment. The commander is, in his turn, required, by para. 71 Field Service Regulations, Part 2, to see that all ranks render loyal and intelligent assistance to the medical officer in the performance of his duties, and that

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the efficiency of the unit is not impaired through neglect or non-compliance with sanitary rules.

From this it is apparent that the medical officer of a unit is *primarily* a regimental officer of health, and *secondarily* an executive military surgeon, rendering medical and surgical aid in all the exigencies of war.

The regimental sanitary personnel of a unit should be formed from men specially trained, as they have to act generally as sanitary police, in order to prevent soil pollution, and *in detail* to supervise :—

(1) The preparation and care of latrines and urinals, including, of course, the proper filling in and marking of old sites.

(2) The systematic collection, removal and disposal of refuse by burning or otherwise.

(3) The construction of ablution places and the disposal of waste water.

(4) The sanitation of cooking places, horse and mule lines, and slaughtering places in the area occupied by the unit.

The duties of the Royal Army Medical Corps, rank and file, attached to a unit are detailed as follows in the Regulations :—

(1) The daily supervision of the water supply, and its purification for drinking purposes by boiling, filtration, or the addition of chemicals as may be directed.

(2) The charge of all apparatus and stores connected with the water supply of the unit.

(3) The supervision of the use of disinfectants in camp or quarters as may be necessary.

(4) The care of the sick of the unit until they are removed to hospital, the immediate removal and segregation of all cases of infectious diseases, and, if necessary, of "contacts."

In India we have no special Corps, such as the Royal Army Medical Corps, and therefore the duties performed by the Regimental Sanitary Detachments and the Royal Army Medical Corps, for water duties with Imperial troops are, as we have seen, performed in the Indian Army by Regimental Sanitary Detachments which are organized for peace duties in accordance with Indian Army Order, No. 354 of 1907. For war their personnel remains as in peace time, viz. :—

Regiment of Cavalry	1 N.C.O. and 1 man per squadron.
Battalion of Infantry	1 ,, ,, 1 ,, ,, company.
Other units	1 ,, ,, 1 ,, ,, unit.

Each detachment is under the orders of the medical officer in charge of the unit or of the medical subordinate in units without a medical officer. Its duties in war will be :—

(1) Supervision of water supplies, including the protection, purification, and distribution. Apparatus and chemicals required for these purposes will be in charge of each detachment.

(2) Supervision of food supplies, cooking, and slaughter places of their units, and disposal of waste water and refuse.

(3) Disinfection.

(4) Supervision of the ablution places of their units and disposal of waste water.

(5) Conservancy, refuse disposal, and cleanliness of their camps, including that of animals' lines.

(6) Acting as sanitary police.

Indian Army Order No. 780, of 1910, lays down that during an action the regimental sanitary detachment will assist the stretcher-bearers of the unit in the removal of the wounded and dead. This is special to India.

The work of supervising the regimental sanitary arrangements in the field will fall to the following special sanitary officers:—

(1) The Assistant Director (Sanitary) attached to the Headquarters of the Army.

(2) The Principal Medical Officer, assisted by the Medical and Sanitary Officer with the Headquarters of the Cavalry Division.

(3) The Principal Medical Officer, assisted by the Medical and Sanitary Officer with the Headquarters of the Infantry Division.

(II) *The Sanitary Service on the Lines of Communication.*—The sanitary service on the lines of communication is organized on a more elaborate basis than that for field units. It comprises:—

(1) Special sanitary officers. (2) Sanitary sections. (3) Sanitary squads (with the Imperial Army only).

(a) The sanitary officers are, invariably, officers of the Royal Army Medical Corps, who have specialized in sanitation, with, perhaps, the single exception of the sanitary officer of the Base.

(b) Sanitary sections have no permanent organization in peace.

With an Imperial Force the sanitary sections consist of one officer of the Royal Army Medical Corps and twenty-six rank and file of the Corps trained in sanitation.

With an army organized in India the personnel and organization of a sanitary section is as follows:—

	N.C.O.'s	Privates	Native establishment		
			Sweepers	Bildars	Bhisties
British ..	2	8	0	0	0
Indian ..	2	12	60	10	5
Total ..	4	20	60	10	5

Each section is divisible into squads as may be required. It will be commanded by a medical officer, but in certain circumstances, such as employment at the base of operations, two or more sections may be commanded by one medical officer.

Divisions and Independent Brigades furnish sanitary sections as follows:—

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Northern Army :—

1st (Peshawar) Division.. ..	3 Sections. Numbered 1 to 3
2nd (Rawalpindi) ,,	4 ,, ,, 4 ,, 7
3rd (Lahore) ,,	4 ,, ,, 8 ,, 11
7th (Meerut) ,,	5 ,, ,, 12 ,, 16
8th (Lucknow) ,,	5 ,, ,, 17 ,, 21
Kohat Brigade	1 Section. Numbered 22
Bannu ,,	1 ,, ,, 23
Derajat ,,	1 ,, ,, 24

Southern Army :—

4th (Quetta) Division	3 Sections. Numbered 25 ,, 27
5th (Mhow) ,,	4 ,, ,, 28 ,, 31
6th (Poona) ,,	5 ,, ,, 32 ,, 36
9th (Secunderabad) ,,	5 ,, ,, 37 ,, 41
Burma	3 ,, ,, 42 ,, 44
Aden Brigade	1 ,, ,, 45

The personnel of the sections will be taken from the non-commissioned officers and men of infantry units who have been trained in sanitation, in accordance with Army Regulations, India, vol. xi., paragraph 893, as amended by January Appendix 2, Indian Army Orders of 1910. Under the orders of general officers commanding divisions, all units will be informed of the number of non-commissioned officers and men they will be required to furnish on mobilization, and the section to which they will be posted. The sections to be formed in the three independent frontier brigades will be composed of Indian troops only. Commanding officers are responsible that the requisite number of trained men is always forthcoming. Any further practical training of the sections which may be necessary will be arranged by the general officers commanding divisions. Indian Army Orders lay down that the personnel of sanitary sections should be brought together and exercised during manœuvres, and a medical officer or officers appointed to command them.

(3) Sanitary squads consist of one non-commissioned officer and five men of the sanitary section of the Royal Army Medical Corps.

The sanitary squad is only organized for Home troops. It has no equivalent in an Indian Army.

For the purpose of sanitary administration the lines of communication are divided into :—

(1) Sanitary districts. (2) The base. (3) Sanitary posts.

As a rule, the base, railhead, and any specially important parts will constitute separate sanitary districts.

(1) *The Sanitary District.*—A specialist sanitary officer will be appointed to each district, and a sanitary section will be allotted thereto, which may be augmented from time to time, and supplemented by civilian labour as required.

(2) *The Base.*—The base will, of course, form the most important of these districts, and will be in charge of a special sanitary officer, who

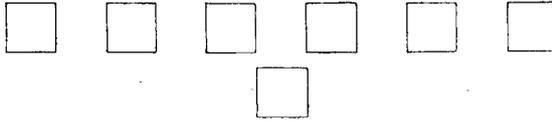
DISTRIBUTION OF SANITARY SERVICE IN THEATRE OF WAR.



Sanitary Officer with H.Q. Division.

Regimental Sanitary Squads and R.A.M.C., attached 3 per Regiment for Water Duties.

INFANTRY DIVISIONS.



Sanitary Officer with H.Q. Divisions.

Regimental Sanitary Squads and R.A.M.C., attached 5 per Battalion.

ARMY TROOPS.

HEAD QUARTERS OF THE ARMY.

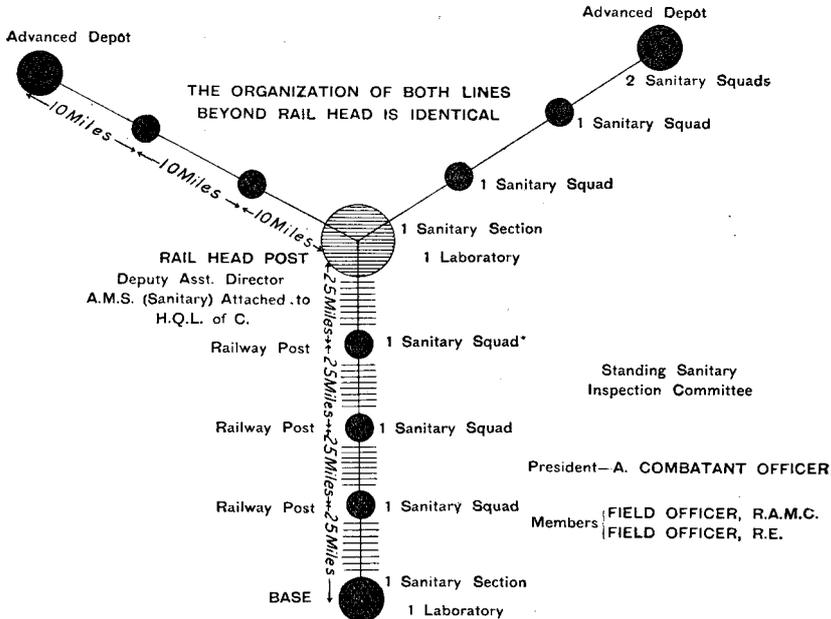


Assistant Director, A.M.S. (Sanitary) with Army H.Q.

Regimental or Company Sanitary Squads and R.A.M.C. for Water Duties, strength per Regiment as above, and at rate of 2 per Company for R.E., and similar units.



Regimental or Company Sanitary Squads and R.A.M.C. for Water Duties, strength per unit, as above.



may, especially where the base includes a large seaport, be aided by one or more assistant sanitary officers. He will be entrusted with the duties of port sanitary officer, with a view to preventing the introduction of infectious disease from transports, and he will arrange for the segregation of cases of infectious disease and of "contacts" when this last measure is considered necessary.

With an inland base in India, the sanitary officer would usually be the senior medical officer of the nearest cantonment.

(3) *Sanitary Posts*.—The responsibilities and duties of the military commandant of a section or post, sanitary officer, sanitary sections, and sanitary squads, are as follows:—

(a) *Duties of Commandant*.—The commandant is responsible for the sanitary condition of the area under his control, just as the commander of a field unit is responsible for the area occupied by the troops under his command.

(b) *The Duties of Special Sanitary Officer*.—The duties of a sanitary officer in charge of a district are analogous with those of the medical officer of health of a city or borough, and include the supervision of (1) food and water supplies; (2) the disposal of sewage and refuse; (3) disinfection; and (4) all measures necessary to prevent the introduction and spread of disease.

(c) *Duties of a Sanitary Section*.—With an Imperial Army a sanitary section corresponds to the personnel attached to the office of a medical officer of health in civil life.

The N.C.O. and men will act as sanitary inspectors and carry out skilled sanitary work, such as disinfection, and will also, in addition to the sanitary duties of civil life, act as sanitary police.

With Indian Forces, the duties of sanitary sections are laid down as follows:—

(i) Supervision of water-supplies, including their protection, purification, and distribution. Apparatus and chemicals required for these purposes will be in charge of each section.

(ii) Supervision of food supplies, cooking, and slaughter places, and disposal of waste water and refuse.

(iii) Disinfection.

(iv) Supervision of ablution places and disposal of waste water.

(v) Conservancy, refuse disposal and camp cleanliness, including that of animals' lines.

(vi) Sanitation of camps, of hired transport, camp bazaars, railway stations, camp and sites for troops passing through.

(vii) Sanitation of routes between camps and posts, and the disposal of carcasses, &c.

(viii) Carrying out sanitary schemes which are beyond the power of regimental sanitary detachments.

(ix) Acting as sanitary police.

On mobilization being ordered, or before this if necessary, General Officers commanding divisions will be informed of the number of sanitary sections to be furnished, the destination of each, and the required date of its arrival there. On receipt of these orders the requisite native establishment for each section will be entertained—preliminary arrangements for this having been already made by general officers commanding divisions—and the sections formed, equipped and dispatched under their own medical officers. On arrival at destinations the sections will at once assume such sanitary duties as may be ordered, and will receive any necessary transport.

It is of the utmost importance that sanitary sections should have everything in readiness before main bodies of troops, &c., arrive at the several camps, and they should therefore invariably proceed with the most advanced troops.

(d) *The Duties of a Sanitary Squad.*—A sanitary squad will:—

(i) Execute skilled work in connection with (a) disinfection, (b) the provision of pure water, including its collection, distribution and storage, and (c) construction of incinerators.

(ii) Supervise the work of permanent fatigue parties employed for conservancy or other work in connexion with sanitation.

(iii) Act as sanitary police. For this purpose the N.C.O's and men are invested with the authority of military police and wear a police badge.

(iv) Where a post has a railway station under military control the squad will exercise sanitary supervision over the water supply to troops passing through, and over the conservancy arrangements generally.

(III) *The Sanitary Inspection Committee.*—On the mobilization of a field force being ordered by the Army Council, a Sanitary Inspection Committee will be formed, consisting of:—

President: A Senior Combatant Officer.

Members: A Field Officer, Royal Engineers, a Field Officer, Royal Army Medical Corps.

This Committee will, in a general sense, perform duties similar to those of the Local Government Board of the United Kingdom in relation to sanitary matters.

Its President will receive the instructions of the Commander-in-Chief through the Director of Medical Services.

The functions of the Committee are defined as follows:—

(1) To assist commanders and the medical service in their efforts to maintain the health of the Army, not only by co-ordinating the work of the different military branches, but also by co-ordinating the military with the civil sanitary organization of the country or area it occupies.

(2) To initiate important schemes of general sanitation and to serve as a board of reference for the solution of sanitary problems.

(3) To visit and inspect stations occupied by troops, to advise local authorities regarding necessary sanitary measures, and to further in every way the maintenance of satisfactory sanitary conditions, reporting

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to the Director of Medical and Sanitary Services any measures they consider necessary, but which they cannot arrange to carry out locally.

(4) To ascertain what sanitary appliances and materials of all kinds are required for the Army, and that an adequate reserve of these materials and appliances are maintained.

No similar organization is provided for an army having its base in India.

Such is the present sanitary organization for both the Imperial and Indian armies.

These schemes have, of course, only been evolved since the South African War, and have yet to bear the test of experience.

So far as they can be judged, they provide for well-nigh perfect sanitary services in theatres of war.

An integral part of the system is, it will be observed, a specialized rank and file trained to carry out skilled sanitary work.

We will now consider the sanitary lessons to be learnt from a recent campaign in the Orient, and find that the methods of the Japanese in the war selected are well worth studying, as they secured such extraordinary immunity from disease, that while nearly twenty-two cases of sickness were admitted to hospital from the British forces in South Africa for each wounded man during a period of thirty-one months, only one and a half cases of disease were admitted for each wound from the Japanese forces in Manchuria during a period of eighteen months. (*Vide* the following table.)

Nature of comparison	Japanese Forces, Manchuria (1904-5) Period of 18 months	British Forces, South Africa (1899-1902) Period of 31 months
Admissions from wounds. Annual ratio per 1,000 mean strength	391·6	34·2
Deaths from wounds, including killed. Annual ratio per 1,000 mean strength	137·3	14·4
Admissions from disease. Annual ratio per 1,000 mean strength	589·6	727·0
Deaths from disease. Annual ratio per 1,000 mean strength	41·2	24·4
Admissions for enteric and dysentery. Annual ratio per 1,000 mean strength	47·6	138·7
Percentage of deaths from wounds amongst admissions for wounds	5·6	11·2
Percentage of deaths from disease amongst admissions for disease	5·8	3·3
Percentage of deaths from enteric fever and dysentery amongst admissions for enteric and dysentery	33·4	12·0
Proportion of killed to wounded (officers and men). Admissions only	1 to 3·4	1 to 3·6
Proportion of admissions for wounds to admissions for disease	1 to 1·5	1 to 21·8
Proportion of deaths from wounds, including killed, to deaths from disease	1 to 0·3	1 to 1·7

The first thing which strikes the student on considering the sanitary history of the Russo-Japanese War, and comparing it with the elaborate sanitary service which has been evolved for our own Army, both at home and in India, is that no such organization existed so far as we know with either of the armies in the great struggle in the Far East.

In the Field Medical Regulations of the Japanese Army there is no chapter which is specially devoted to the sanitary duties of the Medical Service, nor are there any specific paragraphs relating to these, except such as deal with the disinfection of trains and ships, and the manner of disposing of the bodies of those who have died from infectious disease (Medical and Sanitary Reports, p. 13).

Our sanitary information with regard to the two great armies involved is widely dissimilar as may be gathered from the facts, that out of forty-nine reports contained in the valuable volume of "Medical and Sanitary Reports," published by the War Office, forty-five deal with the Japanese and only three with the Russian Service.

Out of 571 pages of letterpress, 530 refer to the Japanese, and out of 107 maps and illustrations only one refers to the Russians.

Under the circumstances it is obvious that most of my remarks must refer to the Japanese Medical Service in the War, as our information with regard to the Russian Service is so meagre.

THE JAPANESE SANITARY SERVICE.

"The remarkable success of the Japanese in preventing disease in their armies during their war with Russia must be attributed, in large measure, to the fact that they accepted as a fact that their medical officers possessed superior knowledge of sanitary matters, and that having employed them as specialists in that line, they accepted their advice without question, gave the men, material and money, to carry out their suggestions and held them responsible for results."

The foregoing paragraph which I quote from the Address of the President of the Association of Military Surgeons of the United States Army, delivered at Washington in 1910, gives the keynote of such sanitary organization as existed in the Japanese Army.

Each medical officer, however employed, was an active and enthusiastic sanitarian, and the fighting men recognized him as such. He bound up their wounds, of course, when they needed it, and they were grateful for that service, but he taught them how to avoid getting sick, and they were far more grateful for that.

As no definite sanitary organization existed, the arrangements which were found so useful in the war with Russia may be considered under the following headings:—

- (1) The training of the individual soldier in sanitation.
- (2) The methods adopted to secure a pure water supply for the troops.

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(3) The methods adopted for securing cleanliness of the person, the camp, and the battle-field.

(4) The organization for securing the provision of sound food and suitable clothing.

(5) The methods adopted to prevent the introduction or spread of epidemics.

Let us consider these several headings:—

(1) *The Training of the Individual Soldier in Sanitation.*—The essential difference between the system in the Japanese Army, and that which existed at home prior to 1905, and in India up till little more than three years ago, was that each individual soldier was trained in sanitation. In his interesting Report dated May 17, 1905, Captain Vincent, of the Royal Artillery, says: "In the Army it is recognized that the most effective way of preventing disease is by teaching the men to look after themselves.

"In peace time every Saturday a medical officer of a battalion lectures to the men on disease, and tells them of the awful results of *not* taking sanitary precautions. In war time the same thing takes place at least once a month. (Indeed the Army Orders issued in May, 1905, directed that these lectures should take place *twice* monthly.) "In addition to this, the company and section officers pay great attention to the health of their men, and take every opportunity of talking to them on the subject. They tell them that it is a shameful thing for a soldier when fighting for his country to get ill, and *that disease is a far more dangerous enemy than the Russians.*

"They impress upon them that in war everything depends on the spirit, and if the spirit is weak, disease attacks" (Report No. 2).

The lectures and instructions to the men on sanitation referred to by Captain Vincent were generally intended to amplify a pamphlet which was issued to every Japanese soldier on mobilization, entitled "Health Memoranda for the Use of Soldiers in Time of War."

It consisted of a brief introduction and seven sections on the following subjects:—

- (a) Instructions regarding the care of the body.
- (b) Instructions regarding clothing.
- (c) Instructions regarding food and drink.
- (d) Instructions regarding marching.
- (e) Instructions regarding quarters.
 - (i) When quartered in houses.
 - (ii) When in tents and bivouacs.
- (f) Instructions for preventing diseases during the march.
 - (i) Frost-bite.
 - (ii) Sunstroke.
- (g) Instructions regarding infectious diseases.

The brief introduction is so much to the point that I venture to quote it.

It says: "Officers commanding regiments are responsible for the health of their soldiers; but each soldier must himself look after his own health. Thus the hygiene of the soldier consists, first, of that for which the commanding officer is responsible; secondly, that for which the soldier *himself* is responsible, and each must help the other.

"These are memoranda on personal hygiene and not on public hygiene. The soldier must read and remember them, and even during the most severe fighting he must do everything in his power to preserve his health."

The pamphlet consisted of thirty-nine pages, and company officers were directed to read it to their men frequently. In April, 1905, Colonel Macpherson reported that many men had lost their copies, but all non-commissioned officers possessed theirs.

The instructions with regard to the prevention of sunstroke and frost-bite, are remarkably clear and easy to follow, whilst those regarding infectious disease are equally good.

The following were the instructions for the prevention of infectious disease:—

(1) Infectious diseases have their origin outside the body, and on this account they should be easily avoided if proper measures be taken. The germs that cause them are living organisms, although they are too small to be seen with the naked eye. When they enter the body they develop rapidly and cause serious disease. The history of all wars tells us that the number of men who succumb to these diseases is greater than those killed by the enemy. All the staff officers take special precautions to prevent infection on this account, and the soldiers must help them by strictly following the instructions.

(2) Both in peace and in war, the chief infectious disease affecting soldiers is enteric fever. The germ of the disease enters the body with the food and drink. The first thing to do, therefore, is to eat and drink nothing that is not cooked. The germ also exists in the bedding and clothing, and in the dirt on the hands and fingers. Therefore the under-clothing must be kept clean, the outer clothing well brushed, and the hands must be washed before eating, if this is possible.

(3) The germs of dysentery and cholera also enter the body in the same way as the germ of enteric fever, therefore the same precautions must be taken. Unripe fruit is apt to cause dysentery, and must not be taken when dysentery is prevalent.

(4) Small-pox is still prevalent in China and Korea. Houses occupied by persons suffering from this disease must be avoided, even by those who are well vaccinated.

(5) Plague always enters the body through small cuts or sores. Therefore, when this disease is prevalent, do not neglect even the smallest cut, and the surgeon should be consulted regarding it. It is very dangerous at such a time to walk with bare feet. Gloves should also be worn.

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Rats and flies carry the disease germ, therefore keep them away from the food, &c.

(6) Malaria fever is given to men by mosquitoes. Mosquito nets must, therefore, be used where there is malarial fever.

(7) The venereal diseases are gonorrhœa, syphilis and soft chancre. They are contracted by intercourse with infected women. The prostitutes in China and Korea are full of infection; therefore avoid them, so that the world may not know your shame, nor your children suffer.

(8) There are several infectious diseases of the eye, but the most dangerous is trachoma or Egyptian ophthalmia. Men are attacked by these diseases by using washing basins and towels in common. This practice must, therefore, be avoided when such disease prevails. But when it is impossible to have separate basins, &c., rinse out the basin before using it. Anyone who touches his eye with the discharge of gonorrhœa will probably lose his sight. (Report 26.)

I think that you will all agree with me that these instructions are remarkably clear and concise.

(2) *The Methods adopted to Secure a Pure Water Supply.*—In his Report above referred to, Captain Vincent says: "I think that the extraordinary absence of sickness in this army is largely due to the fact that there have been none of the usual campaigning difficulties with regard to water."

Be this as it may, the authorities took no risks in the matter, and the Health Memoranda, above referred to, says that: "Uncooked food and unboiled water frequently contain the germs of disease and must be avoided.

"Although a soldier may have previously been accustomed to drink water from wells, pipe supplies, streams and springs without boiling it, he must acquire the habit in war of boiling water before drinking it."

Captain Vincent says that Japanese soldiers, if they cannot get tea, seem to be fond of hot water as a beverage, and for this reason water is not, as a rule, boiled in large quantities with a view to allowing it to get cold.

After the Battle of Mukden, Divisional Orders were published with regard to this subject, to the following effect:—

"Soldiers must boil water before drinking it. Any soldier who neglects to do so will be made a prisoner, and no excuse will be listened to. The means for boiling water must always be kept ready by the soldier himself. Stations will be formed at various places where boiled water may be obtained.

"Boiled water must always be kept at stations where the rations are distributed for the use of the men coming from units to draw rations." (Report 30.)

These "boiled water stations" were a feature of the campaign. They were formed in accordance with an Army Order, issued in May, 1905. (Report 30.)

Colonel Macpherson gives an account of one of these, which consisted of a Chinese fireplace and a cauldron in one of the temples: "Water was boiled here and benches placed in the yard for the soldiers to sit on and rest. The boiled water was placed in old beer and other bottles, and a notice was placarded up outside the temple saying, 'From 8 a.m. to 8 p.m. tea may be obtained here.' In other words, the boiled water distribution station had been converted into a tea house, such as is found on the roadside anywhere in Japan.

"The tea was supplied by the *intendance* officer of the battalion, whose duty it was to maintain the water station. Many similar stations have been established in accordance with the orders on the subject, and they are all much of the same character. No special apparatus is used for boiling the water, and the arrangements are of an improvised nature." (Report 31.)

The quantity of tea issued was small and was used over and over again, so that although a man was said to be drinking tea he was practically drinking hot water.

Not only was all drinking water boiled, but when cholera was feared, an order was actually published in May, 1905, saying that "All water used for brushing the teeth must be boiled or passed through an *Ishiji filter*." (Report 27.)

The *Ishiji filter*, which was a special Japanese invention, was only issued after the army had been fourteen months in the field. It consisted of a canvas cone on a metal ring with two outlet sleeves, let in midway between the apex and middle of the cone. These sleeves acted as outlets for filtered water, and each contained a metal cylinder filled with granulated charcoal and a sponge.

The water to be filtered was mixed with two powders. One consisted of aluminium silicate and permanganate of potash, and the other, which was added after the water had been thoroughly mixed with the first named powder, consisted of aluminium silicate and hydrochloric acid.

This apparatus was said to give excellent results, but it may be practically disregarded as a safeguard against water-borne disease, as it was only introduced quite late in the campaign, so that we may say that what has been appropriately called the "tea-kettle policy" was relied on throughout the severest stress of the war.

The manner in which the Japanese soldier observed this policy, almost like a religious observance, may be gathered from the following note by Colonel Macpherson: "On my march up to join General Nogi I had a small escort of cavalry soldiers with me. On arriving at the Liao River I decided to lunch on its banks. The water in the river was not inviting, but I would have drunk it and so would any British soldier. Not so the Japanese. One of the cavalry men collected all our water-bottles, got on his horse and rode back some quarter of a mile to the *etappen station*, where he knew he could find boiled water, and there filled them and returned." (Report 22.)

The same officer, referring to the sentries, who we are told were posted on wells not fit for drinking purposes, says that: "Those responsible trust a great deal to the common sense of the men themselves, and to the careful instructions they have received in (sanitary) matters in peace time.

"All this, coupled with the good influence of the older soldier, has the desired effect. However, that some men will, when thirsty, try and get water anywhere they can, I have ample proof. A battalion passed through a village in which we were quartered.

"The men had evidently marched a long way, and were hot, thirsty, dusty and tired. In passing a well, in which I know the water was not good, some of them tried to fill their water-bottles, and would have done so had not their company officers prevented them." (Report 32.)

With drinking water, as with everything else, the responsibility of seeing orders complied with comes down to the company commander.

The manner in which he performs his duties was gauged in the campaign by carefully kept statistics.

In other words the efficiency of a Japanese captain was judged not merely by his valour in leading his men against the Russians, but also by his ability to keep them on the alert against more insidious and formidable enemies in the form of disease germs.

(3) *The Methods adopted for Securing the Cleanliness of the Person, the Camp and the Battlefield.*—(a) *The Person.*—Japanese soldiers are naturally very clean in their habits, and Captain Vincent tells us that during the campaign they always contrived to bathe every other day even in the coldest weather.

In the Health Memoranda it was pointed out to them that even such trivial complaints as whitlow, boils and toothache reduce the fighting power of an army. These occur most frequently from the soldier being too lazy to clean himself.

He must, therefore, be careful to cleanse every part of his body even in the field. Specific instructions were given as to carrying out these orders, and especially the necessity for cleansing the hands in war time was emphasized. "Dirt under the nails," the men were told "often contains the germs of disease. The nails must, therefore, be cut short at suitable times, but they should not be cut too close, otherwise inflammation under the nails is apt to occur."

(b) *The Camp.*—We have all heard of the Japanese belief that their ancestors hovered round their camp fires and that, therefore, the camps should be kept in a state worthy of visits from these sainted relations.

This may have had something to do with it, but certainly there appears to be no doubt that cleanliness of environment was, equally with cleanliness of the person, a leading characteristic of the Japanese soldier throughout the war. Colonel Macpherson says "Anyone who has seen a Chinese village in its natural state knows what a collection of filth and dirt it represents.

“ Well, in all villages in which the Japanese soldiers were quartered cleanliness had completely ousted such a horrible state of things.”

(c) *The Battlefield*.—There are two principal sects in Japan; one of these cremates its dead, but the other enjoins burial.

In the field, however, all corpses were cremated on sanitary grounds, but in order not to offend the religious scruples of the enemy, the Japanese did not cremate the bodies of Russians except in the case of infectious disease.

The method of cremation adopted was to lay the corpses on a pyre, and cover them with wood or branches of trees, pour petroleum over them, and set fire to the whole structure.

There can be little doubt that cremation is far more sanitary than the hurried burial which has formed the means of disposal of dead in European wars, and that its adoption contributed very considerably to the cleanliness of the battlefields in the Far East.

(4) *The Methods adopted to Secure Sound Food and Suitable Clothing*.—(a) *Food*.—The Japanese soldier was told in the Health Memoranda, to which I have previously referred, that food is the source of bodily strength. In war the body is especially in need of strength, and therefore more food must be taken, as in consequence the soldier marches better, can stand cold better, and resists disease better.

Excess must of course be avoided, and when the body is fatigued or hot after exercises it is best to wait a little before eating.

Flies he was told are the chief intermediaries in spreading cholera and he was, therefore, not only to take every means to destroy them, but to actually avoid food on which flies had settled. If he was obliged to eat such food, he was told to cook it over again.

All eatables offered for sale to the troops had to be passed by medical officers as fresh and free from parasites, and kept protected from dust and flies.

All articles of food were required, by Army Order of May, 1905, to be cooked.

Lieutenant-General C. J. Burnet, C.B., reports that the food of the Japanese soldier was good, plentiful and varied, and both tea and tobacco being weak the men's nerves were not affected by their excessive use.

“ The men all take it in turn to cook, but as the cooking is so simple there is no difficulty in this.

“ I noticed that all guards have their meals cooked at the kitchen nearest their post.

“ From the highest to the lowest, the greatest attention is paid to the feeding of the men. A General who has had much to do with conducting the affairs of the whole Japanese Army now in the field has recorded his opinion that he considers the great attention which has been given to the proper feeding of the men has, as much as anything else, contributed to their freedom from sickness. The Japanese

thoroughly realize the principle that prevention is better than cure." (Report 41.)

(b) *Clothing*.—Perhaps the most explicit and detailed of the Health Memoranda issued to soldiers were those relating to clothing.

They pointed out that the chief effect of clothing is to prevent cold and that the principal article to be used for this purpose was the greatcoat. The soldier was instructed how to take care of it and also that it was as necessary to keep the underclothing as clean as the body itself, as the shirt, drawers and socks absorbed dirt from the body and must, therefore, be frequently washed.

Footwear came in for special consideration as the Memoranda declared that "the military boot is to the infantryman what the horse is to the cavalryman. It must, therefore, be kept as carefully as the horse."

Special instructions with regard to socks were given, and the necessity for having them sound and 'in good order was insisted on. Where they became worn out and could not be replaced the Continental plan of using bandages as a substitute was recommended.

Lieutenant-Colonel Hume, D.S.O., of the Royal Artillery, has submitted a special report on the clothing which is worth reading by all concerned with the clothing of soldiers. The summer clothing has apparently small claim to call for special mention, but the winter clothing is described as excellent, and Colonel Hume considers that it was "largely due to its good quality that the men have been practically immune from the effects of the cold." (Report 43.)

Mosquito nets were used and supplemented by mosquito head nets or veils which were worn as a protection against flies and mosquitoes. (Reports 22, 23.)

An abdominal sash or cholera belt was insisted on as an essential article of clothing at all times.

(5) *Special Methods adopted to Prevent the Introduction of Epidemic Diseases either into the Army or the Home Territory*.—There can be little doubt that the arrangements for the prevention of epidemic disease in the Japanese Army were very complete.

The Regulations provide that where an outbreak exists, or is anticipated, the Officer Commanding the Station will appoint a Committee to undertake the whole matter of preventing the introduction of the disease or its spread.

The Committee consists of :—

- (a) Two senior medical officers.
- (b) One regimental officer.
- (c) One *intendance* officer if necessary.

The Regulations make provision for the establishment of infectious disease hospitals with four classes of wards.

- (a) For suspected cases.

- (b) For light cases.
- (c) For severe cases.
- (d) For convalescents.

Elaborate rules for disinfection were laid down and no detail necessary to ensure the complete destruction of disease germs in and on the patient and his surroundings were overlooked.

All corpses of infectious cases had to be carefully disinfected and the orders were that they should be burned where possible. Burning, steaming and boiling were the disinfecting agents chiefly relied on, but, where these were impracticable, mercuric chloride 1 in 1,000, 20 per cent. carbolic acid, and quick lime were the chemical agents most in favour.

Not content with safeguarding the troops in the field, the Army Medical Service established quarantine stations to safeguard the Home Territory.

Lieutenant-General Ishimoto in his instructions with regard to the stations pointed out, with pardonable pride that during the eighteen months of the War, the Army had been so fortunate as to escape contagious and infectious disease and that it would be "a deplorable circumstance if the troops returning from the front brought back any epidemic disease with them thereby sacrificing in vain the lives of those who had returned crowned with success. Moreover such a disaster might spread to their units, and from their units to their homes, and from their homes to their towns and villages, and lastly to the country itself. Consequently all officers, men and civilians were asked to bear in mind the object aimed at, and subject themselves to quarantine examination and disinfection in accordance with the instructions, endeavouring thereby to ensure, on the one hand, the safety of their own persons and on the other, prevent their countrymen falling victims to camp epidemics.

These quarantine stations provided for the disinfection of the entire kit and equipment of the soldier and the provision of a hot bath for each individual. The organization was so complete that a whole battalion was passed through the quarantine station in four hours. Officers went through the same process as their men, but had separate baths and waiting-rooms.

There were three of these stations established in connexion with the great ports of Japan, the largest and most important of which had a staff of over 800 officers and men.

With this brief reference to this special institution of the Japanese to protect themselves against their own soldiers, I must pass from this sketchy account of the Japanese methods of preventing diseases in the Army in the field to a brief consideration of

THE RUSSIAN SANITARY SERVICE.

With regard to the Russian Army we have, unfortunately, very little information to go on.

250 *Sanitary Organization of Imperial and Indian Armies*

In a report by Major J. M. Home, 2nd P.W.O., Gurkhas, we learn that a selected combatant officer on the staff of the Commander-in-chief was designated Chief Sanitary Inspector of the Manchurian Army. Under his orders was a Surgeon-General, who was responsible for the preservation of the health of the Army.

The Surgeon-General dealt with a sanitary department, which was apparently distinct from the medical department. He was also the head of the veterinary service.

Directly under his orders were two military hygienists who reported on all hygienic measures. One of these was at Harbin and the other with the Army in the field. There was also a civilian bacteriologist under orders of the Surgeon-General.

Each Army corps had a corps surgeon, and sometimes a corps sanitary officer. The latter was responsible for the supply of food, horses, carts, personnel, &c., and generally for sanitation, but he had nothing to do with the treatment of sick and wounded.

Each division had a chief surgeon with a sanitary inspecting officer, but the latter was apparently mainly responsible for the routine administrative work.

Major Home informs us that five special sanitary and ten disinfecting detachments were formed.

Each detachment was to consist of four bacteriological specialists and to be furnished with a laboratory in which the most minute bacteriological investigations could be carried out. Presumably the detachment had a personnel in addition to the specialists, but the report is silent on this point.

These detachments were all stationed on the railway south of Harbin.

In the event of any doubtful case of epidemic disease occurring the nearest sanitary detachment would proceed to the spot, carry out the necessary bacteriological investigations and preliminary disinfecting measures.

A disinfecting detachment would immediately follow the sanitary detachment, and if the bacteriological investigations showed the existence of a serious infection it would carry out the more serious disinfecting measures.

It was proposed to employ these special detachments, if not required for their legitimate work, in examining and taking measures for purifying water which the Army had to use for drinking purposes (Report 46).

Colonel Waters, of the Royal Artillery, in a special report on the health of the Russian troops, says that he was told "that the health of the Army had suffered very considerably, partly on account of exertion and exposure and partly owing to polluted water and the utter absence of any sanitary arrangements whatever."

He concludes his interesting report as follows: "I had originally expected that there would be a terrible amount of sickness, but after

living with average troops for several months, I believe that the losses due to this cause were small, notwithstanding the great hardships, foul water and utter absence of any sanitary arrangements."

The last phrase of the Report is the one with which we are most concerned.

Having detailed to you the elaborate precautions of the Japanese the "utter absence of any sanitary arrangements" in the lines of their European antagonists is a matter that speaks for itself.

In the Russian Army the proportion of sick to the wounded was one man wounded to four or five admissions for disease, whereas in the Japanese Army the proportion was 1 to 1.5 or nearly four times as good.

We did better than the Russians in South Africa, so we have nothing to learn from their sanitary story in Manchuria.

We have, however, great and important lessons to learn from our Japanese allies. Briefly stated they are these:—

(1) The Japanese experienced the horrors of war due to the careless sanitation during their campaign with China. They profited by the lesson, and at once drew up simple and suitable rules for the guidance of their soldiers as to the preservation of their health in the field.

(2) These rules and regulations had been so inculcated into the minds of all concerned that they had become household words with them.

(3) The individual soldier had been made to understand that he is only of use to his country when fit and well. That if sick, not only is he useless, but he is an encumbrance.

(4) The national spirit had been so fostered that he would not allow any indulgence or neglect of rules to impair his fighting efficiency.

(5) Lastly, but perhaps most important of all, the older soldiers had been trained to keep the few waverers in the right way.

Colonel Macpherson, to whose reports, not only the present writer, but the whole Army is indebted for our knowledge of the sanitary aspects of this remarkable campaign, concludes that when you once get the ranks of an army imbued with these lessons, you have no need for the constant supervision which under existing circumstances is essential in our own Army both at Home and in India.

When all European and Indian officers and men realize, as the Japanese did, that sanitation is the first essential of an army in the field, and that training in sanitary details is every whit as important in peace time as training in other military exercises, I venture to predict that in future campaigns we shall hear no more of the so-called Sanitary Scandals of War.

